NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

UNIVERSITY OF ALBERTA

THE EFFECTIVENESS OF TWO STAGES OF WELLNESS INTERVENTION UPON RCMP OFFICERS IN THE VICTORIA SUB-DIVISION

by

Wayne G. Pealo

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PHYSICAL EDUCATION AND SPORT STUDIES

EDMONTON, ALBERTA
SPRING 1991

ISBN 0-315-66777-X

NATIONAL WELLNESS INSTITUTE, INC.

December 5, 1990

Wayne Pealo
Malaspina College
Vancouver, B.C.

Dear Mr. Pealo,

Your request to obtain permission to include a copy of the LAQ in the appendices of your dissertation is hereby granted. We are looking forward to receiving a copy of the final results of your study.

Sincerely,

Linda R. Chapin, DDS, MS
Director of Operations
NATIONAL WELLNESS INSTITUTE

INNOVATION IN
NUTRITION
EDUCATION
B.C. DAIRY FOUNDATION

Dec. 10, 1990.

Mr. Wayne Pealo
University of Victoria
Box 1700
Victoria, B.C.
V8W 2Y2

Dear Wayne:

The B.C. Dairy Foundation is pleased to give permission for the inclusion of copies of "FoodTrack - Nutrition by Design" and the finetuners, "Fibre", "Caffeine" and "Light" in your Doctoral Dissertation.

Good luck with this. We would very much like to have a copy.

Yours sincerely,

G. Ackhurst (per: fw)

Gillian Ackhurst
Coordinator
Nutrition Education

GA:LH

Tel 204-3775

MORTON PUBLISHING COMPANY
925 W. KENYON AVE., UNIT 12
ENGLEWOOD, CO 80110
(303) 761-4805

November 29, 1990

Wayne Pealo
Box 220
Shawnigan Lake
British Columbia
V0R 2W0

Dear Mr. Pealo:

In reviewing your request to reprint information from our text, "Behavioral Guidelines for Health and Wellness" by Hafen, Thygerson, and Frandsen, we will give you permission as long as proper credits are given in the footnote.

Sincerely,

Ruth Horton

Ruth Horton
Manager

UNIVERSITY OF ALBERTA

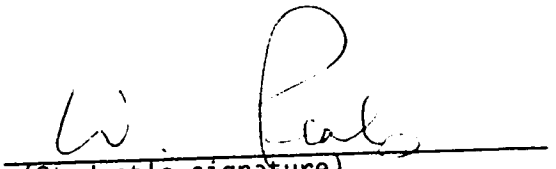
RELEASE FORM

NAME OF AUTHOR: Wayne G. Pealo

TITLE OF THESIS: THE EFFECTIVENESS OF TWO STAGES OF WELLNESS INTERVENTION UPON RCMP OFFICERS IN THE VICTORIA SUB-DIVISION

DEGREE: DOCTOR OF PHILOSOPHY

YEAR THIS DEGREE GRANTED: 1991



(Student's signature)

2400 Ravenhill Road
(Student's permanent address)

Shawnigan Lake, B.C. V0R 2W0

Date: Jan 22/91

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled THE EFFECTIVENESS OF TWO STAGES OF WELLNESS INTERVENTION UPON RCMP OFFICERS IN THE VICTORIA SUB-DIVISION submitted by Wayne G. Pealo in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

Dr. R.A. Faulkner

Dr. H.A. Scott (Supervisor)

Dr. H.A. Quinney

Dr. M. Collis

Dr. L. Wankel

Dr. R.G. Glassford

Dr. R.B.J. MacNab

Date: Nov. 19, 1990

Dedication

I dedicate this work to my family. My spouse Karen, daughters Caitlin and Danielle; my parents George and Eva, and my sister Carrie, who all provided me with enthusiasm and wisdom to see this project through to the finish. And to the Lord, who provided me with courage and understanding during the difficult times.

Abstract

The purpose of the study was to examine the effectiveness of a wellness program, featuring two stages of intervention (fitness and nutrition), on RCMP officers over a six month period. The research attempted to answer the following questions:

- What are the fitness and wellness characteristics of RCMP officers?
- Can an organized, wellness intervention program alter the fitness and wellness of RCMP officers?
- What is the relationship between health-related fitness and wellness in the officers?
- Can the Lifestyle Assessment Questionnaire reflect health, fitness and wellness changes in RCMP officers?

One hundred and fifty officers from the Victoria subdivision were selected from the thirteen detachments using matching techniques and randomly assigned to the research groups. The Lifestyle Assessment Questionnaire was used to measure individual well-being in the officers and a fitness test battery was selected to assess the health-related aspects of officer fitness.

The experimental group received six months of fitness intervention and the additive effects of three months of nutrition education. The control group received only testing. The following conclusions were made as a result of the investigation:

- The RCMP officers perceived themselves as having good health attitudes and behaviors, yet their physiological and wellness profiles demonstrated they were below average or poor in several health-related and wellness variables.

- The Wellness Intervention featuring fitness and nutrition education suggested a trend towards improvement in the fitness and wellness of both research groups in the Victoria subdivision over a six month period.
- A positive relationship existed between health-related fitness and wellness in the RCMP officers in the Victoria subdivision.
- The Lifestyle Assessment Questionnaire appears to have reflected changes in officer well-being. However, several changes are necessary to improve the effectiveness of the instrument in law enforcement populations.
- The adherence problems of RCMP officers are similar to those in community and corporate settings.

The research provided insight into some of the unique problems experienced with the implementation of wellness intervention in law enforcement agencies.

Acknowledgement

I would like to express my sincere thanks to the members of my doctoral committee for the time and effort in the development of my program. I would particularly like to acknowledge Dr. Howie Wenger for his guidance and inspiration with the development of the research project and for being a great scientist and human being.

A special thank you to the staff and graduate students of the Fitness Testing Centre at the University of Victoria, Corporal Rick Vincent, the RCMP officers of the Victoria subdivision, and the consultants at the Cornett Statistics Centre at the University of Victoria.

Table of Contents

List of Tables

List of Figures

Chapter 1

The Problem

"When a man dies he dies not so much from the disease he has, he dies from his entire life."
Dr. K. Cooper

Introduction

There has been growth in wellness programs for the monitoring and enhancement of employee health and lifestyle in the past decade. Wellness has been defined as a dynamic state of full and effective living (Dunn, 1961). This definition has prompted researchers to examine this concept in a number of disciplines. Physical fitness and health screening programs have become popular amongst many law enforcement agencies in the United States and Canada (Fraser, 1986; Drews, 1984; Goldstein, 1983; Charles, 1982; Wood and Associates, 1982; McNeil, et al. 1982; Bahrke and Olin, 1981; Sarason and Associates, 1979; Bonney, 1979; Price, 1979). With the increase in programs comes the requirement to determine the effects on personnel, attributed to wellness programs.

Research has been directed at identifying the effects of health related physical fitness programs upon officers. Benefits have included an increase in aerobic power (VO_2 max), decreased resting heart rate, decreased body fat, as well as an indication that the programs produce desirable results, that is, they are effective and worthwhile (Gettman, Pollack, Ward, 1983; McNeil, Prentice, Servatius, 1982). Fraser (1986) reported a decrease in physical performance with age and that police personnel would need up to two years in an organized intervention program to achieve wellness/ lifestyle goals. Furthermore, Price (1978)

reported that officers were lower in work capacity when subjected to a physical functioning test, and that with the implementation of a fitness program, positive physiological changes were observed. Higher ratings in self-concept and improved agility were also observed in older officers.

The increase in health care costs has escalated at an alarming rate (Baun, 1986; Elias, 1986; Green, 1986; Patton, Cory, Gettman, Schavee, Graff, 1986; Bowne, 1984; Parkinson, 1982). Fraser (1986) stated "In nearly every incidence of disease associated with poor physical fitness, law enforcement officers fair worse, particularly in the areas of coronary heart disease and lower back problems." Police work is a very stressful occupation involving personal danger, challenge and anticipation. Police rate high in a variety of risk factors including cardiac disorders, suicide, and depression (Sarason and Associates, 1979). These identified problems suggest a broad based, wellness program could be beneficial to this unique population.

Exercise programs are one dimension of a comprehensive wellness process. Much research to date has been directed at examining this single dimension (Fraser, 1986; Gettman, 1983; Bahrke and Olin, 1981). Other wellness dimensions include nutrition, stress management, substance abuse, environmental sensitivity, spirituality, and medical health education (Hoeger, 1988; Ardell, 1985). In examining health problem development, law enforcement agencies have focused narrowly in their attempts to resolve the health problems related to police officers. The efforts to identify physiological changes in police personnel have been well documented. However, no attempt has been made to examine the effects of a multi-staged wellness program upon the

well-being of police officers. There is a need to determine if implementation of a wellness intervention will help enhance some of the positive behaviors undertaken by personnel in law enforcement agencies.

Green (1986) identified health promotion as "any combination of health education and related organizational, economic and environmental supports for action conducive to health." He further identified two primary concerns which need to be examined in the evaluation of health promotion research.

1. Do health promotion programs produce positive actions (behaviors, lifestyles)?
2. Do people who change their behavior or lifestyle as a result of exposure to health promotion programs, have positive outcomes compared to others?

The Problem

The study examined the effectiveness of a wellness program, featuring two stages of intervention (fitness and nutrition), on R.C.M.P. officers over a six month period. The research attempted to determine the nature and extent of:

1. The health and wellness status of R.C.M.P. officers in the Victoria Sub-Division.
2. The relationship between:
   (a) The health related fitness variables, and
   (VO_2 max, grip strength, push ups, curl ups, sit and reach, adiposity, weight, sum of skinfolds).
   (b) Wellness characteristics
   (physical wellness, exercise, nutrition, self care,

vehicle safety, drug use awareness, social wellness, emotional awareness, emotional management, spiritual wellness, occupational wellness, overall wellness).

3. The effectiveness of the Lifestyle Assessment Questionnaire to reflect changes in well-being in a law enforcement population.
4. Changes in officer fitness, and wellness as a result of the staged wellness program.

Research Questions

The study attempted to answer several research questions:

1. What are the fitness and wellness characteristics of RCMP officers?
2. Can an organized, wellness intervention program alter the fitness and wellness of RCMP officers?
3. What is the relationship between the health-related fitness variables and the wellness characteristics in the officers?
4. Can the Lifestyle Assessment Questionnaire reflect health, fitness and wellness changes in RCMP officers?

Sub-problem. Do those officers who participated in the wellness program have lower absenteeism rates than those who do not participate?

Definitions

There are several terms associated with the health and wellness area which were defined for the purpose of achieving a common understanding in the thesis.

1. **Employee health, fitness and lifestyle programs** are designed to enhance the well-being of an individual through a

combination of educational, fitness and lifestyle experiences.

2. **Wellness** is perceived as a dynamic way of life in which good health habits are incorporated into one's lifestyle to improve both health and the quality of life (Johnson, 1986). The term is used interchangeably with "well-being."
3. **Health promotion** is part of a broad spectrum encompassing all of the health services and activities which are aimed at individuals with the intent of helping them to achieve maximum health (Elias and Murphy, 1986).
4. **Holistic health** is the treatment of illness conditions with modalities, therapies, and emphasis on varied forms of treatment of a non-drug, non-surgical nature (Ardell, 1983).
5. **Health related fitness programs** are designed to improve the fitness level of an individual through a variety of fitness activity. Emphasis is upon the health related aspects of fitness, cardiovascular fitness, strength, endurance, flexibility and body composition.
6. **Lifestyle** is the way in which a person lives from day to day, and includes existence, subsistence and leisure time.

Delimitations of the Study

1. The research was confined to R.C.M.P. officers from the Victoria subdivision who volunteered to participate in the study.
2. Medical health screening by a licensed physician was used to identify any subjects who were high risk and should not take part in exercise testing or a vigorous physical fitness

program. Specific criteria for the high risk classification is discussed in Chapter 3.

3. The Lifestyle Assessment Questionnaire (LAQ) was used to measure the wellness characteristics in the officers.

Limitations of the Study

1. The generalisability of the study was limited to the R.C.M.P. officers of the Victoria subdivision, and the thirteen detachments which comprise the subdivision.
2. The study was limited by the reliability and validity of the instruments used for gathering the data. Specific test protocols and test validation are discussed in the methodology.
3. The study was limited by the skills of the research team in administering the fitness tests, lifestyle assessment questionnaire, medical health screening, descriptive questionnaires, and the interview questionnaire. The research team training and protocols are discussed in the methodology.
4. The study was limited by the reactive effects of the pretest and experimental procedures. The process of pretesting and having the officers exposed to observers and testing equipment every three months may have limited the generalizability of the research findings.

Significance of the Study

Much of the research to date in the law enforcement field has been directed at the implementation of physical fitness programs and

the benefits derived from these programs (Fraser, 1986; Gettman, 1983; McNeil, 1982; Bahrke and Olin, 1981; Sarsson, 1979; Bonney, 1978; Price, 1978). Benefits have included increased aerobic functioning, higher self-concept, improved endurance and a drop in body fat percent and resting heart rate. Also identified in these studies were problems in poor fitness perceptions in officers, low participation in aerobic exercise, and high absenteeism rates amongst officers. However, to date few agencies have examined the effects a wellness program, featuring fitness and nutrition, could have upon the well-being of police officers.

Gettman (1988) reported that the high risk nature of police work presents some unique behavioral problems for researchers to examine. He identified difficulties in officers relating to exercise programs, and little initiative to stay fit, regardless of the physical demands of this high risk occupational group. Since the reported success of fitness programs upon this population has been well documented, it is important to examine a much broader, cross sectional approach to resolving some of the unique problems. A wellness approach would provide a shift in emphasis which focuses on total well-being and not physiological effects.

Finally, Green (1986) identified several concerns with respect to the evaluation of health promotion problems. Of utmost importance is the need to identify actions and behavioral changes as a result of lifestyle and health promotion interventions. The "primary" question which this research project addressed was: Do officers who modify their lifestyle through the wellness program practise measurably healthier lifestyles compared to other officers?

Chapter 2

Review of the Literature

Introduction

The relevant literature in the area of health promotion and wellness programs is described in three major themes. They are:

1. Employee health, fitness and lifestyle programs
2. Evaluation of employee health, fitness and lifestyle programs
3. Health, fitness, lifestyle programs and law enforcement agencies.

The growth in employee health, fitness and lifestyle programs experienced by large corporations, government departments, and other agencies during the eighties has been a direct attempt to determine the benefits of such strategies. Law enforcement agencies have been slow in responding to this trend, and have focused mainly on the physiological benefits derived through fitness programs. Furthermore, research has identified several unique problems specific to police populations. One specific problem has been the lack of initiative demonstrated by police officers to stay in good health, regardless of the importance of well-being to perform job-specific tasks. Police officers have also been identified as being high risk with respect to cardiovascular disease, suicide, and other health related maladies. There has been little research documented which has tried to address some of these problems and the effects a broader, wellness strategy might have upon this population.

The importance of program evaluation has been a developing theme in employee health, fitness and lifestyle programs. As programs develop

so does the need for accountability and documentation of program effects. Much energy has been directed towards research studies which answer questions with regards to the direct benefits to the company and the individual through participation in health promotion strategies. Does productivity increase, does absenteesim drop, and does the overall lifestyle of an individual change in a positive fashion? What are the costs and benefits to the company? These questions and more can only be answered through well-planned and rigorous evaluation.

The development of wellness strategies in Canada is still in its infancy stages. There have been few attempts to examine the overall effects on well-being which may result from a broad based program. Furthermore, within law enforcement agencies in Canada, there has been no research which has attempted to identify the health status and well-being of police personnel. Similar to the United States, attempts have been narrowly directed towards the physiological area.

Current Trends in Employee Health, Fitness and Lifestyle Programs in Canada

There are two distinct approaches to health, fitness and lifestyle programs being implemented in Canadian companies and institutions. These are the health promotion approach, and the employee fitness approach. The health promotion approach emphasizes a broad based program which through educational, organizational, and environmental activities, is designed to support behavior conducive to

approaches attempt to increase the well-being of the employee, with the end result of improved health for the employee, and increased benefits for the company. Many Canadian companies have been identified for program excellence using these models and include: Abitibi Price, Inc. (Toronto), Esso Resources Canada Ltd. (Calgary), The Canadian Wheat Board (Winnipeg), British Columbia Telephone Co. (Vancouver), Canada Life (Toronto), Crossley Karastan Carpet Mills Ltd. (Truro), Alcan Chemicals and Smelters (Jonquiere), Nova (Calgary), Mobile Oil Canada (Calgary, Shoppers Drug Mart (Moncton), and the University of Alberta (Edmonton) (Rudnicki, Glassford, Burgess, 1986). All eleven organizations have varying degrees of program design and implementation and have received awards of excellence from Fitness Canada.

The Employee Fitness Approach

Much attention has been directed at increasing the physical fitness levels of employees in companies throughout North America. The emphasis of many programs has been aimed at the reduction of health care costs and improved worker performance (Howard and Mikalachki, 1979; Carroll, 1980; Shephard, Cox, Corey, 1981; Pollack, Foster, Salisbury, Smith, 1982; Bowne, Russell, Morgan, Optenberg, Clark, 1984; Baun, Bernacki, Tsai, 1986; Seaward, 1988).

Physical inactivity has been shown to be a contributing risk factor in various maladies including cardiovascular disease, obesity, and musclo-skeletal problems (Carroll, 1980). He further suggested that the justification for providing employee fitness programme benefits at

justification mirrors many of the other attempts to quantify the benefits of physical fitness and activity. Carroll identified the leading morbidity causes in terms of "time lost at work" as arteriosclerotic and degenerative heart disease, arthritis and rheumatism, gastric ulcer, musclo-skeletal problems and occupational accidents.

This descriptive and narrative work provided an overview of the status of employee fitness programs in Canada. It further suggested several challenges which Carroll believes need to be addressed in the future, including:

1. effecting positive health development through health promotion and preventative health strategies.
2. training of effective fitness and lifestyle leaders; and
3. development of effective fitness and lifestyle programme methodologies.

His focus on research methodology identified the problem of applying theory and knowledge to practice as being paramount in the future. The suggested direction includes more research involving "holistic educational approach," integrating four lifestyle areas (nutritional awareness, stress management, physical fitness and environmental sensitivity). The suggestion of combining these four and other health intervention strategies with a physical activity programme at the workplace provides future directions for research in the health and fitness area.

The expected outcomes for organizations implementing physical [illegible] for competent people to

company, and the provision of the development of social activity for the non-work aspects of employees lives (Howard and Mikalachki, 1979). The focus of the research was on the relationship of exercise and fitness to productivity. The study utilized an experimental design with matched control group. However the matching process was not specified in the article. This weakness does not allow the reader to fully understand the logistics of the investigation. There was also no description of the methodology utilized for the study.

Reported findings included a significant improvement in fitness over the six months in the exercise group, while the control group experienced no change in physical fitness. Productivity levels were difficult to measure since the group was selected from middle management. However, improved fitness did not significantly affect productivity. The lack of rigor in this investigation helps to demonstrate some of the problems related to the scientific literature in the area of employee fitness.

The authors presented a model describing the likely relationships between exercise/fitness and productivity. The model was based upon previous research. One primary assumption was that the employees possessed the necessary skills, abilities and knowledge to perform the job.

The model focused on the importance of participation and the influence of ensuring participation by employees. Employees who have good knowledge of the benefits of fitness are more likely to participate. Thus, the educational component of any intervention strategy is significant. The issue of the life cycle of the program was

should be viewed as an opportunity to adopt finess as a part of overall lifestyle, which provides long term benefits. A third area of the model suggested that fitness leads to greater energy and, consequently, less mental and physical fatigue. The fourth area identified through the model was the influence fitness programs may have on employee feelings and attitudes. It was suggested that the individual who has become more fit may develop a more positive self image. The final component of the model proposed a relationship between exercise/fitness and health (lack of illness). A healthier employee would attend work more (morbidity) and stay in the work life cycle longer (mortality). Absenteeism and disability were reported throughout the literature as affecting employee productivity.

The summary and conclusions of this descriptive research suggests several relevant points including:

1. Participation must be considered in the design of employee fitness programs.
2. Absenteeism and turnover are important human resource problems which employee fitness intervention may have a positive effect upon.
3. Productivity is difficult to measure in white collar populations, and easier in blue collar groups. The securing of absenteeism figures from companies may be difficult.
4. Cross-sectional studies should be directed at examining long term effects of intervention strategies.

Shephard et al, (1981) investigated the effects of employee fitness programs upon absenteeism and worker productivity in two large [illegible]. This controlled trial involved the use of

volunteers who were assigned treatment and control based on which company they worked for. The subjects were invited to participate in fitness tests at baseline and six months. The fitness program was implemented at the test company where the subjects were assigned to age and sex specific classes. Participation was three times per week for thirty minute sessions, with the focus on slow and progressive cardiorespiratory fitness.

The subjects were also separated into four categories to identify their participation in the program. These four categories were:

1. non-participants - subjects who took the initial test but did not participate in the fitness program.
2. dropouts - subjects who participated in the fitness program for two months or less and then ceased participation.
3. high adherents - subjects who attended an average of two classes per week throughout the six months.
4. low adherents - subjects who attended an average of less than two classes per week.

Questionnaires were utilized to identify employee health care visits and absenteeism information.

The findings of this exploratory research has been instrumental in shaping the directions of employee fitness programs in Canada. Both staff and management were positive about the outcomes of the investigation. An improvement in physical condition (work capacity, reduction in body fat, improvement in flexibility) was experienced by the experimental group. Gains in worker satisfaction and productivity were limited and demonstrated the difficulty in making these types of assessments under "field research settings." One interesting finding

was the "Hawthorne Effect" which took place. Trends between the experimental and control groups were very similar. Shephard suggests the possible explanations as selective sampling, seasonal trends and non-specific response to experimental intervention. This important research demonstrated some of the problems experienced with field research related to the design of employee fitness investigations. It further provided guidelines for future research.

There is evidence in the research literature to suggest that corporate fitness programs improve employee morale, self esteem and overall health (Collis, 1977; Walter, 1981; Shephard and Cox, 1982). There has been a lack of controlled investigations to provide data on costs and dollar benefits from such programs (Bowne, Russell, Morgan, Optenberg, Clarke, 1984). As a result of this void in the literature, the study at prudential Insurance Company was initiated. The focus of the investigation was to examine work site costs and benefits resulting from a fitness program. Thirteen hundred and eighty-nine white collar employees were self-selected for the research. Randomization was not possible as a "rolling entry" approach was used to allow participants to enter the fitness program at any time. Each subject received a submaximal treadmill test based upon the Ellestad protocol and percent body fat was calculated using skinfold calipers using the Behnke and Wilmore protocol upon entry to the program and annually after. All participants were taught to monitor their heart rate by palpating the radial and temporal artery. Exercise prescription consisted of exercising at least three times per week, for a minimum of twenty minutes, at an intensity level between 70 to 80 percent of their predicted maximum heart rate for their age. The main emphasis of the program was upon improving cardiorespiratory fitness.

A second focus of the study examined the longitudinal effects of a physical fitness program. It was believed that improvements from such a program could be reflected by a reduction in medical and disability costs. Two inclusions for employee participation in the study were:

1. the participant must have been an employee of the company for at least one year prior to entry in the program, and
2. must have remained in the program for at least one year after entry.

One hundred and eighty four participants fulfilled these requirements.

An improvement in the level of cardiorespiratory fitness was observed from baseline measure to the one-year follow-up in the participants. Males had a higher fitness level than females at entry and were more successful in improving their fitness levels over one year. An inverse relationship was observed between the level of cardio-respiratory fitness and disability absenses at one year. That is, the higher the level of fitness, the fewer disability days. An inverse relationship was also observed between cardiorespiratory fitness and major medical care costs. As fitness increased, major medical costs decreased. Neither sex group demonstrated a significant loss in weight although the percent of body fat did increase significantly, indicating an increase in lean body mass.

The study has helped demonstrate that an investment in fitness programs may bring a return sufficient to justify the expense. The average combined savings per participant was $353.38, while the average operational cost was $120.60 per participant. The results indicate that worksite fitness programs can make a substantial contribution to the reduction of health care and disability costs. Although the

investigation lacked rigor in the research design, the results of the study are useful for corporate administrators wishing to address the cost and benefit issues for employee fitness programs.

In the past three years, the focus of employee fitness has expanded to include a broader "wellness" perspective. Seaward (1988) examined the transition from corporate fitness to wellness at the University of Maryland. The Lifeline Program was designed using the basic wellness concepts focusing on physical, mental, spiritual and emotional well-being. It replaced the Get Fit program which focused on the physical fitness aspect of an individual's lifestyle. Each program area was designed with education, prevention/maintenance, intervention and rehabilitation as the focus.

The findings of the descriptive study indicated a 500 percent increase in participant enrollment and an increase in service program offerings. The success of the transition from a fitness program to a wellness format was related to the planning and design of the investigation. The establishment of short and long-term goals combined with a needs assessment provided a sound framework to implement and establish the new wellness strategy. Although the study lacked scientific rigor, it provided a much needed attempt to move from the narrow physical fitness approach to a much broader wellness or health promotion approach.

The Health Promotions Approach

The second major thrust in the corporate sector has been directed at examining the effects of health promotion programs at the workplace. Fielding (1982) critically reviewed the results from several investigations in this area. He stated that numerous program designs,

modes of operation and staffing have been reported. However, many studies fail to answer the underlying question of the effectiveness of the program. He identified the three following weaknesses:

1. Goals and objectives are not explicit.
2. Information is not available on which to assess whether goals and objectives have been met.
3. An inadequate evaluation schema makes it difficult to assess whether changes observed can be reasonably attributed to the health promotion program.

The research further provided six questions which need to be addressed regarding reasonable expectations for worksite health promotion programs:

1. Has the target problem been causally associated with significant increases in morbidity and mortality?
2. Is the problem relevant to workers?
3. Are the increased risks associated with the problem reversible with changes in habits or with control methods?
4. Are there effective interventions that result in a change in target behavior and/or physiological measures?
5. Are there good analyses that relate costs and benefits and/or costs and degree of effect?
6. To what degree have program costs and effects been reported from experiences in the work environment?

These questions provide researchers and corporate administrators with an excellent framework for the development and evaluation of health promotion programs. They further help to demonstrate some of the

potential problems from the current research literature which must be addressed.

Much of the research efforts in the health promotion area have been descriptive in nature and not derived from long-term, case-controlled studies (Gibbs, Mulvaney, Henes, Reed, 1985). It was further concluded that the evidence is inadequate to demonstrate monetary benefits from work-site physical fitness programs. Previous studies suffer from imprecision in the controlled comparisons, i.e. participants are compared with all employees including themselves and not with only non-participants. A more recent longitudinal study was conducted by Gibbs et al. (1985) to examine the long-term effects of health promotion at the Blue Cross and Blue Shield program.

The research took place between 1978 and 1982. The program included health risk reduction, risk screening by questionnaire and physiological measurement post-intervention follow-up was carried out by telephone interview. Group programs were offered in nutrition, weight reduction, smoking cessation and physical fitness. Participants were those employees who completed the health risk screening phase. Non-participants were those employees who had not been screened and had not participated in the health promotion intervention. Health care costs were defined as health insurance benefit payments.

The short term results indicated that participants average more claims and higher payments than non-participants, or that participants initially incur greater health care costs. However, long-term results indicated that non-participant payments increase significantly after one year and continue to increase until the last six months of the study. Overall, the payments per participant were 76% of those for

non-participants. Total program costs per employee was $98.86, with the overall ratio for the five years at $143.60/$98.86. This was reported as a conservative estimate for several reasons including the reduced utilization of non-participants; the reductions being distributed across all employees rather than only those who remained for the entire study period and all start-up costs were included in the ratio.

The major importance of the research was the longitudinal nature of the investigation which helped to demonstrate long-term effects of health promotion strategies. The design of the study had several weaknesses including self-selection, small numbers of male subjects and a short baseline period. However, the findings helped to support the concept of program cost benefits after a temporary increase in investment dollars.

Several of the efforts to investigate effects of the broad based health promotion/wellness programs have taken the case study approach (Tampson, 1988; Evans, Harris, McNeil, McKenzie, 1989; Erfurt, Foote, Heirich, Gregg, 1990). These less rigorously designed studies provide an opportunity for professionals in the field to report the success and failure of health promotion programs. The American Journal of Health Promotion encourages these types of descriptive reports.

The wide range of health promotion programs available to employees at Franklin International was described by Tampson, 1988. The purpose of the case study was to delineate the efforts to establish and maintain a health promotion program for blue collar workers. The company has experienced success with white collar workers, but had experienced problems with the hourly staff. The objectives of the program included the increasing of employee health awareness, the

increasing of employee participation in all programs, the increasing of employee productivity, morale and corporate image and the implementation of programs designed to reduce health care costs. A needs assessment indicated exercise, nutrition education and stress management to be the most desired programs, while life stress and being overweight were the two most common lifestyle problems experienced by employees.

The health promotion program offered by the company included fitness (testing, prescription, aerobics, walking, sports, strength programs and martial arts) and wellness (weight loss, wellness breaks, stress breaks, smoking cessation and blood pressure screening). An incentive program was built into the overall intervention to encourage participation through motivation.

The program had a positive impact on the employees after ten months. The participation rate increased to its highest rate with 193 participants involved in the program. Just over fifty percent of the total employee population participated in some aspect of the health promotion program. The blue collar population participation increased five hundred percent over the ten months of program.

Several problems were observed with the process including the program possibly attracted those employees who would have stayed healthy on their own, and thus may not have been motivated by the program and program strategies. This is a major problem without a rigorous control group study. Several employees could not attend the educational sessions which provided a rationale for lifestyle change and may have affected their program motivation. The incentive program focused on rewards for ultimate achievement and not overall

participation. This could also have had a negative effect upon employee participation.

This study provided an insight into the problems experienced with non-rigorous research. Although trends towards improvement were observed through the investigation, it is difficult to draw conclusion as to why the improvements happened.

The current literature on worksite wellness programs has largely focused on the program impacts upon employee participants. The nature of such research usually required motivated volunteers as subjects. This presents a problem of reporting how effective the investigation was at reaching the at-risk population (Erfort, Foote, Heirich, Gregg, 1990). An attempt to examine the effects of four different models of health promotion over a three year period was conducted by Erfurt et al., 1990.

This quasi-experimental study compared four types of worksite wellness strategies to reduce cardiovascular risks. Four large manufacturing companies, ranging from 1500 to 3000 employees were utilized. Workers were predominantly male, blue collar employees. The investigation randomly selected worksites as opposed to employees to reduce contamination across intervention groups. The interventions designed for the companies were group specific. The focus of the study was to reduce risks in the areas of high blood pressure, cigarette smoking and obesity. Identical screening methods were used at each site and included three blood pressure measurements, height and weight measurement and questions about health history, smoking and an interest in wellness or health promotion programs. The four selected sites chosen for the research were:

1. Control site - testing of the traditional medical approach to wellness. This model tested the advice-only approach.
2. Health education site - media-focused health education strategies were used to encourage participation. This model tested the hypothesis that raising participant awareness of health issues would stimulate at-risk people to utilize risk-reduction services.
3. Risk reduction site - follow-up procedures were utilized for program participants. The assumption of this model was that behavior change requires not only awareness but also support, encouragement and assistance with problem-solving.
4. Full service site - same as site 1, 2, 3 plus improvement of the flow of health communication, support of behavior change and the promotion of group activities to improve health. The model emphasized learning positive substitutes for negative behaviors which create long-term health risks.

More than two thirds of the employees screened at the four plants had one or more of the three cardiovascular disease risk factors. Only one third of those screened had none of the risk factors. Despite the high level of reported interest at the control site, only three subjects enrolled in the program. This was attributed to the off-site nature of the program.

All three intervention models were reported as effective at engaging approximately ten percent of the at-risk population. However, the health education model was not as effective at engaging smokers and obese subjects in risk-reduction classes. Three conclusions were

employee into wellness programs utilizing on-site programs was effective. Second, engaging the "non-committed" employee into wellness programs requires a one-to-one approach. The third, increasing participation in wellness programs requires a menu approach. One major limitation of the study was that the effect of staff time could not be separated from the effects of the one-to-one follow-up. It would be beneficial to hold staffing constant but vary staff activities. The use of randomization using subjects instead of work-site would also strengthen the study.

The investigation has provided insight into the inherent problems associated with quasi-experimental research designs. However, it helps to reinforce the fact that it is not always possible to conduct rigorous research in this discipline and that "field research" may provide some much needed answers to research questions.

Summary

The two main thrusts for implementing health, fitness and lifestyle programs at the workplace have been the employee fitness approach and the health promotions approach. Over the past ten years employee fitness had provided much needed information on the benefits of such strategies. The reported literature supports the expanded concept of health promotion as a more diversive and essential method of reducing health care costs. This expanded focus is directed at the broader, total well-being of an individual and not just the physical well-being. There is a demonstrated need for more research in this expanded notion.

Adherence in Health, Fitness and Lifestyle Programs

The study of program adherence in a fitness or health promotion intervention setting has become an area of focus in recent research attempts (Dishman, 1988). Many problems and strategies have arisen from the current research into program adherence and compliance in the workplace (Feldman, 1983; Shephard, 1985; Davis, Jackson, Kronenfeld, Blair, 1987; Wankel, 1985; Wankel, 1987; Brosmer, 1987; Adams, Landgreen, 1988; Gauvin, 1990). Three of the major reasons for the development of employee health/ fitness programs have been to lower health care costs, increase productivity and decrease absenteeism. In order to achieve these goals, it is imperative to develop programs which will enhance user adherence. It has been difficult to predict who will adhere to programs and who will drop out. Much focus has been directed at addressing these concerns and provide the health/fitness professional with useful guidelines for the development of workplace health, fitness and lifestyle programs (Brosmer, 1987).

Factors which determine exercisers versus non-exercisers have been described as biological, psychological, sociological and demographic. Brosmer (1987) has described a variety of problems and strategies in exercise adherence in the workplace. From a biological standpoint it appears that leaner, lighter and less fit individuals are more likely to adhere to an exercise program. Age apparently plays some role in adherence but it is unclear of the exact extent it plays with influencing subjects to adopt a program. He further pointed out that persons who are goal oriented, self-motivated and have a high level of self-efficacy are more likely to adhere to exercise programs. These psychological reasons are important when designing programs. Social

factors affecting adherence rates include spousal and family support and positive worker support, which all appear to have had a positive affect. Demographic factors influencing program adherence were higher educated, white upper class males.

Many strategies have been tested for enhancing adherence to exercise programs and include credibility of the health/fitness professional, counselling therapy by professional staff, group programs versus individual programs, increased knowledge through educational classes for program participants, incentive programs, matching the activity to the likes of the participant to make the activity enjoyable, convenient time and location of classes and management support/involvement of employees in the decision making process for the program.

The task of improving exercise and health program adherence is complex. Much effort has been directed at this problem over the past ten years and substantial findings have helped answer some of the questions surrounding this problem area. More attempts are needed to provide answers to some of the yet undecided questions.

Dishman, Sallis and Orenstein (1985) attempted to review effective interventions on determinants relating to adoption and maintenance of physical activity. The descriptive paper provided many insights into the problems related to adherence and physical activity. The following findings were supported through the research. Regular participation in physical activity should be viewed as a dynamic process through which adoption and sustained involvement are the focus. This would allow for program participants to achieve personal and program outcomes. Intention, personal capabilities, behavioral skills,

commitment and reinforcement appear as critical factors affecting adherence throughout the literature. These determinants were found across populations, settings and modes of activity. Attitudes and beliefs about health and physical activity, perceived needs and personal abilities interact with personality traits, feelings, lifestyle behaviors and environmental factors to influence an individuals decision to adopt or maintain involvement in physical activity.

It was further suggested that it was not possible to specify important interactions among known determinants, but it appeared that some determinants were direct in their influence, while others were indirect and operate through mediators. The main focus of interventions should be upon the stable influences while modifying those which are dynamic.

Important recommendations for research include: the necessity to specify major activity determinants for certain populations and settings including how activity determinants differ according to age, ethnicity, socioeconomic status and health/fitness status; examine past activity environments and experiences to determine when and how preferences for types and intensity of activity are formed. To accomplish these outcomes it will be necessary to examine longitudinal studies utilizing a representative sample at intervals of three to four years. Furthermore, concurrent, small, descriptive and experimental studies, examining selected groups (children, blue collar workers, high risk populations) should be implemented. The findings of these investigations would help to fill the void in the exercise adherence literature.

Shephard (1985) examined personal factors which influenced participants' decisions to commence and adopt exercise programs. The findings were drawn from three data sources: the Canada Fitness Survey (1981), the Toronto Life Assurance Study (1981), and the General Foods Study (1980).

The Canada Fitness Survey was conducted throughout 13,500 households across Canada. The purpose of the study was to determine the attitudes about exercise and determine current fitness levels of the respondents. Eighty-eight percent of the households cooperated with the study. A field interview was used to collect the descriptive data and field tests were used to collect the fitness data.

The findings of the investigation provided some insights into adherence concerns. Specifically, five of the top six activities chosen by respondents were individual activities requiring little equipment and organization (walking, cycling, swimming, jogging, gardening). The main perceived barrier towards participation was lack of time as opposed to lack of facilities or equipment. This finding helps to guage program growth for program professionals. There was a noticeable gap between perceived intentions and actual growth of sports participation. Status seeking sports requiring expensive equipment became more popular from 1976-1981. This suggests that commercial interests were more successful than government initiatives to convince the population to use more free time for physical activity. The teaching of leisure time management may be a method of changing this phenomenon. More research directed at this area is needed.

The main reasons subjects exercised was to feel better. Female subjects also valued weight loss and improved flexibility, while fun

and enjoyment were important reasons for participating for both groups.

The Toronto Life Assurance project matched control data for 1800 office workers. The experimental company received a fitness intervention program, while the other closely matched company received three fitness tests over nine months. The study investigated a combined blue and white collar population.

The findings suggested that obese, cigarette smoking males, were not the primary dropouts as previously thought, and that this may suggest in part, the previous activity of many participants. A second important finding was that program goals were important in determining adherence. Over the program life, there was a loss of subjects whose goals were more or less than the class mean. More research is needed to support this concept. There was a considerable gap between subject awareness and participation. Many people read information about fitness but did not change their behavior.

The drop-out rate over eighteen months was approximately 50%, with the main reasons being lack of time, loss of interest, exercising on their own and exercising elsewhere.

The General Foods Study involved 535 workers from the head office in New York. It was reported that almost half the sample had been previously active. Classes were divided by sex and the male classes focused upon vigorous endurance activities. The males tended to be obese but high in aerobic power and muscular strength, while the women were average in fitness and close to ideal body mass. Reasons for exercising included for health, fun, socializing and improving body tone.

The attitudes and beliefs of those who joined the program were

compared to non-joiners. Program participants had a better perception of their current health status and their ability to improve their health. Spouses, friends and significant others all influenced the likelihood of participation. After twenty months of intervention, current participants health perceptions and beliefs had continued to improve. One negative outcome was that program dropouts had a lessened appreciation of the social value of exercise. It was suggested that the "fun" component may have been overshadowed by the "endurance" objectives of the program. It was concluded that a wide range of activities provides incentives for individuals to participate in exercise programs, and that participation should have as its focus, fun and enjoyment as program outcomes.

This research has provided several informative factors toward answering adherence questions on employee fitness programs. One major weakness with this descriptive report was the lack of hard statistical data to backup the findings of the report. More information would have made it easier to accept or refute some of the suggested outcomes.

Another approach for examining adherence in exercise involvement is the health education approach. The basic assumption of the approach is that through educating participants about positive health behaviors, they will act upon the information and make positive changes in their lifestyle. Wankel (1985) suggested that considerable evidence indicates that behavior change is not that simple, and in view of the limited success of the health benefits approach to promote exercise adherence, a more recreational approach focusing on enjoyment and the quality of the experience warranted investigation.

The purpose of the exploratory research was to investigate

factors relating to continuing involvement or program dropout. Specific attention was directed to the quality of the experience. The program was conducted in a university setting with emphasis on running or jogging three times per week. Enrollment was limited to male employees from a large manufacturing firm, the head offices of two insurance companies, and the university. The majority of participants were white collar workers.

Personal interviews were conducted with the continuing and program dropouts at eight to ten months from their commencement in the program. The interview protocol was comprised of a combination of open and closed-ended questions. The questions covered the areas of reaction to the program; degree of social support received for involvement in the program; reasons for initial joining in the program; and liked and disliked aspects of the intervention. One hundred and eleven respondents were interviewed, sixty dropouts and fifty-one participants.

Two limitations with the study were the non-representativeness of the sample to the population. It was composed of self-selected volunteers who were probably more motivated to be active than their peers. However, it was still relevant to investigate such a group and determine factors affecting continued involvement. The second limitation was the retrospective nature of the data. It was possible that after ten months of program, the results reflected rationalizations and cognitive restructuring to match the individuals preceding behavior. Methodological considerations and observed patterns in the results helped to discount this concern.

Several important findings were resultant from the study. First,

continuing participants reported a greater change in feelings of physical and psychological well-being. This was to be expected because they were exposed to the intervention longer than dropouts. It was suggested this may also be related to encouragement from significant others. Second, health related goals were reported as the most important reason for joining the program in both groups. This was expected as the promotional program surrounding the research was oriented to the benefits derived from such endeavors. Participants scored higher than dropouts on the non-health-related factors. The setting and goal attainment not directly related to fitness may have been one important link to improved exercise adherence. Third, combined initial goals, reaction to the program and level of social support can be utilized to discriminate between adherers and non-adherers. From a programmatic perspective, type and emphasis of program should be closely aligned with participant needs.

Exercise drop-outs reported that program flexibility, invonvenient time and location were reasons for non-participation, and program leaders must try to ensure these problems are addressed to reduce drop-out rates. Type and intensity of the activity were important considerations in the study and had a negative affect on both groups. The dropouts also reported loss of interest and poor activity selection as reasons for withdrawal from the program. All of these factors must be given consideration in the design of physical activity programs.

The investigation identified several very pertinent factors which relate to exercise adherence and program drop-out. The concept that factors beyond the desire for improved health and fitness were

important to program adherence or non-adherence. The suggestion that a more recreational approach to the facilitation of exercise adherence, focusing on enjoyment of the activity requires further research.

Several problems and issues regarding research in the exercise adherence area have been identified throughout the literature (Wankel, 1987). Four main topics suggested were: measures of exercise involvement/adherence; lack of sound theoretical frameworks for adherence research; the need to differentiate between initial and long-term involvement; and practical research implications. The absence of acceptable standardized measures of adherence has made it very difficult to compare studies. Wankel has suggested the utilization of a system of excused absences to better reflect motivation and commitment. Adherence could then be defined as a percentage of attendance of possible classes with excused absences controlled for. This would appear to be a good solution to the problem of standardized measures.

The descriptive nature of adherence research to date has been slow in developing an integrated theory, which brings together factors explaining involvement in exercise programs. Wankel suggests the two basic theoretical orientations are a behavioral focus and a cognitive focus. The behavioral orientation involved various reinforcement techniques, while the cognitive utilized goal setting, perceived choice, decision making and attitude change. The main problem to date suggests the lack of a systematic approach has not been established and that it is necessary to utilize this type of model.

Long-term adherence has been an area which has not been successfully established. Little is known about why people adhere or dropout over a longer period of time. Wankel suggests that enjoyment of

the activity could play a role in the establishment of long-term adherence. Future research into the role enjoyment plays for exercise involvement may provide some much needed answers for intrinsic motivation and exercise adherence.

Practical applications for program leaders has implications for future research. The search for the "optimal package" to assist leaders to develop effective motivational techniques for program participants. There is a need for clinical research to assess which combinations of treatments are most effective. Second, controlled experimental investigations are needed to systematically investigate the effectiveness of treatment components. There is a need for both types of studies in exercise adherence to establish effective intervention strategies for professionals. Gettman et al. (1983) noted many law enforcement personnel fail to start an exercise program or drop-out once they start because of psychosocial reasons, including lack of interest or motivation. Three further specific factors identified in the article related to exercise dropouts are perception of the program, personal convenience, and family attitude. The study examined adherence, attrition, and training changes in police officers. Three groups, supervised exercise, unsupervised exercise and no exercise were observed. Results of the research were similar to other studies on program adherence. However, a higher drop-out rate was observed in the supervised group (45%) than the unsupervised group (35%). Cardiovascular fitness improved similarly for both groups, and decreases in body fat were similar for both. One important finding was that supervised subjects adhered longer than the unsupervised before dropping out. It was suggested that this may be due to the personal

attention given to the supervised group. Further research with law enforcement agencies is needed.

Kruse and Calden (1986) examined compliance to a clinically prescribed exercise program directed at individuals to adopt behaviors which would lead to improved health status. The study analyzed the impact of a health/fitness intervention to determine compliance to the clinically prescribed program. Fitness evaluation consisted of five segments, cardiovascular function, flexibility, muscular strength, body composition and exercise prescription involving cardiovascular exercise, three to five times per week for twenty to thirty minutes at a prescribed heart rate for each individual. The program was conducted over a ten week period. A questionnaire was used to gather data about participant exercise habits prior to and after the program. The major result of the study indicated one's past exercise habits determine how well participants adhere to an exercise program. Participants most active prior to the program continued to be most active after the program. It was unknown if any positive behavior changes represent permanent lifestyle alterations. This finding would suggest that police officers, because of their previous fitness history during their officer training program should have a high adherence rate. More research is needed to examine this postulation.

Wanzel and Danielson (1977) attempted to determine reasons why participants withdraw from a company exercise program. A questionnaire was used to determine participants attitudes towards the fitness program and facilities. One hundred and eighty-nine males and sixty-five females responded to the questionnaire. Major determinants included, overcrowded facilities, distance from home to workout

facility, and rearrangement of schedule to accommodate the program. Other factors influencing respondents participation were seasonal influences, the day of the week programs were offered and the time of day programs were offered. Another important finding of the study was that the majority of respondents had withdrawn from the program by the end of six months. This suggests the importance of careful planning and contact with the participants during that first six months of the intervention.

Feldman (1983) examined strategies for improving compliance with health promotion programs in industry. He suggested seven factors to consider for improving health program compliance. They are:

1. Consideration must be given to the characteristics of the program setting, i.e. time, place and scheduling.
2. Effective communication patterns between workers and health care providers should be developed.
3. Social support networks can be developed to assist workers with health problems.
4. Well designed communications should be tailored to specific audiences.
5. Health knowledge can be increased through multi-method presentations.
6. Psychological and behavior methods can be used to initiate and maintain positive health behavior.
7. An integrated plan including all levels of management, unions, and community health programs, and the incorporation of methods, techniques, and approaches can be successful in health promotion interventions.

These factors, combined with the current knowledge from the literature on adherence and compliance to health and fitness programs, provides a basis for future research, including directions and considerations for the planning of health, fitness and lifestyle intervention programs for law enforcement personnel.

Summary

Current trends in employee health, fitness, and lifestyle programs in Canada have followed the trends demonstrated successful in the United States. The two major thrusts, the health promotion approach, and the employee fitness approach have helped to demonstrate the positive effects of health, fitness and lifestyle interventions on employee populations. Furthermore, they help to identify the multi-disciplined nature of successful programs in Canada. More research focusing on special population groups, ie. high risk populations is needed. Research within these populations should address issues relating to exercise adherence and long-term affects through both descriptive and experimental research. Although the employee fitness approach has been dominant throughout the early eighties, the broad based health promotion approach has become the model for the nineties. It has become apparent that it is necessary to examine the total well-being of an individual and not just the physical well-being of employee populations. Trends in adherence have been focused towards the nature of supervised and unsupervised programs. Lack of interest and motivation have been identified as important psychosocial factors affecting adherence. Participant perception of the program, personal

The Purpose of Program Evaluation in Employee Health, Fitness and Lifestyle Programs

The need for evaluation in employee health, fitness and lifestyle area is a result of the tremendous growth experienced over the past decade. Evaluations are designed to answer questions regarding the value or worth of a program. It is imperative to establish and clarify the goals and objectives of interventions, in measureable terms. Rossi (1979) explains that evaluations may be undertaken for management purposes, to assess the appropriateness of program shifts, to identify ways to improve the delivery of interventions, and to meet the needs of funding groups responsible for the allocation of program funds. The most pressing problem facing the employee health and lifestyle field today is determining the effects and direct benefits derived through health promotion programs. Several attempts to date have attempted to support this concern (Shepard et al. 1982). Fielding (1982) stated there are three characteristics of many written evaluations which interfere with attempts to provide answers:

1. Goals and objectives are not explicit.
2. Information is not available on which to assess whether goals and objectives have been met.
3. An inadequate evaluation scheme makes it difficult to assess whether changes observed can be reasonably attributed to the specific intervention (health promotion/fitness program).

Identification of direct benefits to the employee and the agency has been the focus of evaluation attempts to date (Spilman and [illegible] 1986; Gibbs et al., 1985;

Identified benefits from these investigations include: increased fitness levels, better self-image, reduced absenteeism, increased productivity, and reduced health care costs in employees who participated in the programs. The key to these studies with respect to program evaluation is that each investigation has demonstrated the usefulness of employee health promotion programs. Furthermore, each has attempted to take a rigorous scientific approach to answering some very important issues. Two important studies examining evaluation in employee health, fitness and lifestyle programs are the Live For Life Evaluation (Manring, 1985) and the A T & T Evaluation (Spilman, Goetz, Schultz, Bellingham, Johnson, 1986). The objectives of the Live For Life study were to examine the areas of wellness promotion and sickness prevention, with emphasis on economic benefits. Twenty-one hundred employees received treatment, while two thousand employees comprised the control group. Health and lifestyle measures were collected on each employee at baseline, one year, and two years. Variables included biometric (blood lipids, blood pressure, body fat, weight and aerobic power), behavioral (smoking, alcohol use, physical activity and nutrition), attitudinal measures (general well-being, stress management, organizational commitment). This longitudinal study has provided some interesting findings. The treatment group demonstrated greater improvement in fitness, weight control, smoking cessation, general well-being, sick days, worker satisfaction and self-esteem. It was concluded that the program was effective in achieving its goals. The cost effectiveness data had not been analyzed and a model to predict economic consequences was in the developmental stages.

impact of a broader wellness strategy. It furthermore identified the need for further research utilizing wellness programs.

The effects of a pilot health promotion project were investigated at A T & T by Spilman et al. (1986). This evaluative research had two objectives. The first was to measure the effects of the program on worker health status, health related attitudes and behavior, and on attitudes toward the company and work. The second was to determine possible cost savings to the company from decreased disability insurance. Three groups were used for the study. Group one received health risk assessment and health education modules, Group two received the health risk assessment but no modules and group three received neither HRA or modules. All subjects were randomly selected and assigned to a group. Data was collected at baseline and one year. A followup questionnaire was used to obtain productivity data and cost benefit data was taken from company files.

It was reported that participants receiving treatment demonstrated greater improvement than the controls in exercise levels, their ability to stop smoking, in health perception, and in type A behavior modification. The risk of dying from heart attack in the next ten years was significantly reduced. The treatment group also become more committed to improving their health related behaviors and felt more positive towards the company than the control group. It was surmised that health promotion programs can offer substantial benefits to the employee and the company. No cost benefits were investigated as of the first year of intervention.

The strengths of this randomized control study were the strong research design and longitudinal aspects of the study. More research is

Summary

The recurring theme on the purpose of employee health, fitness and lifestyle program evaluation is to determine the benefits and costs of interventions. Many organizations are awaiting results from current studies before making a decision on program implementation. Secondary purposes include determining new program strategies and the initiating of new intervention programs. Program evaluation can provide the decision maker with the necessary information to determine directions the organization should take and program strategy. Without it, program costs and program implementation are difficult to justify.

Evaluation Methods in Employee Health, Fitness and Lifestyle Programs

Evaluation methods in the employee health, fitness and lifestyle discipline appear as three distinct themes; medical/clinical evaluation, fitness test evaluations, and health/fitness program evaluation. The first two examine the individual, the last examines the process. Each will be briefly described and discussed.

It is generally agreed that before participation in a program which demands a major increase in physical activity, an individual should be evaluated by his/her physician (American College of Sports Medicine, 1980, American Heart Association, 1977). Furthermore, there is a variety of information gathered during this stage, including:

a. a comprehensive medical history which covers information on personal and family surgical history, and symptoms or signs related to cardiovascular disease;

b. a physical examination prior to taking the program, directed towards identifying symptoms related to cardiovascular disease and other contraindications to exercise testing;

c. a laboratory evaluation which may include; an ECG, blood pressure, blood chemistry (HDL, LDL, Triglycerides), and a chest x-ray (American College of Sports Medicine, 1980).

Once this has been accomplished, the status of the individual is determined and recommendations are made as to whether they may continue to the fitness testing stage or whether they need treatment for a detected medical problem. This form of screening has become popular and effective in the detection of existing health problems in employees (Wood et al., 1982).

A very important development in the health promotion field has been the growth of health risk appraisal and lifestyle inventories (Sacks, Krushat, Newman, 1980; Fielding, 1982; DeFriese, 1990). These two instruments have provided much needed, computerized health assessment tools for the identification of individual well-being. The health risk appraisal (HRA) is generally used in conjunction with other physiological and psychological tools to better identify objective information for individuals. The health behaviors of the individuals are compared to epidemiological data to estimate the person's health age as compared to their actual age, or the risk of dying at some future time along with the amount of that risk which could be eliminated by making the appropriate behavior change (Wagner, 1982).

Richardson and Felts (1988) describe the following characteristics associated with health risk appraisals:

1. The focus is on health risks or health problems.
2. They identify health behaviors that should be avoided.
3. Feedback is provided based on epidemiological data bases focused toward middle age groups and not toward older or younger populations.

4. A composite score is given for the results (chronological age versus actual age).

5. Focus is on "life extension."

Lifestyle inventories (LII) assess the behavioral, hereditary and psychological health indicators and provide specific recommendations for health improvement. The instruments are developed in a similar manner to psychological instruments. Based upon quality research, they are a valid and reliable research device. Richter (1985) examined the reliability and validity of the Lifestyle Assessment Questionnaire. The sample was comprised of eighty-eight female junior nursing students at the University of Colorado. Test/retest reliability was established by using fifteen randomly selected subjects who completed the questionnaire and were retested two weeks later. Reliability of the subscales was reported as a range of r = .81 to .97. Reliability of the wellness subscales ranged from r = .67 to .94. These results demonstrate the reliability of the instrument. Other studies have reported similar findings in the literature (Elsenrath, 1982); Freeman and Gintner, 1986; and DeStefano, Richardson, 1987).

The Lifestyle Assessment Questionnaire instrument was not designed to determine how much of a person's life is likely to be shortened or lengthened by health practice, but rather to indicate health dimensions that are a problem or strength area, and provide recommendations regarding each other. The recommendations are specific to varied populations. The areas assessed are modifiable, and therefore beneficial for the individual and the health facilitator (Richardson and Felts, 1988).

Sacks et al. (1980) suggested the reliability of the HRA instrument is to be seriously questioned. The purpose of the

investigation was to determine the effectiveness of health hazard appraisal to stimulate risk reduction through assessing the reliability of the instrument. Two hundred and three subjects were randomly assigned to treatment or no treatment after stratification by age and sex. The instrument was implemented at baseline and eighty five days later for both groups.

The results indicated 15% of all subjects had no logical consistency evident when both questionnaires were compared. Other inconsistencies included the disappearance of various maladies, ie. heart murmur, hypertension, colitis and one subject reported his age as 55 at baseline and 50 at follow-up. Females appeared to be more reliable reporters than males, and the control group showed less reliability than the treatment group.

The inconsistencies from research have demonstrated a major concern with the use of health hazard appraisal. Specifically, these inconsistencies can produce an effect on the overall measure of risk, the appraised age. It is possible that previous reports of the HHA capability to stimulate risk reduction may be due to response variation. The study further demonstrated that previous studies evaluating the effectiveness of HRA lacked control groups, had high drop out rates, non-rigorous statistical approaches, or serious self-selection biases. One of the strengths of the lifestyle inventory questionnaire has been the success in establishing validity and reliability coefficients. The key singular difference between the two instruments is that lifestyle inventories are more comprehensive and focus on behavioral areas which may be changed. More research is needed with the questionnaire to help verify the reliability and validity of the instruments.

Fielding (1982) has suggested health hazard appraisal research has had methodological and data base problems. He posed several questions regarding this process including: where do the data base and risk estimations come from?; does the feedback focus primarily on ameliorable risks?; what are the safeguards for privacy and confidentiality? and what quality control mechanisms are in place to protect against errors in entering information? These questions and others need to be addressed and until such time the reliability and validity of health hazard appraisal instruments are questionable.

DeFriese (1990) has suggested regardless of the wide acceptance of the health hazard appraisal instrument there is still a substantial need for additional research. He has suggested several important issues which need to be addressed:

1. There is a need to establish large, reliable data bases on disease specific mortality and morbidity for populations which include age, race and gender. It will be important to measure the intermediate effects of HHA upon specific groups to certain psychological and educational goals of the health educational program.

2. There is a question of whether HHA produces measurable and significant effects on the attitudes, knowledge or behavior of those who participate. More research designed to measure these specific factors is needed.

3. Further research should investigate the influence of qualitative information on perceptions of risk, of the likelihood of significant changes in personal health, and the relative importance of qualitative and quantitative information when provided as part of HHA feedback.

The focus of such research should be directed at a broader plan which includes the potential educational impacts of such endeavors.

One further evaluation method, fitness testing includes a battery of tests to determine body composition, strength, muscular endurance, flexibility, and cardiorespiratory endurance (Jetté, 1981; Johnson and Nelson, 1979; Collis, 1977). These measurements were designed to provide information on each individual's fitness level, and then compared to a set of norms. Jetté (1981) pointed out that one of the objectives of these standardized tests is to create awareness for fitness and enhanced lifestyle in the individual. There are a wide variety of tests and measurements in use today to help predict fitness levels in individuals. Perhaps the most important factor is that fitness assessment must be combined with a counselling session. Fitness testing with prescription provides the individual with the necessary information to make positive lifestyle changes safely.

Collis (1977) stated that it is not feasible for all healthy individuals to undergo comprehensive physical examinations prior to starting an exercise program. As a result, screening questionnaires have been developed to determine if a prospective client may have any underlying health problems. The questionnaire is designed to be administered prior to the exercise or activity class. It asks questions on health and lifestyle, and is brief for ease of administration. If the respondent replies affirmatively to any of the questions, he or she is referred for medical consultation. This has been a very effective and reliable format (Chisholm et al., 1975).

The final evaluation method for discussion is the program evaluation. Much attention has been drawn to the importance of the two

aforementioned methods, however, the same amount of commitment has not been given to the area of program evaluation. Part of the problem lies with the fact the employee health, fitness and lifestyle area is relatively new.

Parkinson (1982) examined seventeen large corporations in the United States which had some form of employee health, fitness or lifestyle program. The areas of sponsorship, objectives, target population, program structure, program processes, costs, evaluation and special features were investigated. The results indicated that very few corporations have implemented program evaluations. Several were in the process of evaluating, but the majority were still in the planning stages. There appears to be a lack of a model or process to provide direction for evaluating employee health, fitness and lifestyle programs.

Green (1986) has identified two major concerns in the evaluation of employee health promotion programs. The first is to identify the objects of interest with sufficient specificity to allow their classification into distinct categories, yet have enough generality to allow new innovative, concepts, processes, theories, and outcomes. The second is to classify the methods of comparison, based upon theory of causation, ie. scientific design; then rate them on standards of acceptibility or rules of evidence. This will allow researchers to conduct investigations which are rigorous, yet practical. However, the results will be demonstrable and acceptable to the scientific and practitioner communities. He further outlined three primary questions which should be answered through evaluation:

1. Do actions (behaviors, lifestyle) produce positive change?

2. Do health promotion programs produce positive actions (behaviors, lifestyles)?
3. Do people who change their behavior or lifestyle as a result of exposure to health promotion programs, have positive outcomes compared to others?

These questions and the proposed model provide a framework for researchers in the discipline to follow and implement research studies which will provide information which may be substantiated.

In a recent publication released by the Government of Canada (1986), entitled "Fitness . . . The Future," some major directions are projected. The direction of the future of fitness as a Canadian, includes a society that values well-being as fundamental and an integral part of day-to-day life. Physical activity, health, and a positive lifestyle will be looked upon favorably. The family, educational institutions, workplace and health care systems will all work towards this end. In order to achieve this end product it will be necessary to implement evaluation research to measure whether the goals and objectives have been met.

The publication further identifies the workplace as an area of emphasis. The overall goal of providing opportunities for all levels of workers to participate in physical activity and lifestyle promotion is specific and obtainable. Incorporation of fitness and lifestyle activities for all levels of workers will require more research and program strategies. The document clearly delineates key components and strategies which include; the provision of research grants, development of appropriate models for implementation of programs for small and medium size companies, and research on the current state of the art of

employee fitness in Canada. Many other resources are identified and discussed. However, the major indication is for more development in the employee health, fitness and lifestyle area. With the emphasis on these proposed developments, one of the key factors with respect to achieving the desired results, may very well be evaluation. Without it there will be no answers, only more questions.

The methods for evaluating employee health, fitness and lifestyle programs are diverse. Much attention has been drawn to each method. Many current studies have used combinations of the three methods described, depending upon the specifics of the investigation. The literature has indicated the weaknesses of the health hazard appraisal instrument and the inherent problems of reliability and validity. It has also demonstrated the strengths of lifestyle inventories combined with fitness evaluations. Future directions should be directed towards utilizing the strengths of these combined methods.

Summary

Evaluation methods in health, fitness and lifestyle programs appear as three distinct approaches throughout the literature. The medical/clinical evaluation has been used as a screening process to identify health problems in employee populations prior to program commencement.

Fitness testing has been used extensively to examine the physiological status of employee populations, and as part of the process of identifying direct benefits resulting from physical exercise. Health/fitness program evaluation has experienced positive growth in the eighties as a result of the expansion of program interventions. One major problem has been the lack of an evaluation

model which will allow investigators to conduct research which is rigorous, yet practical. Finally, the Canadian government has identified the importance health, fitness, and lifestyle programs will play in Canadian society and the workplace. It will be imperative to evaluate the different strategies and programs to identify whether the goals and objectives have been met.

Health, Fitness and Lifestyle Programs in Law Enforcement Agencies

Research in the fitness and health promotion area of law enforcement agencies in the United States and Canada, has been directed towards the physiological benefits derived through participation in physical fitness intervention. Bonney (1978) examined the relationship between fitness, self-esteem, and job performance in police officers in Orange County California. The findings identified several important characteristics of police officers including:

1. Police officers are 11 to 15 pounds overweight.
2. The job involves little regular physical activity.
3. Officers are involved in minimal physical activity during leisure time.
4. Officers high in hours of sick leave, are low in their level of physical fitness.
5. Officers have a poor self-image and satisfaction level with respect to fitness.

The profile produced through this study of fourteen departments has provided some insight into the type of unique problems law enforcement agencies are faced with.

Price (1978) demonstrated there is a distinct increase in

cardiovascular heart disease risk with age among police officers. Also demonstrated through the study was younger officers (20-35 yr.) compared favorably to the normative population in work capacity, cardiorespiratory endurance, pulmonary function, serum lipids and motor ability. The purpose of the study was to investigate the effects of twenty weeks of fitness upon Los Angeles County Law Enforcement personnel. All officers were given a fitness prescription involving a forty-five minute exercise session, three days per week. The intensity and type of exercise was not reported. Officers were tested at baseline and at the end of twenty weeks. A control group was utilized but no information was given on the specific number of subjects or characteristics of either group. The reported research did specify the subjects were randomly assigned to specific exercise groups. The research design was not specified for the investigation. Officers in the (36-52 yr.) range were considered below average in work capacity, cardiorespiratory fitness, and body composition. After participation in a 20 week exercise program, physiological changes were observed in the young and middle aged group. Specifically, decreased heart rate, improved VO_2 max, and percent body fat reduction in both groups. Although the study helped to demonstrate the health problems and potential benefits derived through fitness intervention programs in law enforcement agencies, the rigor of the study is questionable. The study does not provide specific information to be able to determine if the results are valid. This has been a potential problem with research in the law enforcement area.

purpose of the research was to examine the effects of individualized fitness programs on police officers. Fitness evaluations were conducted with each officer at baseline and eleven months later. The tests consisted of medical and exercise histories, body composition, grip strength, flexibility and aerobic power. The results of the study were disappointing. The voluntary fitness intervention program had little or no impact over the year it was in operation. The major weakness of the study was with the participant contact and follow-up. Nearly a year elapsed prior to follow-up during which time "individuals supposedly" carried out their exercise prescription. It would appear the researchers did not give enough attention to the adherence problems encountered in fitness programs. It is important to keep constant contact and participant involvement through regular communication, incentives and supervision.

McNeil et al. (1982) demonstrated the importance of monitoring fitness programs in law enforcement agencies, and the success of programs which offer incentives for regular participation in physical activities. The Idaho Department of Law Enforcement initiated a program to determine the effects of fitness intervention on police officers. Medical screening and fitness tests were administered to 26 participants at six weeks, and quarterly thereafter for the duration of the program. Motivation was kept high through knowledge of progress towards goals and commitment of department headquarters to the program. As well, incentives such as on-duty work-out-time, t-shirts, lapel pins, and name recognition in the training bulletin were implemented.

[illegible] aerobic functioning and that the

program. The increase in fitness over time was a gradual, steady improvement. Secondly, a significant negative relationship between VO_2 max and diastolic blood pressure, systolic blood pressure, body fat, waist girth and heart rate, was observed. That is, VO_2 max can be expected to decrease as each above variable increased. This important work has provided an indication of how well-monitored programs, with designed motivators for adherence can produce positive results in police officers.

Gettman et al. (1983) examined the effects of unsupervised and supervised exercise programs on 47 police officers. Training consisted of walking, and jogging three days per week for 20 weeks. The results indicated a lower attrition rate for the unsupervised group. The main reasons the subjects gave for non-adherence was a lack of time. Both training groups increased significantly compared to the control group in treadmill performance time, maximum oxygen uptake, and maximum oxygen pulse. Significant decreases were observed in resting heart rate, percent body fat, total skinfold fat and waist girth. One critical observation resulting from the study was that if subjects are taught how to start an exercise program, are supervised in the early stages of the program, and report their progress regularly, it is possible to conduct a successful unsupervised exercise program.

Fraser (1986) examined 458 Pennsylvania State Police personnel. The research attempted to examine a cross section of agency members on physical fitness and physical work capacity variables. This randomized control study provided a health and fitness profile for the agency. The trend from the data suggested a decrease in performance in officers

will be at varying fitness levels, and thus will require varying time frames to achieve optimal fitness levels, it may take as long as 18 to 20 months to achieve this goal. The finding helps to support the need for longitudinal observation of law enforcement agency programs.

Finally, Wood et al. (1982) attempted to implement a wellness strategy with law enforcement officers. The study took place in California with 4,524 California Highway Patrol officers. The question the study attempted to answer concerned the effectiveness of wellness screening as an alternative way to determine health risks in police officers? The research protocol included blood tests, height and weight measurements, skinfold measurements, blood pressure tests, lung function tests, and a lifestyle evaluation focusing on attitudes and habits concerning nutrition, exercise, substance abuse, and stress. This evaluation provided each officer with a profile of his or her relative wellness. The findings of the study included:

1. It is feasible to conduct a low-cost health screening program in the field on a statewide basis.
2. Health evaluation screening, in lieu of standard physical exams, can alert otherwise unsuspecting officers to the need for more extensive diagnostic and remedial health care services.
3. Eighty-eight percent of the officers perceived themselves to be in good health, yet nearly half (48%) failed to satisfy four or more wellness criteria on an eight factor index.
4. Aggregate health evaluation data for an entire law enforcement agency can be used to accurately predict morbidity for heart attack, stroke, and lung cancer along with associated costs.

5. The motivational potential for self-improvement through the adoption of healthier lifestyles is high among police officers.
6. Fifty-seven percent of the officers responded they were too fat; seventeen percent reported having experienced high blood pressure (140/90 mm/Hg); twenty-five percent of the officers had blood cholestrol levels in the high risk range (251-300mgm).

This important research has provided some insight into the potential for wellness intervention in police personnel. It also provides an indication that law enforcement agencies are examining how wellness can be implemented into the effective operation of a department or agency.

Growth in employee health, fitness and lifestyle programs has been well documented during the past decade. The research in law enforcement agencies has been directed at evaluating the effects health related fitness programs have upon police populations (Fraser, 1986; Drews, 1984; Goldstein, 1983; Gettman, 1982; McNeil et al., 1982). Benefits of increased aerobic power (VO_2 max), decreased resting heart rate, and decreased body fat have been reported as positive program effects. Furthermore, police officers have been identified as high in a variety of risk factors including cardiac disorders, suicide and depression (Sarason et al., 1979). Law enforcement officers are required to perform heavy physical exertion through their jobs on a non-regular basis. Running, strength and endurance are physical attributes which officers require to effectively perform police work. However, the physical component is only one factor. These problems

suggest the broad nature of the health problems facing law enforcement agencies.

Research to date has been directed towards the physiological problems and benefits of physical exercise programs upon police personnel. Exercise programs are but one dimension of a comprehensive wellness process. Other wellness dimensions including nutrition, stress management, substance abuse, environmental sensitivity, spirituality, and medical health education could provide answers to the multi-faceted problems facing law enforcement agencies. No attempt has been made to examine the effects of a multi-staged wellness strategy upon the well-being of police officers. There is a demonstrated need to determine if implementation of a wellness program will help to resolve some of the unique behavioral problems experienced by law enforcement personnel.

One final consideration, the problem of lack of rigorous and controlled studies within law enforcement agencies has been identified. The high-risk nature of police work combined with diversive work schedules may have had an effect upon the design of existing studies. However, field work research can still provide answers and solutions to some of the health-related problems facing police populations in the workplace today.

Chapter 3

Research Methods

The Sample

The subjects for the study were drawn from RCMP personnel of the Victoria sub-division, which was comprised of thirteen detachments. One hundred and fifty officers (n=150) were selected from the detachments using matching techniques and randomly assigned to the Experimental and Control groups. Non-officers and officers considered high risk were screened out. Further discussion of this process is included in the instrumentation explanation.

The detachments were identified by personnel size to minimize the reactive effects of testing, especially in the small detachments. It was believed this procedure was the most effective and would reduce any sampling bias. Small detachments were those with less than twenty officers, large detachments were those with twenty or more officers. The subjects were matched in clusters and assigned to the Experimental (E89) Group and Control (C89) Group. The small clusters were matched by groups based on the variable of age, while the large clusters were matched by individuals, based on the variable of age. The variable of age was chosen for matching the subjects as several of the variables were a function of age, i.e. fitness, physical activity, cardiovascular risk factors, etc. Age was also chosen because the sample had to be selected prior to fitness testing as exercise counselling was provided for the experimental group and not for the control group. The control group were instructed not to change their exercise habits over the next six months and that they would receive the intervention after six months.

One hundred and thirty-seven officers (n=137) participated in the pre-tests. Thirteen officers did not participate due to transfer, off duty sick, or demanding work schedules. Adherence to exercise programs has been reported to have considerable variability, 9% to 87%, which indicates substantial non-compliance among those individuals who volunteer for physical conditioning programs. (Franklin, 1988). Table 1 indicates the non-returnee rate over the six months of the wellness intervention. One hundred and three officers returned for testing at three months (seventy-five percent), and fifty-six officers returned for testing at six months (fifty-one percent).

Table 1

Non-Returnee Rates For The RCMP Wellness Intervention

	Time 1 0 months	Time 2 3 months	Time 3 6 months
Number of officers	n=137	n=103	n=56
Non-returnees (%)	0	25	59

Research Design

The design used for the research was a randomized, control-group, pretest-posttest design (Isaac and Michael, 1977). Internal validity was strengthened by the use of randomization and matching. Between-session variation, maturation, pre-testing, and statistical regression should occur equally in each group (Isaac and Michael, 1977). Within session variation was reduced through the use of the same test equipment, protocols and staff. The external validity for the design has been reported as good (Issac and Michael, 1977). One potential weakness was the interaction of pre-testing and the intervention. Although it was possible that the pretest could be considered a form of intervention, it was not believed to be a problem as each group received the same pre-tests. One possible way to control this problem would have been to implement two tests prior to intervention for both groups. The results of the two pre-tests could then be compared for similarities and differences. The generalization of the study was limited to the Victoria sub-division and the officers of the thirteen detachments. The exploratory nature of this field research project presented several problems with respect to the experimental and control groups because of the nature of the RCMP organization. The communications between detachments, the competitive nature of the officers, the fact that they would all be re-tested every three months compounded the difficult in controlling interaction. This was not considered to be a problem in the initial design but became apparent as the project developed. The effects of this contamination is explained further in the discussion of the research.

Procedures

The research procedures are described in the order which they occurred. Figure 1 describes the research design and the timelines for the project. Figure 2 describes the organizational structure for the research project.

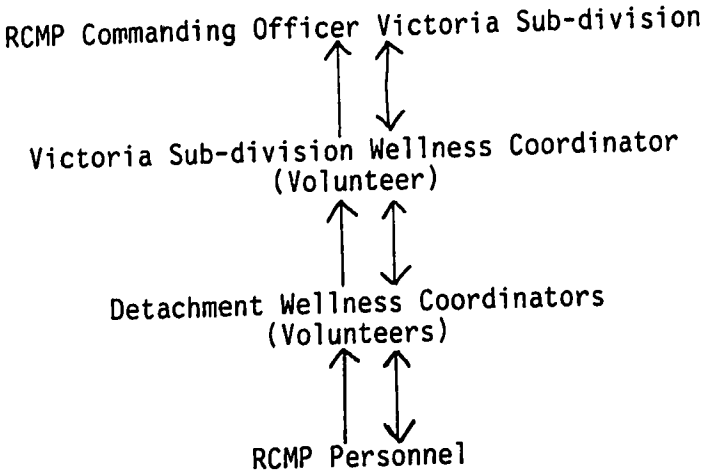
The Wellness program consisted of two stages. Stage I featured a three month individualized fitness intervention. Characteristics of the program included:

1. A three month individualized program emphasising aerobic activity and incorporating the FITT principle (Cooper, 1982).
2. Cooper's (1982) Aerobic Chart Pack program used as a motivator to enhance officer adherence.
3. A diary used for recording weekly participation.

Timeline	Feb 20-Mar 3 1989	Mar 6-June 4 Fitness	June 5-June 9	June 12-Aug 25 Fitness & Nutrition	Aug 28-Sept 29
	Pre-test	Intervention	Post-test	Intervention	Post Post-test
Research Group					
Experimental (n=29)	T_1	X_a	T_2	X_{ab}	T_3
Control (n=27)	T_1		T_2		T_3

X_a - Fitness Intervention
X_b^a - Nutrition Intervention

Figure 1. Research Design and Timelines



The keys to the structure were:

- it provided optimal opportunity for communication between all levels within the sub-division.
- the detachment coordinators provided the direct link to the officers in the sub-division.
- the volunteer sub-division wellness coordinator was the direct link to the commanding officer, the wellness research consultants and the detachment wellness coordinators. This maximized rapid and effective communications between all levels.

Figure 2. Organizational Structure - RCMP Wellness Program - Victoria Sub-division Pilot Project

4. An incentive program featuring a lapel pin earned for points accumulated over the three months.
5. Detachment wellness coordinators provided contact and encouragement to enhance officer program adherence.
6. An educational package including posters and a resource library were provided for each detachment. (See Appendix A)

Stage II featured a three month nutrition program and continuation of the individualized fitness intervention. Characteristics of the nutrition intervention included:

1. Implementation of the Foodtrack Nutrition Program (B.C. Dairy Foundation, 1989).
2. Emphasis on self-assessment and learning to enhance nutrition behavior.
3. Detachment wellness coordinators provided contact and follow-up to enhance officer program adherence. (See Appendix B)

Fitness testing procedures and protocols followed recommended guidelines as outlined in the Standardized Test of Fitness (1981). The PWC 170 Test (Wahland, 1948) was used in place of the Step Test to measure predicted maximal oxygen uptake. The PWC 170 test was chosen for several reasons including: the relatively low cost and ease of equipment use; the fact that it requires only a submaximal energy expenditure on the part of the subject; the simplicity of the testing procedures and training of the testing team; and the demonstrated high relationship with maximal oxygen intake tests. In addition, it met the following accepted criteria for tests measuring cardiovascular and pulmonary function: a large muscle mass was involved; the work

increased in step-wise progressions; each level was no longer than six minutes in duration; and the measurement of various parameters was easily carried out (CAHPER 1968). A testing-team training program was conducted over the four weeks prior to the subject testing, and before each test session at three months and six months. (Appendix C). The following test order was implemented at the pre-test:

1. Physician health screening (7 to 10 days prior to actual test date)
2. Lifestyle Assessment Questionnaire (actual test day)
3. Standardized Test of Fitness (actual test day)
4. Counselling (actual test day).

This order was selected because it followed a logical sequence and helped to minimize any learning effect taking place from the testing. One concern was that if the subjects received the fitness test prior to the LAQ, information they received during the fitness test would influence how they responded to the LAQ instrument.

Instrumentation

Several instruments were used in the study and are described in detail.

1. Clinically Determined Health Screening

The health screening was implemented in a licensed physicians clinic and included resting heart rate, blood chemistry (HDL, LDL, TCHOL), blood pressure, and a comprehensive medical examination. (Appendix D). Officers identified as high-risk, as determined by the

a. High blood pressure (140/90 mm/Hg)

b. High cholestrol levels (TCHOL 5.2; LDL 3.0; TCHOL/HDL ratio 4.0)

c. Previous history of cardiovascular heart disease (myocardial infarction)

d. Previous history of diabetes, osteoporosis or other medical contraindications.

2. Standardized Test of Fitness

The health-related components of fitness were measured by the standardized fitness tests and included:

a. The PWC 170 Test (Wahland, 1948) was used to predict the maximal oxygen uptake (V02 max). (Appendix E)

b. The anthropometric measures (Jette, 1981) included height, body weight, girth measurements, and skinfold measures. The O scale protocol (Ross,1984) was used to determine the adiposity of the subjects. (Appendix F)

c. The modified sit and reach test (Johnson, 1977b) was used to measure the subject's flexibility. (Appendix G)

d. Muscular strength and endurance was measured using grip strength, push-ups (Jette, 1981), and sit-ups (Faulkner, 1988). (Appendix H)

Reliability and validity for the tests were reported as satisfactory (Sjostrand, 1947; Johnson, 1986; Faulkner, 1988). (Appendix I).

3. The Lifestyle Questionnaire

The Lifestyle Assessment Questionnaire (LAQ) was used to determine the well-being of the officers. It examined the areas of

social wellness, emotional awareness, emotional management, spiritual wellness, occupational wellness and appraised risk age. Reliability and validity of the instrument has been reported as good among non-law enforcement populations (Elsenrath, 1982; Richter, 1985; Freeman and Gintner, 1986; DeStefano and Richardson, 1987). (Appendix J)

4. The Interview Questionnaire

The Interview Questionnaire was used to examine the characteristics of the officers who returned or did not return for the six month tests. This quantitative research followed guidelines suggested by Mishler (1986) and The Research Centre, University of Michigan (1976). A pilot study was implemented in December, 1989 to assess the conceptual clarity of the instrument. The pilot study was conducted using RCMP police officers and the wellness research consultants (n=5). The participants were instructed to identify any questions or aspects of the questionnaire which proved difficult to understand. The Interview Questionnaire is shown in Appendix K. Minor changes were made to the structure of the questionnaire as a result of the pilot study.

The pilot study also provided an opportunity for the researcher to refine the interview skills necessary to complete the study. Guidelines for interviewer behavior (Atkinson, 1971) were followed and adhered to by the researcher. The questionnaire was administered in December, 1989.

5. Descriptive Questionnaires

Three descriptive questionnaires were administered at different times throughout the study. The Participant Needs Assessment, the [illegible] and the Six Month Follow-up questionnaires were

adapted from Hafen et al. (1988). The main purpose of these instruments was to provide descriptive information on the RCMP officers. The Participant Needs Assessment was administered at the beginning of the project; the Nutrition Intervention at three months;, and the Six Month Follow-up questionnaire at the end of Stage II. (Appendix L).

6. The Three-Day Food Analysis

The purpose of the three-day food analysis was to provide specific data on the participants' food choices and examine the area of fat and cholestrol consumption by the officers. The Food Processor program (ESHA Research, 1988) was used to analyse the data. The analysis was implemented at the beginning of Stage II and six months later. A sub-group of officers (n=60) was used for the analysis as there was a limit on the funds available to the researcher. The blood tests which accompanied the analysis had the same limitation. (Appendix M).

Statistical Analyses

The analyses of the data for the study were divided into three sections. The first section was descriptive and described the wellness profile of the RCMP officers and some of the unique characteristics of the program returnees and non-returnees. It attempted to answer the following research questions:

1. What are the health, fitness and lifestyle characteristics of the RCMP officers?
2. What are the unique characteristics of the RCMP Wellness Program returnees and non-returnees?

The SPSSX Statistical Package was used to run frequencies and

The percent change was chosen, that is, the percentage of change over time or relative score, as it provided a meaningful comparison for each individual officer relative to where he/she started at baseline. This meaningful output allowed the officers to compare their results and to better understand what changes had taken place in their overall well-being. It also provided meaningful information to the RCMP administrators for the purpose of evaluating the success of the program.

The question of the use of relative change versus absolute change has been discussed in the literature (Brown, McCarthy, Gotham, Der, 1988; Goldstein, 1983). Goldstein has suggested that in addressing trends over time, general difficulties arise and that an alternative approach to telling us something about change over time is relative change. He furthermore suggested that relative change may provide more interesting information than absolute change. When providing feedback to the research subjects it was believed that a positive change of ten per cent in a wellness variable would be more meaningful than an absolute change value of two or three units. As the research groups were reasonably homogenous at baseline, the percent change was a plausible alternative to use for the analysis. The data was also analyzed using the raw scores. For those scholars who wish to view the data, the analyses may be found in Appendix P. The conversion factor for computing the percent change is shown in Figure 3.

The independent variable was comprised of the experimental and control groups. The dependent variables were weight, VO2 max, adiposity, sum of skinfolds, pushups, curlups, sit and reach, physical wellness, exercise, nutrition, self care, vehicle safety, emotional

awareness, emotional management, social wellness, occupational wellness, spiritual wellness and composite score. The three new dependent variables, percent change A, percent change B, and percent change C were created for analyzing the changes in the RCMP officers (Figure 3). These three variables represented the changes which took place in the officers from:

Percent change A - 0 months to 3 months

Percent change B - 3 months to 6 months

Percent change C - 0 months to 6 months

The Hotelling T test (Harris, 1975), multivariate test of significance was used to determine if the changes which took place in the officers was significant. The multivariate test examined the pooled effect of percent change A, percent change B, and percent change C between groups. If the multivariate test is significant it is often informative to examine the univariate test. The univariate test examined the pooled effect of percent change A, percent change B and percent change C compared to zero, within each group. It was not possible to run the MANOVA using all of the dependent variables together as there were too many variables for the number of subjects and it would violate the assumption of ten subjects for each variable. Between group and within group comparisons were made on each dependent variable separately.

The final section of the analyses attempted to examine the relationship between the health related variables and the wellness variables. Cannonical correlation (Warwick, 1975) was used to examine the relationships between the health-related fitness variables (weight, VO2 max, adiposity, sum of skinfolds, pushups, curlups, situps, sit and reach), and the wellness variables (physical wellness, exercise, nutrition, self care, vehicle safety, emotional awareness, emotional

management, social wellness, occupational wellness, spiritual wellness, intellectual wellness, composite score). The rationale for using the health-related fitness variables for comparison against the wellness variables was supported by the work of Fraser (1986), Wood et al. (1982), McNeil et al. (1982), Mealey (1979). These studies have indicated the need for further examination of the relationship between health-related fitness and wellness. It was believed that officer well-being could be predicted from health-related fitness. That is, as officer fitness increased, officer wellness should increase in a similar fashion. Another factor examined through the process was whether changes in officer fitness would affect other areas of officer well-being. This exploratory component had not previously been examined before.

Cannonical correlation was used as it was believed to be the best statistical method for examining the relationship between health-related fitness and wellness. The main purpose of the technique was to attempt to derive a linear combination from each of the sets of variables in such a way that the correlation between the two linear combinations was maximized. The first pair of canonical variates are selected so as to have the highest intercorrelational possible given the particular variables involved. A second set of canonical variates is then selected to account for a maximum of the relationship between the two sets of variables unaccounted for by the first canonical variates, and so forth. (Warwick, 1975). The loadings are established by correlating the raw variable scores with the canonical variate scores. The weights indicate the contribution of each variable to the variance of the respective within set of canonical variates. The following health-related fitness variables were chosen:

1. VO2 max as the aerobic fitness variable.
2. Curlups and grip strength as the strength variable.
3. Pushups as the endurance variable.
4. Sit and reach as the flexibility variable.

The following wellness variables were chosen:

1. Physical wellness which included exercise, nutrition, self-care, drug use awareness, and vehicle safety.
2. Exercise without the impact of the other physical wellness variables.
3. Nutrition without the impact of the other physical wellness variables.
4. Spiritual wellness which had changed in the experimental group.
5. Overall wellness which was a composite of all the wellness variables.

It was necessary to select these variables because of the small number of subjects remaining at six months.

Cannonical correlation was also used to examine the effectiveness of the LAQ to reflect changes in well-being of the officers. If the LAQ was effective in reflecting the fitness changes in the officers, it would demonstrate the selectiveness of the instrument. The same restrictions and variables as used in examining the associations between health-related fitness and wellness were incorporated. The SAS Statistical Package was used to determine the degree of relationship between the two sets of variables.

The findings of this section would indicate the extent to which the changes in officer well-being were associated with the changes in officer fitness.

Formula			Program
$\frac{T_2 - T_1}{T_1}$	=	% change A	Fitness Intervention
$\frac{T_3 - T_2}{T_2}$	=	% change B	Nutrition Intervention
$\frac{T_3 - T_1}{T_1}$	=	% change C	Fitness and Nutrition Intervention

T = Time
1 = 0 months
2 = 3 months
3 = 6 months

Figure 3. RCMP Percentage Change Scores

Chapter 4

Results

Introduction

The research investigated the nature and extent of exercise over six months and the combined effect of a three month nutrition education program to enhance the well-being of police officers, as measured by the battery of standardized fitness tests and the LAQ.

Several instruments which professed to evaluate individual well-being were critically examined prior to the pretest, and the Lifestyle Assessment Questionnaire (LAQ) was selected. The main strength of the LAQ was the comprehensive nature of the instrument in the evaluation of individual well-being. A complete health hazard appraisal and wellness inventory was established, providing feedback on individual strengths and weakness.

A physical fitness battery was selected to evaluate the health-related aspects of fitness: cardiovascular fitness, strength and endurance, body composition and flexibility, and to evaluate the effectiveness of the fitness program.

Health and Wellness Profile of RCMP Officers in the Victoria Subdivision

The health and wellness of the RCMP officers in the Victoria subdivision is described to provide a baseline for comparison over the six months which the investigation took place. The profile was divided into three segments:

1. Demographic characteristics

2. Physiological and lifestyle characteristics

3. Wellness characteristics.

Demographic Characteristics

Table 2 presents descriptive statistics pertaining to the demographic characteristics of the sample.

Physiological and Lifestyle Characteristics

The physiological characteristics of the officers are described in Table 3. The subjects mean score was good compared to Canadian norms in several categories including: sum of skin folds, adiposity and curlups. Their score was average in sit and reach, pushups, grip strength, proportionality, and below average in aerobic fitness. The blood pressure and blood lipid measures were in the normal range of norms presented by Hooger (1989).

The wellness ratings for the officers are described in Table 4. The overall wellness rating was average in terms of LAO norms, but several areas were below average or poor including exercise, nutrition, self care, intellectual wellness, spiritual wellness and physical wellness. Areas reported as good included: vehicle safety, drug awareness and emotional awareness. One interesting finding was the low scores in the physical, exercise and nutritional areas. They paralleled the low health-related fitness scores.

The major lifestyle risk-factors for the sample are described in Table 5. Eighty-two percent of the officers were more than ten percent overweight. Lifestyle quality of life indicators are reported in Table 6. The officers perceived themselves to be in good health, mostly

Table 2

Demographic Characteristics of the RCMP Sample

(n = 56)	Frequency	Percent
GENDER		
MALE	54	96
FEMALE	2	4
AGE (Mean x = 34.0 yr)		
UNDER 25 yr	2	4
25 - 39 yr	45	80
40 - 49 yr	9	16
MARITAL STATUS		
MARRIED	43	77
WIDOWED	0	0
SEPARATED	2	4
DIVORCED	1	2
SINGLE	8	14
COHABITING	1	2
ANNUAL INCOME		
UNDER $30000	2	4
$30000-$40000	5	9
$40000-$50000	18	32
$50001-$60000	19	34
OVER $60000	11	20
EDUCATIONAL LEVEL		
GRADE SCHOOL OR LESS	0	0
SOME HIGH SCHOOL	2	4
HIGH SCHOOL GRADUATE	26	46
SOME COLLEGE OR TECHNICAL SCHOOL	16	29
COLLEGE GRADUATE	7	13
POST GRADUATE OR PROFESSIONAL DEGREE	5	9
RACE		
WHITE	55	98
NATIVE INDIAN	1	2

Table 3

Physiological Profile of the RCMP Wellness Participants

(N = 56)	Mean	Standard Deviation	Rating
Height (CM)	181.0	7.0	
Weight (KG)	86.3	11.8	
Sum of skinfolds (percentile score)	35.6	25.7	good
Adiposity (0 scale score)	5.9	1.9	good
Proportionality (0 scale score)	6.1	1.8	average
Predicted VO2 max (ml/kg/minute) (n = 44)	38.7	8.5	below avg.
Grip Strength (percentile score)	58.0	27.8	average
Pushups (percentile score)	62.0	21.5	average
Sit and reach (percentile score)	52.0	28.7	average
Curlups (maximum number)	44.7	40.5	good
Systolic (mmHg)	122.1	10.5	normal
Diastolic (mmHg)	79.0	8.0	normal

Table 4

Lifestyle Assessment Ratings for the RCMP Sample Based on the Lifestyle Assessment Questionnaire (LAQ)

Category (n=56)	Mean	Standard Deviation	Rating
Exercise	45.6	17.0	poor
Nutrition	61.9	16.4	below average
Self Care	61.7	15.2	below average
Vehicle Safety	81.9	9.4	good
Drug Awareness	85.3	13.0	good
Social Wellness	73.1	13.7	average
Emotional Awareness	81.4	10.4	good
Emotional Management	73.3	13.0	average
Intellectual Wellness	65.2	16.8	below average
Occupational Wellness	79.3	10.5	average
Spiritual Wellness	56.3	22.0	poor
Physical Wellness	67.5	10.6	below average
Overall Wellness	71.0	10.1	average

*Lifestyle Assessment Scores are recorded out of a possible 100. The higher the score, the higher the level of wellness for that dimension. The categories were rated from the LAQ in Appendix J.

Table 5

Major Lifestyle Risk Factors For RCMP Officers

Risk Area	Abusive Level	Frequency	Percent
Smoking	Any	8	14.8
Seat Belt Use	80% or less	8	14.8
Body Weight	10% overweight	44	81.5
Exercise	once per week	10	18.5
(n = 56)			

Table 6

RCMP Officer Lifestyle Quality-of-Life Indicators*

Lifestyle Category	Frequency	Percent
Health Status		
Excellent	7	13.0
Good	29	52.0
Fair	20	36.0
Poor	0	0.0
Life Satisfaction		
Mostly satisfied	42	75.0
Partly satisfied	10	17.9
Mostly disappointed	2	3.6
Job Satisfaction		
Almost always	27	48.2
Very often	21	37.5
Often	4	7.1
Occasionally	0	0.0
Almost never	0	0.0
Positive Self-image		
Almost always	13	23.2
Very often	28	50.0
Often	8	14.3
Occasionally	2	3.6
Almost never	1	1.8
Job-related Stress Reduction		
Almost always	7	12.5
Very often	22	39.3
Often	17	30.4
Occasionally	6	10.7
Almost never	3	5.4
(n = 56)		

*All items are self-reported.

satisfied with life, satisfied with their jobs, positive in their self-image, and to frequently use stress reduction in their jobs.

Wellness Characteristics

This section reports the attitudes and opinions of the officers as they relate to the wellness program. The data was collected through the Participants Needs Assessment. The results of the Needs Assessment are reported in Tables 7-10. Table 7 describes the lifestyle components officers most wanted to improve.

The perceived preferences of the officers for health-enhancing physical fitness activities are outlined in Table 8.

The type of activity in which officers were participating prior to the commencement of the wellness intervention are described in Table 9. Sixty-two percent were currently active in some form of physical activity less than three times per week. Team sports, jogging and weight training were the preferred activities of the RCMP officers prior to implementation of the wellness program.

The preferred times for participation in the wellness program under the present work and leisure constraints are highlighted in Table 10. The evening and after work were preferred times for program participation.

Several topics for personal growth were identified prior to implementation to the program. Table 11 describes the different topics selected by the officers as collected through the Nutrition Assessment Questionnaire. It demonstrated the need to provide programs which would enhance physical and psychological wellness.

The nutritional attitudes of the officers indicated 87 percent usually eat a balanced diet, low in fat-fried foods. Seventy-six

Table 7

Lifestyle Area in Which Officers Want to Improve

Lifestyle Category	Frequency	Percent
Fitness	49	92.5
Stress Management	35	66.0
Nutrition	34	64.2
Weight Management	27	50.9
Low Back Care	14	26.4
Spirituality	7	13.2
Stop Smoking	7	13.2
Drug Usage Awareness	1	1.9

(n = 56)

Table 8

Activity in Which Officers Would be Most Interested in Participating

Type of Activity	Frequency	Percent
Team Sports	33	62.3
Weight Training	32	60.4
Jogging	25	47.2
Cycling	21	39.6
Wellness Education	18	34.0
Walking	17	32.1
Aerobics	12	22.6
Yoga	2	3.8

(n = 56)

Table 9

Type of Activity in Which Officers are Currently Participating

Preferred Activity	Frequency	Percent
Currently Active (3 times per week)	33	62.3
Other (team sports and individual activities)	17	36.2
Jogging	15	31.9
Weight Training	12	25.5
Cycling	11	23.4
Walking	7	14.9
Aerobics	5	10.6

(n = 56)

Table 10

Preferred Time for Participation in the Wellness Program

Preferred Time	Frequency	Percent
Evening	29	54.7
After Work	26	49.1
Lunch Time	16	30.2
Before Work	15	28.3
Mid Afternoon	11	20.8
Mid Morning	4	7.5

(n = 56)

Table 11

Wellness Related Topics Officers Chose for Personal Growth

Category	Total Requests	Percent
Exercise Programs	44	78.6
Stress Reduction	29	51.8
Nutrition	25	44.6
Weight Reduction	21	37.5
Relaxation	13	23.2

(n = 56)

percent reported eating a large helping size meal. Twenty-two percent of the officers reported eating regularly at restaurants. The nutritional variety of the foods the officers reported eating was high in grains (72%), fruit (72%), lean meat (80%), and moderate in vegetables (56%). They reported almost never (87%) eating food that was high in fat.

Changes in Fitness and Wellness in the Officers of the Victoria Subdivision

This section examined the changes in exercise behavior, wellness ratings, fitness ratings, cardiovascular risk factors and sick leave over the six months during which the wellness intervention operated. This section addresses research question number two. Specifically, can an organized wellness intervention program alter the fitness and wellness of RCMP officers? From Table 12 it can be observed that over the six months of the wellness program the number of officers in the experimental group who exercised over three times per week increased. Conversely, the number of officers in the control group who exercised over three times per week decreased. Secondly, the number of officers from the experimental group who increased their activity level from no exercise to less than three times per week increased. A significant reduction ($p < 0.05$) was observed in the number of officers in the experimental group who did not exercise after six months of intervention.

Table 12

Exercise Frequency for Officers in the Experimental and Control Groups Prior to and Following the Initial Stages of the Wellness Intervention

Exercise Frequency	Experimental %		Control %	
	Pre	Post (6 months)	Pre	Post (6 months)
More than three times per week	46.2	61.5	34.6	23.1
Exercised some, but less than three times per week	23.1	38.5	50.0	57.7
No exercise	30.7	0.0*	15.4	19.2

*$p<0.05$ (n=56)

The effect of physical activity on absenteeism was investigated and no significant changes took place, as shown in Table 13.

The percentage of change in the various components of wellness in the experimental and control groups over six months of wellness intervention is shown in Tables 14 through 16. The first three months of the intervention emphasised only fitness in the experimental group while the next three months encompassed both fitness and nutrition education. The overall "Physical Wellness" rating increased 11% in the experimental group and 7% in the control group after three months. At six months, a significant change ($p < 0.05$) was observed, between the two groups (Figure 4). The experimental group increased to 18% and the control group decreased to 5%. Significant changes ($p < 0.05$) within each group were also observed in exercise, nutrition, self-care, vehicle safety and overall wellness in the experimental group at six months (Figures 5, 6, 7). The control group improved significantly in nutrition and self-care (Figure 5 and 6).

Improvement in other areas of wellness in which no specific intervention was offered was observed in the experimental group. At six months social wellness (13%) and emotional management (13%), increased significantly. Intellectual wellness (9%), occupational wellness (5%), drug use awareness (14%) and spiritual wellness (17%) increased as well but were not significant.

The percentage of change in the selected fitness measures over the three and six months of wellness intervention are shown in Table 17 through 19. The tables illustrate the changes in fitness in the experimental and control groups as a result of the fitness and

Table 13

The Number of Sick Days for the Experimental and Control Groups Prior to and Following the Initial Stages of the Wellness Intervention

Sick Days Frequency	Experimental %		Control %	
	Pre	Post (6 months)	Pre	Post (6 months)
More than five days	7.6	7.6	3.8	15.4
Less than five days	92.4	92.3	96.0	84.6

(n = 56)

Table 14

Between Group Multivariate Tests of Significance For Changes In Officer Wellness Measures Over Six Months of Intervention (Means and Standard Deviations)

Wellness Category	(0-3 mos) % Change A		(3-6 mos) % Change B		(0-6 mos) % Change C		Multivariate Test		
	Experimental	Control	Experimental	Control	Experimental	Control	F	df	P
Physical Wellness	11.2 (14.8)	7.0 (10.8)	7.3 (16.2)	-1.7 (10.6)	18.1 (14.7)	5.1 (14.8)	2.98	3,41	0.04*
Exercise	38.2 (46.1)	18.3 (35.6)	11.8 (34.7)	-0.9 (41.8)	48.9 (56.0)	14.1 (47.0)	1.72	3,41	0.18
Nutrition	11.1 (37.1)	18.1 (20.0)	21.8 (41.9)	-1.3 (12.0)	27.7 (35.3)	16.1 (22.1)	2.63	3,41	0.06
Self-Care	12.6 (19.7)	10.0 (19.1)	10.8 (18.5)	1.2 (17.7)	23.4 (23.9)	9.7 (17.4)	2.10	3,40	0.12
Vehicle Safety	7.1 (13.5)	3.0 (15.1)	1.7 (9.6)	0.8 (24.3)	8.8 (17.1)	1.7 (19.0)	1.85	3,41	0.15
Drug Use Awareness	13.2 (27.1)	6.0 (27.5)	1.3 (18.5)	-3.2 (19.5)	13.7 (29.6)	3.0 (34.1)	0.86	3,41	0.47
Social Wellness	12.2 (19.1)	4.1 (16.7)	1.7 (14.4)	1.1 (19.1)	13.2 (18.9)	4.1 (19.4)	1.71	3,40	0.18
Emotional Awareness	2.3 (20.6)	-0.6 (12.9)	11.4 (57.2)	1.1 (18.2)	4.6 (11.5)	-0.4 (16.2)	1.26	3,41	0.30
Emotional Management	10.1 (17.0)	3.9 (15.7)	3.1 (17.2)	0.3 (18.1)	13.3 (25.2)	2.8 (15.8)	1.37	3,41	0.27
Intellectual Wellness	3.7 (22.0)	3.5 (27.0)	10.2 (34.0)	8.9 (50.5)	9.2 (20.7)	3.8 (18.1)	0.50	3,40	0.69
Occupational Wellness	3.9 (17.8)	2.9 (13.6)	2.9 (19.1)	0.2 (15.6)	5.2 (16.1)	2.1 (15.8)	0.39	3,40	0.76
Spiritual Wellness	1.3 (23.8)	0.4 (43.5)	17.2 (32.7)	34.4 (114.0)	17.1 (36.4)	11.5 (38.5)	1.26	3,38	0.30
Overall Wellness Rating	7.9 (11.7)	2.4 (9.7)	3.8 (13.1)	0.5 (12.8)	11.4 (13.6)	2.6 (12.9)	1.77	3,41	0.17

*Indicates Multivariate Statistical Significance +Indicates Univariate Statistical Significance

Table 15

Within Group Multivariate Tests of Significance For Changes In Officer Wellness Measures Over Six Months of Intervention (Means and Standard Deviations)

Wellness Category	Control Group (0-3 mos) % Change A	(3-6 mos) % Change B	(0-6 mos) % Change C	Multivariate Test F	df	P
Physical Wellness	7.0+ (10.8)	-1.7 (10.6)	5.1 (14.8)	3.37	3,21	0.04*
Exercise	18.3 (35.6)	-0.9 (41.8)	14.1 (47.0)	2.55	3,21	0.08
Nutrition	18.1+ (20.0)	-1.3 (12.0)	16.1+ (22.1)	5.98	3,21	0.01*
Self-Care	10.0+ (19.1)	1.2 (17.7)	9.7+ (17.4)	3.74	3,21	0.03*
Vehicle Safety	3.0 (15.1)	0.8 (24.3)	1.7 (19.0)	5.38	3,21	0.01*
Drug Use Awareness	6.0 (27.5)	-3.2 (19.5)	3.0 (34.1)	0.62	3,21	0.61
Social Wellness	4.1 (16.7)	1.1 (19.1)	4.1 (19.4)	1.98	3,21	0.34
Emotional Awareness	-0.6 (12.9)	1.1 (18.2)	-0.4 (16.2)	0.68	3,21	0.57
Emotional Management	3.9 (15.7)	0.3 (18.1)	2.8 (15.8)	1.68	3,21	0.20
Intellectual Wellness	3.5 (27.0)	8.9 (50.5)	3.8 (18.1)	1.14	3,21	0.36
Occupational Wellness	2.9 (13.6)	0.2 (15.6)	2.1 (15.8)	3.00	3,21	0.05*
Spiritual Wellness	0.4 (43.5)	34.4 (114.0)	11.5 (38.5)	0.95	3,19	0.44
Overall Wellness Rating	2.4 (9.7)	0.5 (12.8)	2.6 (12.9)	1.43	3,21	0.26

*Indicates Multivariate Statistical Significance
+Indicates Univariate Statistical Significance

Table 16

Within Group Multivariate Tests of Significance For Changes In Officer Wellness Measures Over Six Months of Intervention (Means and Standard Deviations)

Wellness Category	Experimental Group (0-3 mos) % Change A	(3-6 mos) % Change B	(0-6 mos) % Change C	Multivariate Test F	df	P
Physical Wellness	11.2+ (14.8)	7.3+ (16.2)	18.1+ (14.7)	10.83	3,18	0.01*
Exercise	38.2+ (46.1)	11.8 (34.7)	48.9+ (56.0)	11.50	3,18	0.01*
Nutrition	11.1 (37.1)	21.8+ (41.9)	27.7+ (35.3)	4.90	3,18	0.01*
Self-Care	12.6+ (19.7)	10.8 (18.5)	23.4+ (23.9)	14.15	3,17	0.01*
Vehicle Safety	7.1 (13.5)	1.7 (9.6)	8.8 (17.1)	2.80	3,18	0.07
Drug Use Awareness	13.2 (27.1)	1.3 (18.5)	13.7 (29.6)	1.81	3,18	0.18
Social Wellness	12.2+ (19.1)	1.7 (14.4)	13.2+ (18.9)	3.75	3,17	0.03*
Emotional Awareness	2.3 (20.6)	11.4 (57.2)	4.6 (11.5)	1.79	3,18	0.19
Emotional Management	10.1+ (17.0)	3.1 (17.2)	13.3+ (25.2)	4.82	3,18	0.01*
Intellectual Wellness	3.7 (22.0)	10.2 (34.0)	9.2 (20.7)	2.56	3,17	0.09
Occupational Wellness	3.9 (17.8)	2.9 (19.1)	5.2 (16.1)	1.92	3,17	0.16
Spiritual Wellness	1.3 (23.8)	17.2 (32.7)	17.1 (3[illegible] 4)	1.82	3,17	0.18
Overall Wellness Rating	7.9+ (11.7)	3.8 (13.1)	11.4+ (13.6)	6.82	3,18	0.01*

*Indicates Multivariate Statistical Significance
+Indicates Univariate Statistical Significance

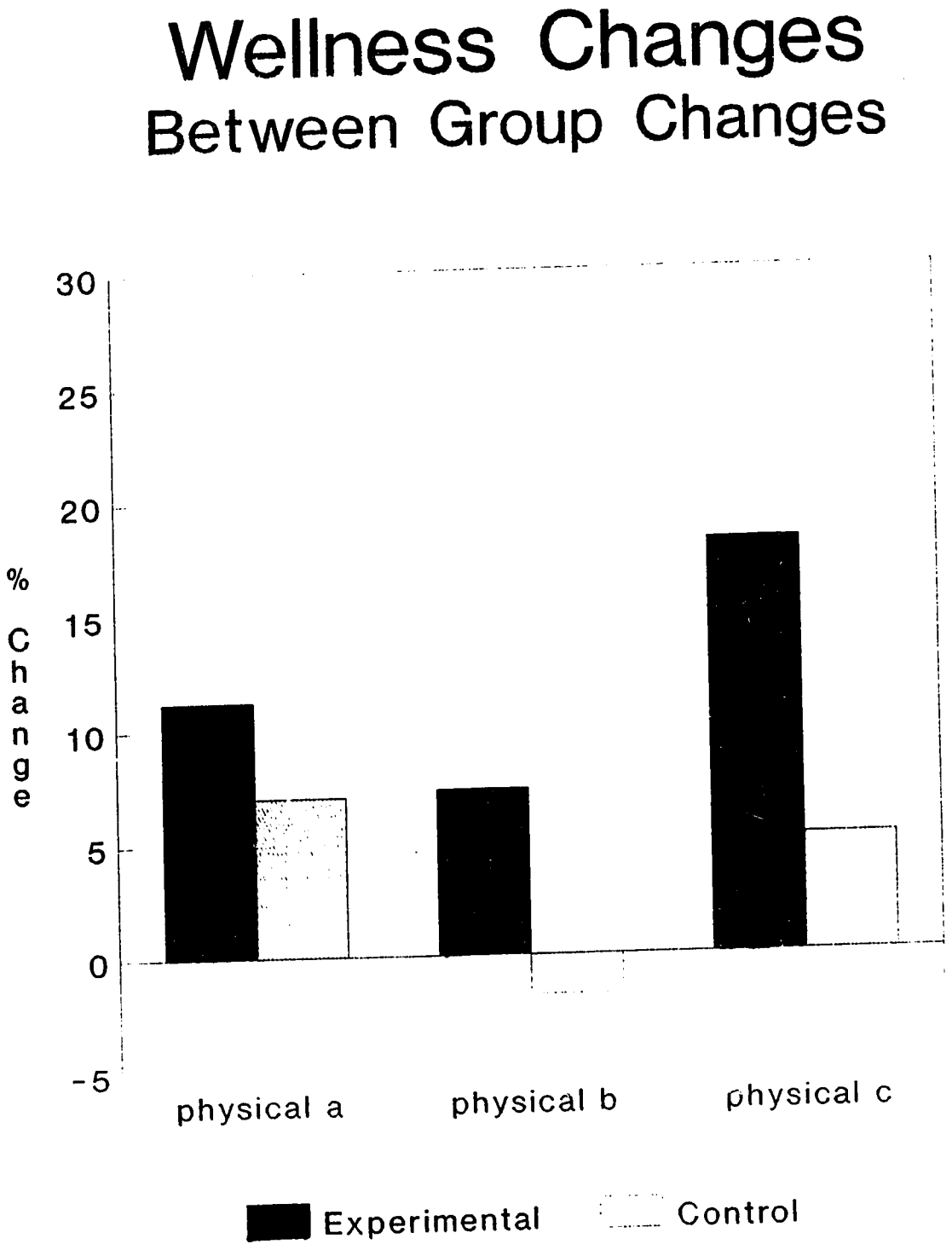


Figure 4. Association Between Health Related Fitness and Physical Wellness for Experimental Group

Wellness Changes
Within Group Changes

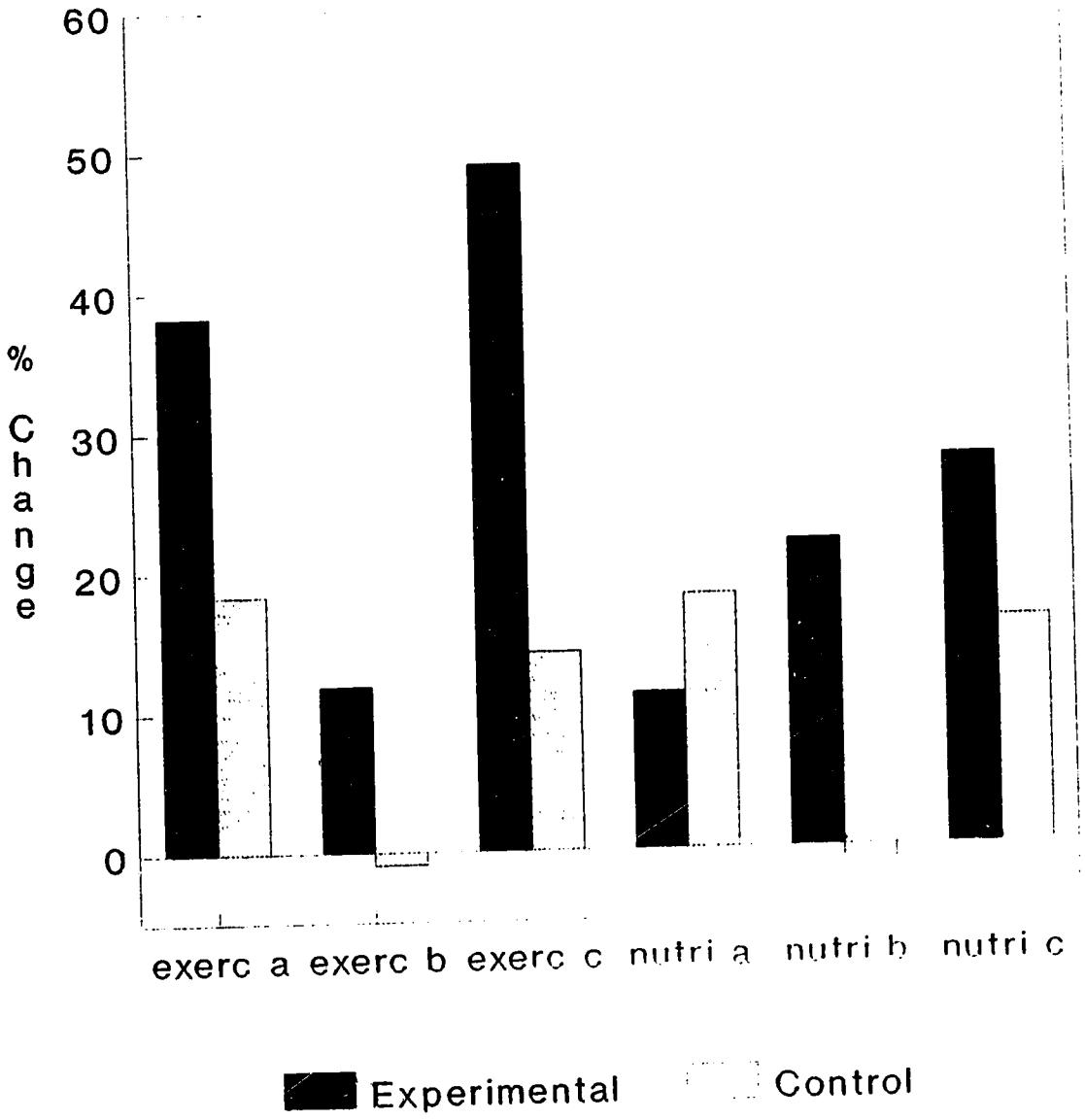


Figure 5. Within Group Wellness Changes for the Exercise and Nutrition Variables

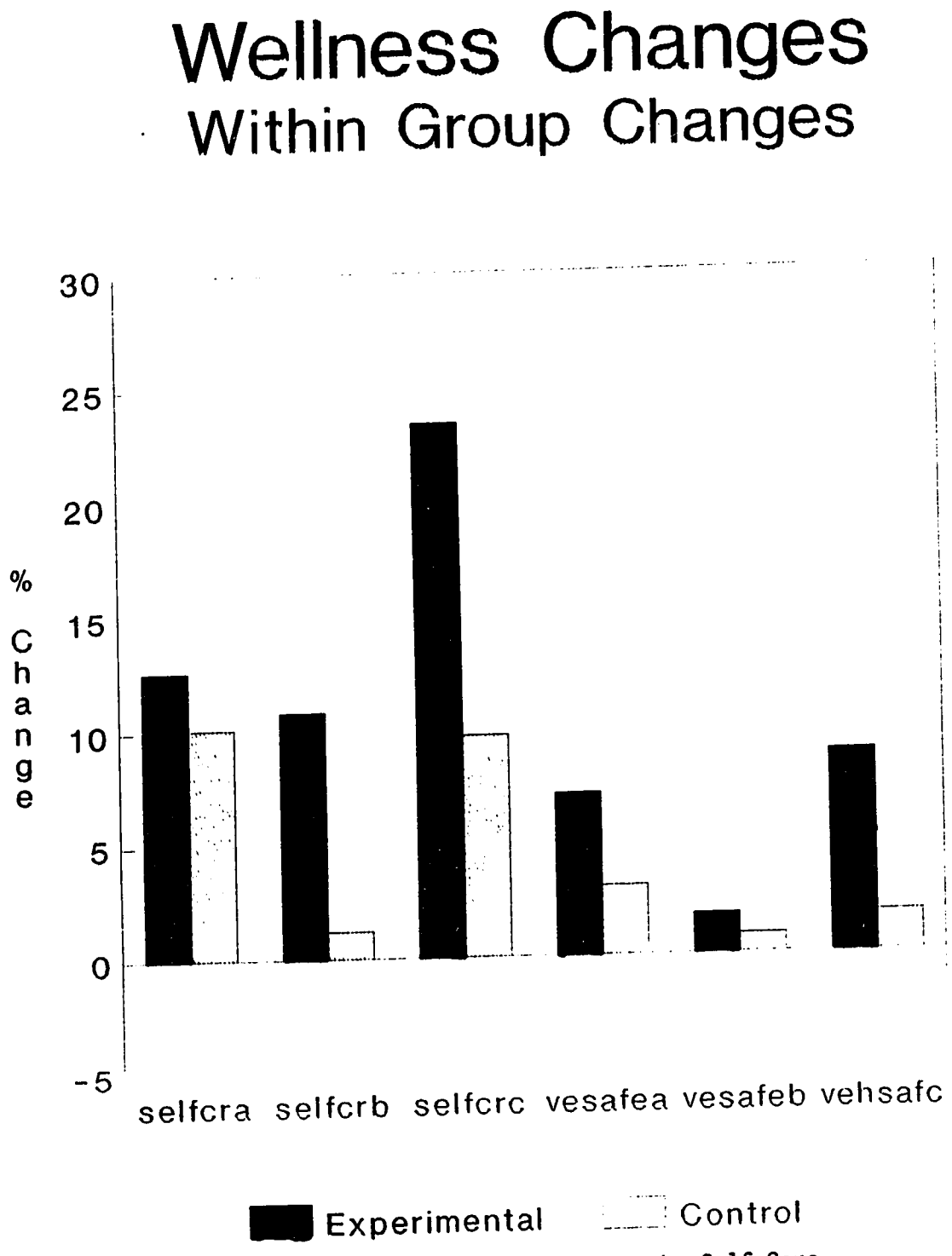


Figure 6. Within Group Wellness Changes for the Self-Care and Vehicle Safety Variables

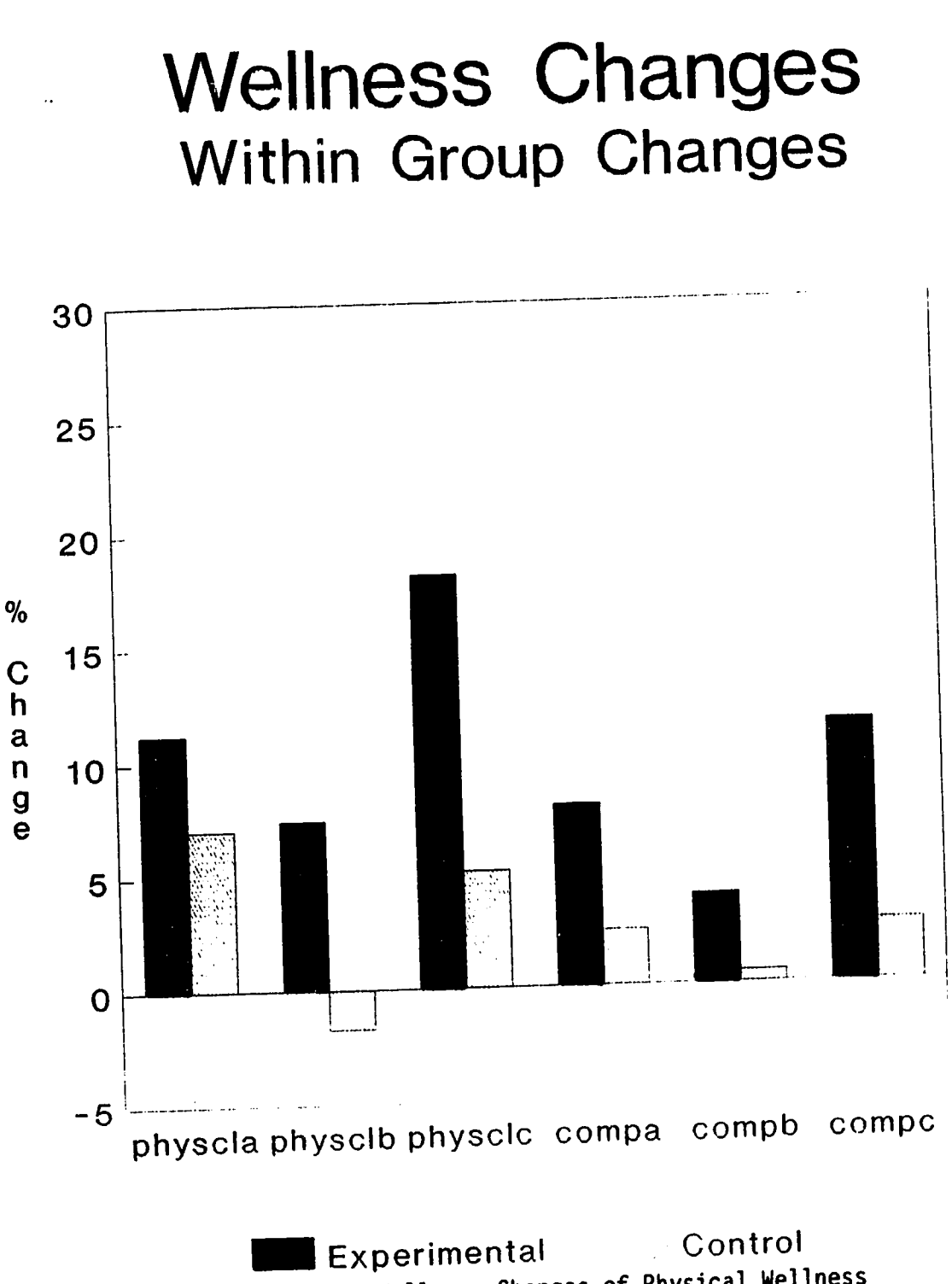


Figure 7. Within Group Wellness Changes of Physical Wellness and Overall Wellness

nutrition interventions. No significant changes took place between the two groups. The control group had a significant improvement ($p < 0.05$) in their body weight, grip strength, and aerobic fitness at six months (Figure 8, 9).

The percentage of change in the experimental group increased significantly ($p<0.05$) in curlups at six months (Figure 9). Improvement was made in the areas of upper body strength (27% at three months, and 32% at six months) and aerobic fitness (9% at three months and 5% at six months). No noticeable change was observed in grip strength, body weight or adiposity at six months.

Changes in the Nutritional Profile of the RCMP Officers

The three day food recall was used to examine the nutritional changes in the officers. Of particular interest were the areas of caloric consumption and the amount of fat, saturated fat and cholestrol in their diets. Only fifteen percent of the officers responded to the questionnaire and blood work. The data could not be analyzed at six months because of the poor response rate.

The Relationship Between Health-Related Fitness and Wellness in the RCMP Officers

The assumption that exercise and health behavior are related has been extensively discussed in the literature. Ample evidence links regular exercise to health and functional capacity throughout life. Exercise may also operate synergistacally with other lifestyle factors to promote better health and quality of life. Present data strongly suggest that elimination of sedentary habits would have a major impact on health for the population (Blair, 1988). One consideration for the

Table 17

Between Group Multivariate Tests of Significance For Changes In Officer Fitness Measures Over Six Months of Intervention (Means and Standard Deviations)

Fitness Variable	(0-3 mos) % Change A		(3-6 mos) % Change B		(0-6 mos) % Change C		Multivariate Test		
	Experimental	Control	Experimental	Control	Experimental	Control	F	df	P
Body Weight (kg)	1.3 (2.6)	1.6 (2.9)	0.9 (2.3)	1.3 (2.2)	0.5 (2.9)	0.4 (2.4)	0.62	3,48	0.61
Sum of Skinfolds (percentile)	10.6 (55.0)	40.5 (98.9)	1.1 (28.4)	-0.9 (38.1)	19.6 (110.8)	23.7 (56.7)	1.65	3,44	0.19
Adiposity (0-Scale:0-9)	-1.7 (25.1)	-4.0 (16.0)	3.9 (13.3)	3.0 (14.9)	0.8 (23.5)	-1.2 (21.7)	0.81	3,48	0.49
Grip Strength (percentile)	15.2 (45.6)	12.5 (66.5)	-7.8 (30.1)	-10.8 (30.6)	0.3 (43.5)	-9.8 (28.7)	0.53	3,45	0.67
Push Ups (percentile)	26.8 (90.5)	12.6 (49.3)	6.8 (19.1)	21.2 (88.8)	32.7 (90.0)	24.0 (87.8)	0.30	3,44	0.82
Sit and Reach (percentile)	38.2 (111.7)	0.0 (21.9)	17.9 (58.9)	12.4 (35.8)	45.6 (114.8)	7.8 (25.5)	0.73	3,38	0.54
Curl Ups (max. number)	60.2 (84.0)	59.5 (123.5)	-2.0 (37.4)	11.1 (80.7)	50.5 (80.5)	74.5 (167.1)	0.25	3,44	0.86
Aerobic Vo_2 max (ml:kg:min)	8.6 (19.1)	15.0 (15.3)	-1.7 (14.5)	-3.6 (12.4)	5.2 (15.2)	9.9 (15.1)	1.09	3,44	0.36

Table 18

Within Group Multivariate Tests of Significance For Changes In Officer Fitness Measures Over Six Months of Intervention (Means and Standard Deviations)

Fitness Variable	Control Group (0-3 mos) % Change A	(3-6 mos) % Change B	(0-6 mos) % Change C	Multivariate Test F	df	P
Body Weight (kg)	1.6+ (2.9)	1.3+ (2.2)	0.4 (2.4)	4.78	3,24	0.01*
Sum of Skinfolds (percentile)	40.5 (98.9)	-0.9 (38.1)	23.7 (56.7)	1.45	3,21	0.26
Adiposity (0-Scale:0-9)	-4.0 (16.0)	3.0 (14.9)	-1.2 (21.7)	0.84	3,24	0.49
Grip Strength (percentile)	12.5 (66.5)	10.8 (30.6)	9.8 (28.7)	3.21	3,21	0.04*
Pushups (percentile)	12.6 (49.3)	21.2 (88.8)	24.0 (87.8)	1.67	3,20	0.21
Sit and Reach (percentile)	0.0 (21.9)	12.4 (35.8)	7.8 (25.5)	2.49	3,16	0.10
Curl Ups (max. number)	59.5 (123.5)	11.1 (80.7)	74.5 (167.1)	1.97	3,22	0.15
Aerobic Vo_2 max (ml:kg:min)	15.0+ (15.3)	-3.6 (12.4)	9.9+ (15.1)	8.45	3,22	0.01*

*Indicates Multivariate Statistical Significance
+Indicates Univariate Statistical Significance

Table 19

Within Group Multivariate Tests of Significance For Changes In Officer Fitness Measures Over Six Months of Intervention (Means and Standard Deviations)

Fitness Variable	Experimental Group (0-3 mos) % Change A	(3-6 mos) % Change B	(0-6 mos) % Change C	Multivariate Test F	df	P
Body Weight (kg)	1.3 (2.6)	0.9 (2.3)	0.5 (2.9)	2.71	3,22	0.07
Sum of Skinfolds (percentile)	10.6 (55.0)	1.1 (28.4)	19.6 (110.8)	0.49	3,21	0.70
Adiposity (0-Scale:0-9)	-1.7 (25.1)	3.9 (13.3)	0.8 (23.5)	0.71	3,22	0.56
Grip Strength (percentile)	15.2 (45.6)	-7.8 (30.1)	0.3 (43.5)	1.44	3,22	0.26
Push Ups (percentile)	26.8 (90.5)	6.8 (19.1)	32.7 (90.0)	2.50	3,22	0.09
Sit and Reach (percentile)	38.2 (111.7)	12.9 (50.5)	45.6 (114.8)	1.60	3,20	0.22
Curl Ups (max. number)	60.2+ (84.0)	-2.0 (37.4)	50.5+ (80.5)	4.95	3,20	0.01*
Aerobic Vo_2 Max (ml:kg:min)	8.6 (19.1)	-1.7 (14.5)	5.2 (15.2)	1.84	3,20	0.17

*Indicates Multivariate Statistical Significance
+Indicates Univariate Statistical Significance

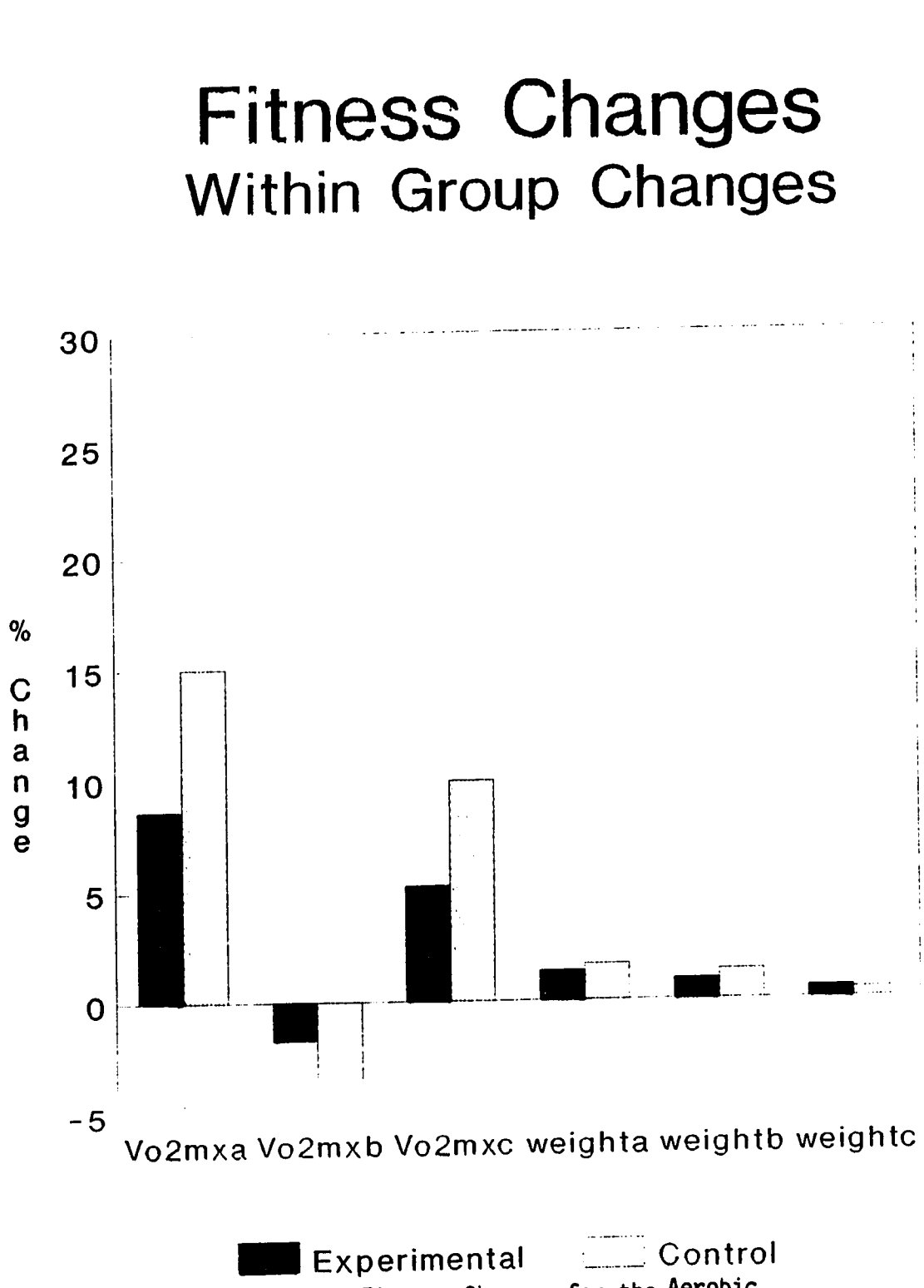


Figure 8. Within Group Fitness Changes for the Aerobic Power and Weight Variables

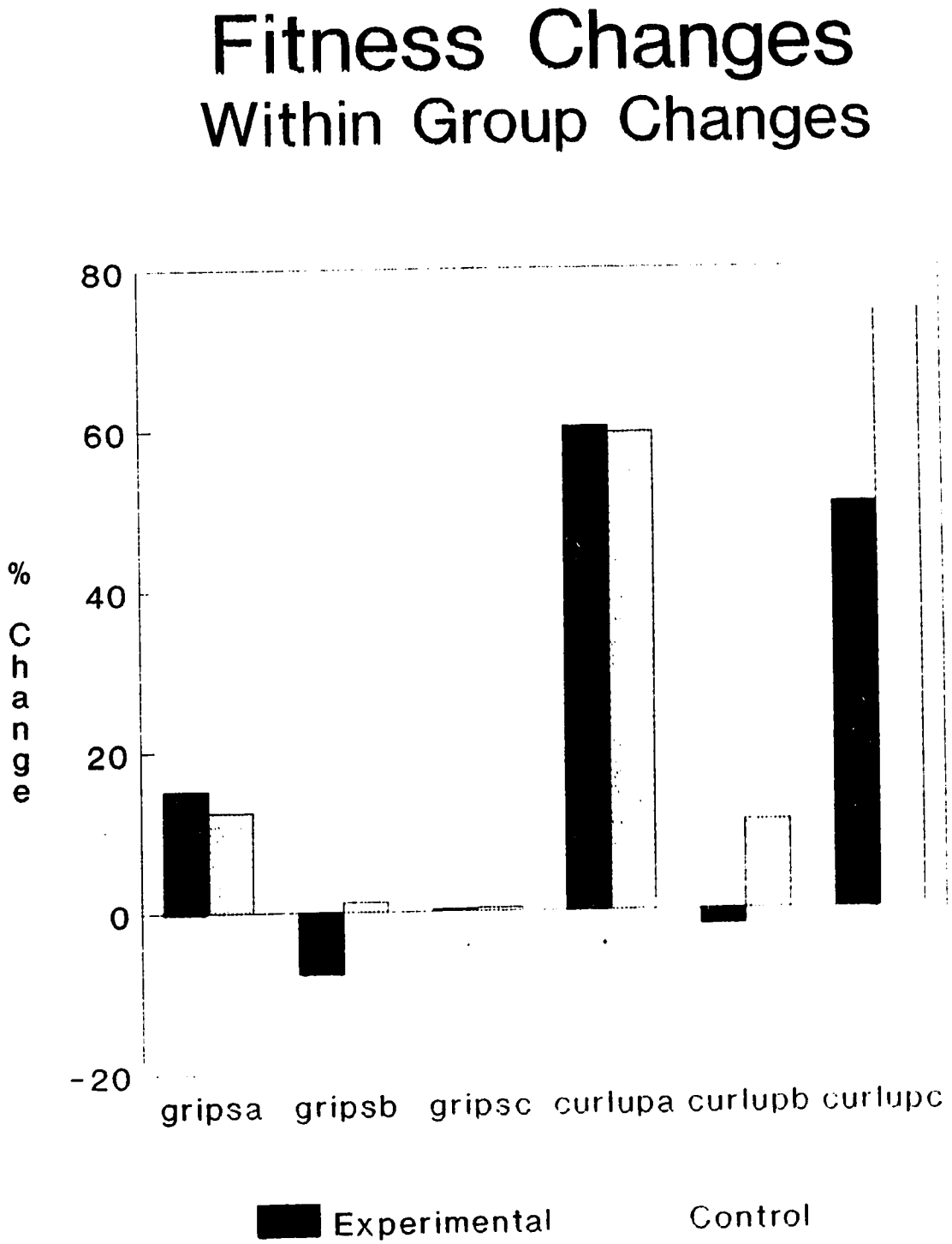


Figure 9. Within Group Fitness Changes for the Upper Body Strength and Abdominal Strength Variables

Association between Health Related Fitness
and Physical Wellness for Experimental Group

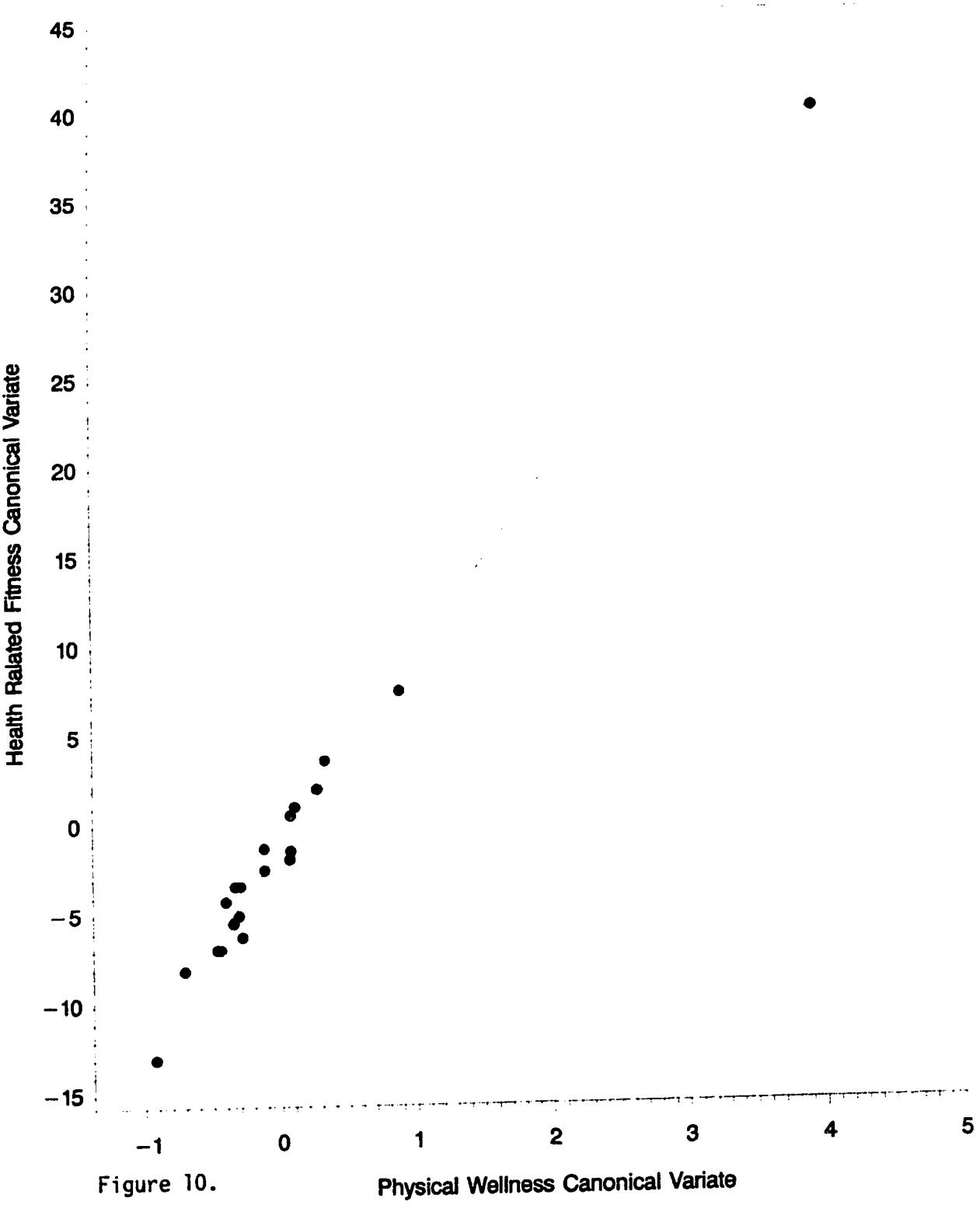


Figure 10.

study was to examine the relationship between the health related fitness variables and the wellness variables. To accomplish this analysis, Canonical correlation was used, applying the SAS statistical package.

The associations between the health-related fitness variable set and the wellness variable set indicated little association existed between health-related fitness and wellness over the six months of intervention in the control group. The relationship between the two sets of variables was significant ($p<0.05$) in the experimental group at six months. Specifically, a relationship was observed ($r = 0.96$, Figure 10) between physical wellness and the health-related fitness variable set, indicating that an association existed between exercise behavior, as measured by the LAQ, and the health-related fitness variables. Strength (0.89) and flexibility (0.71) loaded highly with the lifestyle cannonical variate and physical wellness (0.62) loaded moderately with the physiological cannonical variate. (Appendix Q).

The final research question to be addressed was the effectiveness of the Lifestyle Assessment Questionnaire to reflect changes in well-being in the RCMP officers. A positive association ($r = 0.96$) was observed in the experimental group between changes in physical wellness and the changes in health-related fitness. Strength (0.89) and flexibility (0.71) loaded highly with the lifestyle cannonical variate and physical wellness (0.62) loaded moderately with the physiological cannonical variate. Little association existed between the two variable sets in the control group. The results of the analysis indicated a significant relationship ($p < 0.05$) between physical wellness changes as measured by the LAQ, and health-related fitness changes.

The Characteristics of the Returnees and Non-Returnees in the RCMP Officers

The Interview Questionnaire was used to identify the characteristics of those officers who returned for testing and those officers who did not return for testing at six months. The major purpose of the instrument was to determine whether officers who did not return for testing were program adherers or non-adherers. Table 20 describes the findings of the Interview Questionnaire. Fifty percent of the non-returnees stopped following the program at three months. The remainder of the group who did not return for testing reported personal or occupational reasons as barriers to program adherence. Fifty six officers returned for all three tests over six months.

Table 20

Summary of Characteristics of RCMP Returnees and Non-Returnees

Characteristic	Returnees Percent	Non-Returnees Percent
1. The factors most influencing officer participation were:		
a) improve one's lifestyle	40	37
b) improve one's fitness	20	25
c) peer group camaraderie/influence	40	13
d) poor lifestyle risk-factors	0	13
2. The most important personal reasons returnees participated in the program were:		
a) self improvement	40	n/a
b) stress reduction	20	n/a
c) ageing	20	n/a
d) inactive lifestyle	20	n/a
3. The major occupational reasons non-returnees did not participate in the program were:		
a) lack of time off	n/a	35
b) demanding work schedule	n/a	25
c) job related injuries	n/a	25
d) time in court	n/a	13
e) lack of job seniority	n/a	13
4. The most important program factors influencing participation in returnees were:		
a) convenient time and location	80	n/a
b) individualized programs	80	n/a
c) positive feedback	60	n/a
d) good communication	40	n/a
e) fun and enjoyment	40	n/a
f) good program variety	20	n/a
5. The most important program factors influencing non-participation in the non-returnees were:		
a) lack of program variety	n/a	63
b) inconvenient time and location	n/a	38
c) exercising alone	n/a	13

Chapter 5

Discussion and Conclusions

Introduction

The effectiveness of two stages of a Wellness Program featuring six months of fitness intervention and of three months of nutrition education on the wellness of RCMP officers in the Victoria subdivision were investigated. The discussion is organised as follows:

1. The health and wellness attitudes and behaviors of the RCMP officers.
2. Changes in health-related fitness and wellness in the RCMP officers.
3. The relationship between health-related fitness and wellness in the RCMP officers.
4. The effectiveness of the Lifestyle Assessment Questionnaire to reflect changes in well-being in the RCMP officers.
5. The characteristics of returnees and non-returnees in the RCMP officers of the Victoria subdivision.

The conclusions of the research and recommendations for future research are then presented.

1. The Health and Wellness Attitudes and Behaviors of the RCMP Officers of the Victoria Subdivision

The nature and extent of the health and wellness practices of RCMP officers in the Victoria subdivision was investigated through the first research question. The Standardized Test of Fitness (Fitness and Amateur Sport, 1981), Lifestyle Assessment Questionnaire (The National Wellness Institute, (1988), Clinical Health Screening Questionnaire

(Viszoly, 1989), Nutrition Questionnaire (Hafen et al., (1988), and Participant Needs Assessment Questionnaire (Hoeger, 1988) were used to establish a physiological and wellness profile for the RCMP officers.

Police officers have been reported as being lower than average in several health-related aspects of fitness including aerobic fitness, body composition, and flexibility (Price, 1978; Wood et al., 1982). The RCMP officers from the Victoria subdivision were lower than average in aerobic fitness. The major lifestyle risk-factor for the officers was being overweight. Eighty-two percent were identified as having this problem. These findings demonstrated the need to incorporate fitness and nutrition education in the officers of the Victoria subdivision. The findings add to previous research (Price, 1978; Wood et al., 1982) indicating that RCMP officers have physiological characteristics similar to police officers in other law enforcement agencies.

The wellness ratings for the officers, as measured by the LAQ, indicated they were poor in the exercise component of physical wellness. The officers also scored below average in nutrition and self-care, two of the other components of physical wellness. They scored good in vehicle safety, the final component of physical wellness. These results parallel the low health-related fitness scores in the RCMP officers and suggest that officers who score low in fitness have low physical wellness ratings. A positive relationship ($r = 0.96$) was observed between health-related fitness and physical wellness in the officers of the experimental group at six months. No studies in the literature have investigated the wellness characteristics of police officers and the relationship between health-related fitness and wellness.

The lifestyle quality-of-life indicators showed that although officers were poor or below average in several physiological and wellness factors, they perceived themselves as good in health, mostly satisfied with life, satisfied with their jobs, positive in their self-image. They reported that they frequently used stress reduction strategies at work. These results demonstrate that officers' perception of their health and their actual physiological and wellness characteristics are different. Bonney, (1978), reported that Orange County police officers were generally concerned about physical fitness but that their exercise efforts were too irregular or too feeble to achieve success.

The attitudes and opinions of the RCMP officers as they related to the Wellness program are discussed and highlight the high perceived need for implementing a broad based wellness intervention. The lifestyle components that officers most wanted to improve were fitness, stress management, nutrition, weight management and low back care. Topics for personal growth showed a similar pattern with exercise programs, stress reduction, nutrition, weight reduction and relaxation being the most common topics selected. The range of health-enhancing physical fitness activities highlighted the need for activity which could be adapted to fit work schedules and provide a strong educational component. It also emphasized the preference for strength enhancing activity, which reflects the nature of police work. Moulson-Litchfield, Freedson (1986) have suggested that muscular strengthening exercises for the various areas of the body increase the ability of the specific muscles to generate force, therefore, stronger officers can perform specific job related tasks with less effort than weaker officers.

Charles (1983) identified strength-related activities such as wrestling suspects into submission, intervening in physical disputes and pulling victims from wrecked vehicles as common in police work. The work of Bonney (1978) demonstrated that police officers were generally concerned about physical fitness and they believed regular exercise to be essential to living a vigorous and healthy life. These results reflect the need for RCMP officers to be provided with a program which was comprehensive and which would enhance overall wellness.

The nutritional attitudes of the officers indicated their perception of the foods, the amounts, where, and when they ate were normal. However, it was interesting to observe that nutrition was the third most popular life-style area officers wanted to improve and the third most chosen topic for personal growth. This finding suggests the perceived need for improvement in the nutritional area and the importance of a nutritional education program for RCMP officers.

Summary

RCMP officers perceive themselves as being in good health, yet several fitness and wellness scores indicated they were below average or poor compared to general norms. This problem has been reported in police officer physiological profiles throughout the literature (Price, 1978; Bonney, 1978; Bahrke and Olin, 1981; Fraser, 1986; Gettman, 1988). However, there have been no reports on the wellness profiles of police officers. Furthermore, the profile of the RCMP officers illustrates the need for a diverse, broad based wellness strategy to enhance overall well-being.

2. Changes in Fitness and Wellness in the RCMP Officer

Changes in officer exercise behavior, fitness and wellness

ratings, and sick leave were investigated over the six months of wellness intervention in the Victoria subdivision. Specifically, the second research question attempted to determine if an organized wellness intervention could alter the fitness and wellness of RCMP officers. The Lifestyle Assessment Questionnaire was used to measure wellness changes and the fitness test battery was used to measure changes in fitness. The Six Month Follow-up Questionnaire (Hafen, 1988) was used to measure exercise behavior and absenteeism.

A significant decrease ($p<0.05$) in the number of officers who did not exercise was observed in the experimental group. An increase in the number of officers exercising less than three times per week and more than three times per week was also observed. Conversely, there was a decrease in the number of officers exercising more than three times per week in the control group, as well there was an increase in the number of officers not exercising. Although the changes were not significantly different, the trend was towards improvement in exercise behavior. Bonney (1978) has suggested that for an officer to look his best, feel his best, and perform his best, he must exercise regularly and vigorously. Furthermore, the activity required of a police officer on the job falls below the level necessary to maintain a fit body. At six months, sixty-one percent of the experimental group in the Victoria subdivision were exercising more than three times per week in vigorous exercise, while the remainder exercised less than three times per week. The impact of the first stage of the wellness intervention of increasing physical activity in the RCMP officers produced a positive trend in the RCMP officers.

The effect of physical activity on absenteeism has been

investigated and evidence indicates that on the short term, participants in an exercise program are absent less often when compared to non-exercising participants (Baun, Bernacki, Tsai, 1986; Bowne et al., 1984). No significant change in sick-day frequency was observed over the six months of the current wellness intervention. However, eight percent of the experimental group reported having more-than-five sick days following the first six months of intervention, while fifteen percent of the control group reported having more-than-five sick days over the same period.

Most previous research investigating the effects of physical activity upon law enforcement officers have focused upon the short-term absenteeism benefits to officers. Fraser (1986) reported drops in absenteeism in the range of 18 to 42 percent. A reduction in sick time was also reported by Moulson-Litchfield and Freedson (1986). A longtitudinal approach is needed to examine what happens to absenteeism rates in police officers over a longer period of time. How do they differ from the short-term results?

The current literature on the wellness of police officers has been directed towards their physical well-being (Bahrke and Olin, 1981; Moulson, 1978; Mealey, 1979; Charles, 1982; Gettman, 1988). No reports of research examining total well-being of police officers were found. Improvement in several areas of wellness were observed in the RCMP officers in both groups in the Victoria subdivision. Significant improvements ($p < 0.05$) were observed in physical wellness, exercise, nutrition, self-care and vehicle safety. Of particular interest was the significant improvement ($p < 0.05$) in social wellness, emotional wellness and overall wellness. These findings suggest that fitness and nutrition

intervention have potential for impact upon the total well-being of police officers.

Seaward (1988) has suggested that physical activities have spin-off effects upon a persons overall wellness. For example, he cited several participants in a jogging and aerobic class creating wellness goals geared at strengthening self-reliant behavior, which is a form of emotional well-being. The achievement of these goals have an effect upon the area of emotional wellness. It was possible that similar spin-off effects took place in the RCMP officers. Other factors which may have contributed to these changes were increased peer and family support, changing the work environment and the changing of work schedules. This could help law enforcement administrators justify the implementation of wellness programs for their agencies.

The selected fitness changes which took place in the RCMP officers over the six months of fitness and nutrition intervention were directed towards the health-related aspects of fitness. Significant changes ($p < 0.05$) in the experimental group included the area of curl-ups, while the control group improved significantly in the areas of body weight, and aerobic fitness. These results demonstrate one of the problems encountered in this field research attempt. The ability to control for reactive effects of systematic testing in the RCMP sample was very difficult. One potential area contributing to this contamination included the inability to control for communication between the detachments. The RCMP organization has excellent communication links because of the nature of their work, and as a result, there was communication about the wellness program amongst detachments. This could be utilized as a strength for developing the

program, but under a controlled research investigation it caused contamination between officers and detachments in the two research groups.

A second area of contamination occurred because of the competitive nature of RCMP officers. The research was designed to test officers every three months. It was possible that because each officer was to be re-tested and that their results were to be compared to the previous test, they were motivated to show improvement. In view of the fact that one group received the program while the control group received no program, this may have happened. Also linked to this problem was the possibility of the control group perceiving the program to be beneficial and that they would not wait six months to receive the intervention.

Other factors possibly contributing to this problem included awareness of being part of a research project, a modified work environment, new patterns of social interaction through exercise and physical activity groups and knowledge of feedback from the wellness testing.

Upon closer examination several factors were found which may have caused the effect. There was a high percentage (85%) of officers in the control group who were physically active at the start of the program. Upon closer investigation, forty-four percent of the control group had adopted or changed their physical activity patterns. This was observed through the comments section each subject provided at the testing session. Appendix O provides a compilation of the results from the analysis of the comments. Also included in the appendix is an example of an officer in the control group who had kept a comprehensive record

of his changes in activity patterns. Similar problems of control group improvement have been reported in the literature in examining the effects of fitness upon selected populations (Gettman, Pollack and Ward, 1982; Morgan and O'Connor, 1988). Collis (1977) has suggested that implementation of fitness interventions can be isolated to one group in a population and the intervention will have a rippling effect upon others in the population.

Summary

The wellness program encompassed two levels of intervention over six months. The experimental group received fitness for the first three months, and fitness and nutrition education for the second three months. The control group received only testing. The experimental group:

-had fewer number of sick days than the control group;

-enhanced their physical wellness significantly ($p < 0.05$) more than the control group;

-increased several areas of wellness at six months;

-increased their overall wellness profile significantly ($p < 0.05$);

-demonstrated greater improvement in abdominal strength.

The control group improved significantly ($p < 0.05$) in body weight, grip strength and aerobic fitness at six months.

The first two stages of the wellness intervention, featuring six months of fitness and an additive three months of nutrition education suggest that improvement in officer fitness and well-being has occurred in both research groups.

3. The Relationship Between Health-Related Fitness and Wellness in the RCMP Officers

The third research question attempted to determine if a relationship existed between the health-related fitness variables and the wellness variables. The assumption that exercise and health behavior are related has been extensively discussed and Blair (1988) has reported strong associations between nutrition (caloric intake) and fitness (weight control). He further stated that very little is known for certain, about the relationship between exercise and health behavior, and that ample evidence links regular exercise to health and functional capacity.

The relationship ($r = 0.96$) observed in the experimental group between the health-related fitness variables and physical wellness variables was significant ($p<0.05$). This link between fitness and wellness is important when addressing the problems of designing wellness programs for police officers. It suggested that the implementation of health-related fitness programs may increase the physical well-being of police officers.

4. The Effectiveness of the Lifestyle Assessment Questionnaire to Reflect Changes in Well-Being in the RCMP Officers

The Lifestyle Assessment Questionnaire (LAQ) was designed to assess the current level of wellness and the potential life risks or hazards an individual currently faces (Wolf et al., 1990). One method which determined the effectiveness of the instrument was to assess the relationship between the health-related fitness changes and the wellness changes in the RCMP officers. If the LAQ reflected officer changes in fitness and wellness, it would demonstrate the selectiveness

of the instrument. A significant positive relationship ($r = 0.96$) existed in the experimental group between physical wellness, as measured by the LAQ, and health-related fitness. This important finding demonstrates one measure of effectiveness for the Lifestyle Assessment Questionnaire, that it reflects fitness changes in the RCMP officers.

Another measure of effectiveness of the LAQ was how well the officers responded to the questionnaire. The officers encountered several problems during the administration of the questionnaire. The first problem centered around how they replied to the questions. A five point scale was used to rate the responses of the officers. The scale consisted of:

A - almost always

B - very frequently

C - frequently

D - occasionally

E - almost never.

In the very sensitive lifestyle area of Drug Usage and Awareness, the officers were adamant that an absolute reply "never" must be included. The unique nature of the population suggests that this area be changed if the LAQ is to be effective with law enforcement agencies.

The second problem encountered by the officers was in the Health Risk Appraisal section of the LAQ. The inclusion of the question addressing "the number of times in the past year the respondent witnessed or was involved in a violent act or attack. . ." was inappropriate for the police population.

These two problems indicate there is a need to adapt the LAQ to address the unique characteristics of the RCMP population. Furthermore,

for the instrument to be effective in measuring the changes in well-being in the officers, these modifications should be made.

The final problem encountered when addressing the effectiveness of the LAQ to measure changes in well-being in police officers, was with the written summary document the research team received on the responses of the subjects. The LAQ instrument uses the reply of the subject to determine health-risk factors in the Health Risk Appraisal section of the questionnaire. The reply is compared to the norms established for the instrument and the "Top Ten Risk Factors" for the subject are reported. In the area of Total Cholestrol and High Density Lioprotein, if the individual does not know his/her levels, the "normative score" for that subject was inserted, based on age, height, weight and sex. A discrepancy was observed between using "actual" cholestrol data and "normative" cholestrol data. That is, the ranking of risk factors associated with cholestrol levels (heart attack, stroke and diabetes millitis) changed. (Appendix R).

5. The Characteristics of Returnees and Non-Returnees in the RCMP Sample

The Interview Questionnaire was used to examine the characteristics of those officers who returned for testing at six months, and those officers who did not return. The primary purpose of the interview was to determine whether officers who did not return for testing were program adherers or non-adherers. Franklin (1988) has reported dropout rates in adult fitness programs as varying from 9% to 87%. Furthermore, many variables have been examined and related to exercise dropouts. Shephard (1988) reported lack of time and lack of suitable facilities as barriers to participation in corporate settings.

A similar finding existed in the RCMP officers, who reported a "lack of time off" and "time in court" as major barriers to participation in the Wellness program. The Canada Fitness Survey (1983) also reported similar obstacles to increased physical activity. It further reported injury or illness as barriers. In the non-returning RCMP officers, job-related injury was reported as an occupational reason for non-participation in the program. Other obstacles to participation in non-returning officers included lack of program variety, inconvenient time and location, and exercising alone. Similar findings have been reported in the literature (Franklin, 1988; Wankel, 1987; Wankel, 1985; Gettman et al., 1983; Pollock et al., 1982).

The factors most influencing returning RCMP officers to continue participating in the program included individualized programs, positive feedback, good communication, fun and enjoyment, and regular routine, all of which have been reported as positive factors influencing adherence (Franklin, 1988; Gettman et al., 1983; The Canada Fitness Survey, 1983; Pollock et al., 1982). The reasons for participating in the program for the RCMP officers were similar to those respondents to The Canada Fitness Survey (1983), including to improve fitness and lifestyle and group camaraderie. The personal reasons were directed towards self-improvement and stress reduction to enhance their inactive lifestyle.

The information from the investigation of returning and non-returning RCMP officers in the Victoria subdivision indicated that fifty percent of the officers ceased following the program at three months. The remaining fifty percent of the officers interviewed did not return for testing because of personal or occupational related reasons, and were not program drop-outs.

Conclusions

The following conclusions can be made as a result of the investigation of the RCMP officers in the Victoria subdivision:

1. RCMP officers perceived themselves as having good health attitudes and behaviors, yet their physiological and wellness profiles demonstrated they were below average or poor in several health-related fitness and wellness variables.
2. During the six months of wellness intervention, featuring a fitness and nutrition education, a positive trend was observed towards improvement in the fitness and wellness of the officers in both the experimental and control groups.
3. A positive relationship existed between health-related fitness and wellness in the RCMP officers.
4. The Lifestyle Assessment Questionnaire appears to have reflected changes in officer well-being. However, several changes are necessary to improve the effectiveness of the instrument in law enforcement populations.
5. The adherence problems of RCMP officers are similar to those in community and corporate settings.
6. In exploratory, field research investigations, it was difficult to isolate actual effects because of problems with research design. Specifically, the potential sources for contamination were diversive and must be addressed.

Recommendations

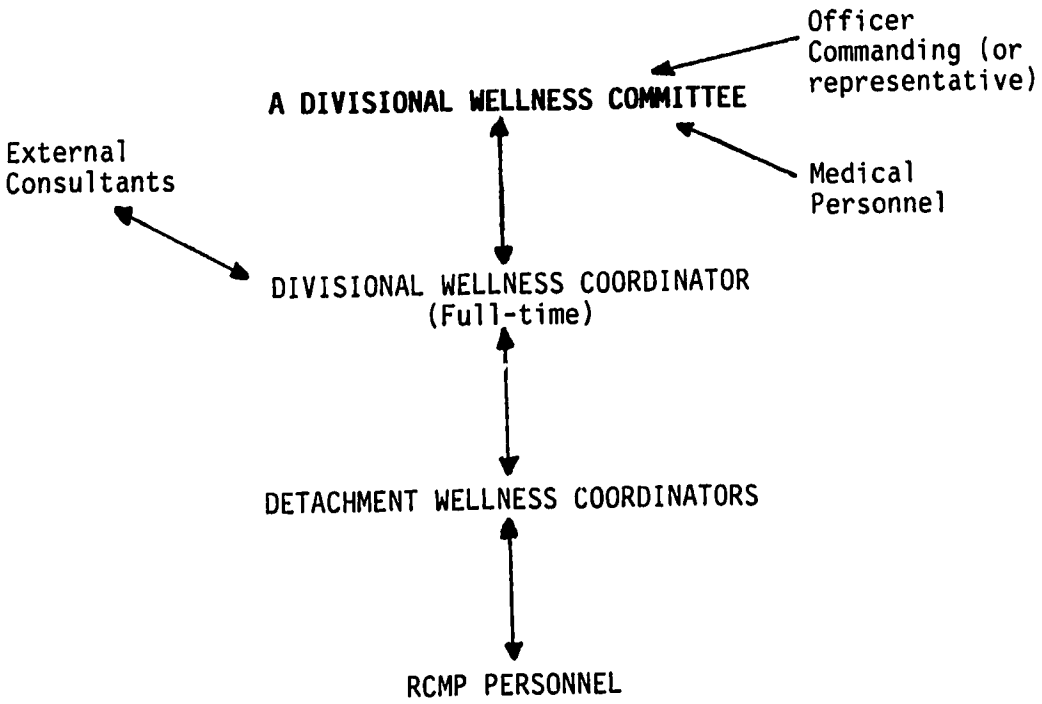
The following recommendations are suggested as a result of the study:

Program Related

1. The approach to enhancing well-being in the RCMP officers of the Victoria subdivision should focus on a multi-dimensional program which encompasses the physical, spiritual, emotional, occupational, and intellectual needs of the individual.
2. The organization of the Wellness Program should utilize the following model (Figure 5) which emphasizes effective policy decisions; effective communication links between units; optimal motivation for personnel; and effective organization of administrative procedures.
3. Detachment Coordinators must be continually updated to keep officers informed and provide answers to questions the officers may have on the Wellness Program. The organization of support groups could be developed through watch or shifts in the individual detachments.
4. Medical screening prior to testing is important for identifying physical contraindications. However, a remedial program is necessary for those officers who fail to get medical clearance to allow them to participate in the intervention program.
5. Based on the responses of the officers, future wellness interventions to be implemented in the Victoria subdivision should include back health, smoking cessation, and stress management based on the responses from the officers.

Research Related

1. A Lifestyle Assessment Questionnaire could be developed for the RCMP populations, which addresses some of the unique characteristics of police officers identified in the study.



The keys to this model are:

that the Wellness Committee is composed of people from all levels;

the Divisional Coordinator is full-time;

The Detachment Coordinators are continually updated and act as the important daily link with the personnel;

rapid and effective communication between all levels is critical -- the Division Coordinator is responsible for assuring this.

Figure 11. Wellness Program Organizational Model

2. An investigation of the effects of using actual data versus normative data for establishing risk factors in the Lifestyle Assessment Questionnaire, University of Wisconsin (1988) is needed. The findings of this study were inconclusive as to what effects, if any, take place using the normative data.
3. The research design for investigating the well-being of police officers must address the reactive effects of systematic testing experienced in this field research. The contamination effect was directly related to the improvement in fitness and wellness in the control group. It is suggested that the assignment of treatment or no treatment be determined by detachment. All officers in the detachment should receive or not receive the treatment. This would minimize the confounding program effects within each detachment. Another possible solution to the research design problem would be to implement two pre-tests before the intervention, and post-tests at three and six months. This could help to eliminate the interaction between the pre-testing and the intervention and strengthen the research design.
4. The phenomenon of "positive contamination" as suggested by Collis (1977) and its application to law inforcement agencies requires further investigation. Does this phenomenon cause a "rippling effect" across populations? What adjustments in research design need to be made to control for this situation? Can pertinent conclusions be drawn from these investigations?
5. Further research directed at some of the program adherence issues in law enforcement agencies is needed. Specifically,

the question of motivation of officers to continue participating in wellness intervention strategies would be useful.

The Wellness Challenges for the Future

Quality-of-life was an important issue of the eighties. As a new decade begins there is no reason to believe this issue will not continue to grow. Hoeger (1987) has stated that a better and healthier life is something which every person needs to strive to attain. The biggest challenge to be faced in the next few years is to teach people how to take control of personal health habits through practicing positive lifestyle activities that will decrease the risk of illness and help facilitate total well-being (Dickman, 1988).

This concept must be provided for law enforcement agencies to help resolve some of the unique health-related problems they experience. The application of wellness strategies incorporating physical, intellectual, social, emotional, occupational and spiritual opportunities may lead to optimal functioning in law enforcement personnel. As suggested through this research project, physical fitness and nutrition have more than physiological benefits for police officers.

Much research to date on police officers has attempted to examine only the physiological effects of physical fitness and nutrition interventions. They have examined one part of the total individual. However, as more research attempts to examine the effects of broader, wellness strategies, more will be known about achieving optimal well-being, the roadblocks to wellness and the benefits derived from the process.

Through the implementation of Wellness interventions in law enforcement agencies, the development of positive lifestyles may be possible. It is through research examining these broader aspects of police officer lifestyles that answers to the health problems facing law enforcement agencies will be found. This expanded focus is much needed for the enhancement of police officer well-being.

In summary, this research has demonstrated the effects of two levels of wellness intervention upon the RCMP officers of the Victoria subdivision. It has identified wellness characteristics of RCMP officers and provided insight into some of the unique problems experienced in the implementation of wellness programs in law enforcement agencies. It further demonstrated the need for more research in the development of wellness strategies for RCMP officers.

Bibliography

American College of Sports Medicine. (1980). Guidelines for graded exercise testing and prescription. Lea and Fibiger, 1-9.

American Heart Association. (1972) Exercise testing and training apparently healthy individuals: A handbook for physicians. vii-1.

Ardell, D.B. (1986). High level wellness: An alternate to doctors, drugs and disease. Berkeley, California: Ten Speed Press.

Astrand, P., Rodhal, M. (1977). Textbook of work physiology. Physiological bases of exercise. McGraw-Hill Company, New York, 333-358.

Atkinson, J. (1971) A handbook for interviewers. Office of Population Censuses and Surveys, Social Research Division, London.

Bannister, E.W., Allen, M., Fadl, S., Bhaktham, G., Howard, D. (1988). Contemporary health issues. Boston, Mass.: Jones and Bartlett Publisher.

Bahrke, M.S., Olin, W.R. (1981). A physical fitness program for police personnel. The Police Chief, 48, 8, 42.

Baun, W., Bernacki, E., Tsai, S. (1986). A preliminary investigation of a corporate fitness program on absenteeism and health care cost. Journal of Occupational Medicine. 28, 1, 18-22.

Blair, S.N. (1988). Exercise within a healthy lifestyle. In Dishman, R.K., Exercise adherence. Its impact on public health, Human Kinetics, Champaign, Illinois.

Bonney, L.A. (1978). Case for an inservice training program for police officers. The Police Chief. 45, 8, 44-45.

Bowne, D., Russel, M., Morgan, J., Optenberg, S., Clarke, A. (1984). Reduced disability and health care costs in an industrial fitness program. Journal of Occupational Medicine. 26, 11, 809-816.

Brosmer, R.J. (1987). Exercise adherence. Problems and strategies. Fitness in Business, 106-110.

Brosmer, R.J. (1987). Exercise Adherence, problems and strategies. Fitness in Business, 2, 3, December, 100-105.

Brown, R.G.; MacCarthy, B.; Gotham, A.M.; Der, G.J. et al. (1988). Depression and disability in parkinson's disease: A follow-up of 132 cases. Psychological Medicine. 18(1), 49-55.

Campbell's Survey on Well-being in Canada. (1989). The Canadian Fitness and Lifestyle Research Institute. Ottawa.

Canadian Association for Health, Physical Education and Recreation (1966). The physical work capacity of Canadian children.

Carroll, V. (1980). Employee fitness programs: an expanding concept. International Journal of Health Education. 23, 1, 35-41.

Charles, M.T. (1982). Women in policing: The physical aspect. Journal of Police Science and Administration. 10, 2, 194-205.

Chisholm, D., Collis, M., Kulak, L., Davenport, W., Gruber, N. (175). Physical activity readiness. British Columbia Medical Journal. 17, 11, 114-119.

Collis, M. (1977). Employee fitness. Government of Canada, Ministry of Supply, 6-14, 114-119.

Cooper, K. (1982). The aerobics program for total well-being. New York: Bantam Books.

Corbin, C., Lindsey, R. (1988). Concepts of physical fitness. Dubuque, Iowa: Wm. C. Brown Publisher.

DeFriese, G.H. (1990). Health risk assessment. Suggested directions for research. American Journal of Health Promotion. 4, 5, June, 373-377.

Dickman, S.R. (1988). Pathways to wellness. Life Enhancement Publications, Champaign, Illinois, 483-487.

Dishman, R.K. (1988). Exercise adherence. Its impact on public health. Champaign, Illinois: Human Kinetics Publisher, 349-367.

Dishman, R.K., Sallis, J.F., Orenstein, D.R. (1985). The determinants of physical activity and exercise. Public Health Reports. 100, 2, March-April, 158-171.

Drews, F.R. (1984). The army's high priority physical fitness program. Journal of Physical Education, Recreation and Dance. November-December, 47-50.

Elias, W., Murphy, R. (1986). The case for health promotion programs containing health care costs: A review of the literature. The American Journal of Occupational Therapy, 40, 11, 759-763.

Elsenrath, D., Fandre, P. Development and testing of the lifestyle assessment questionnaire. (1982). University of Wisconsin at Stevens Point, Institute for Lifestyle Improvement, Stevens Point, Wisconsin.

Erfurt, J.C., Foote, A., Heirich, M.E., Gregg, W. (1990). Improving participation in workplace wellness programs: Comparing health evaluation classes, a menu approach, and follow-up counseling. American Journal of Health Promotion. 4, 4, March/April, 270-278.

Evans, G.F., Harris, P.H., McNeil, A.W., McKenzie, R.D. (1989). Montana State University: An employee wellness program financed by a self-insurance group health plan. American Journal of Health Promotion, Volume 3, Number 4, 25-33.

Faulkner, R.A., Sprigins, E.J., McQuarrie, A., Bell, R. (1988). A brief report of the partial curl-up research project. Canadian Journal of Sport Science, Volume 13, Number 3, 53.

Feldman, R. (1983). Strategies for improving compliance with health promotion programs in industry. Health Education, July-August, 21-25.

Ferguson, G.A. (1981). Statistical Analysis in Psychology and Education. New York: McGraw Hill Publisher.

Fielding, J.E. (1982). Effectiveness of employees health improvement programs. Journal of Occupational Medicine, 24, 11, 907-913.

Fielding, J.E. (1982). Appraising the health of health hazard appraisal. American Journal of Public Health. 72, 4, April, 337-339.

Fink, A., Kosecof, J. (1978). An Evaluation Primer. Capital Publications Inc.

Foster, V.W. (1988). New Start Lifestyle Programs, Santa Barbara: Woodridge Press.

Franklin, B. (1988). Program factors that influence exercise adherence: Practical adherence skills for the clinical staff. In Dishman, R.K., Exercise adherence: Its impact on public health. Human Kinetics, Champaign, Illinois.

Fraser, A. (1986). Physical fitness maintenance: A developmental process. The Police Chief, 53, 6, 24.

Freeman, S., Ginter, G. (1987). Validation of the lifestyle assessment questionnaire. Paper presented at the American Association of Counselling and Development.

Gettman, L.R., Pollack, M.L., Ward, A. (1983). Adherence to unsupervised exercise. The Physician and Sportsmedicine, 11, 10, 56-66.

Gibbs, J., Mulvaney, D., Henes, C., Reed, R. (1985). Worksite health promotion. Journal of Occupational Medicine. 27, 11, 826-830.

Goldsmith, M. (1985). Heart at work campaign encourages healthier living. Journal of the American Medical Association. 254, 11, 1422-1423.

Goldstein, H. (1983). Measuring changes in educational attainment over time: Problems and possibilities. Journal of Educational Measurement. 20, 4, Winter, 369-376

Goldstein, J.E. (1983). Fitness-Wellness: The new military equation. Parks and Recreation. December, 36-40.

Government of Canada, Fitness and Amateur Sport. (1974). Proceedings of the National Conference on Employee Physical Fitness. Ministry of Supply and Services, Ottawa: Ontario.

Government of Canada, Fitness and Amateur Sport. (1980). Summary of the Employee Fitness Project Report, Ministry of Supply and Services, Ottawa: Ontario.

Government of Canada, Fitness and Amateur Sport. (1981). Report on the Employee Fitness and Lifestyle Project. Ministry of Supply and Services, Ottawa: Ontario.

Government of Canada, Fitness and Amateur Sport. (1983). Fitness and Lifestyle in Canada. Ministry of Supply and Services, Ottawa: Ontario.

Government of Canada, Fitness and Amateur Sport. (1985). Fitness Fits: Canadian Symposium of Youth Fitness. Ministry of Supply and Services, Ottawa: Ontario.

Government of Canada, Fitness and Amateur Sport. (1988). Getting Started: Fitness and Lifestyle at the Workplace. Ministry of Supply and Services, Ottawa: Ontario.

Green, L. (1986). A framework for the design of rigorous evaluation of efforts in health promotion. American Journal of Health Promotion, 1, 1, 77-79.

Harris, R.J. (1975). Primer of Multivariate Statistics. Academic Free Press, New Yor, 67-88.

Health and Welfare Canada (1986). Achieving health for all: A framework for health promotion. Minister of Supply and services Canada, Ottawa, 2-14.

Health and Welfare Canada (1987). The active health report--perspectives on Canada's health promotion survey. (1985). Ministry of Supply and Services, Ottawa: Ontario, 5-7, 26-30.

Health Insurance Association of America. (1983). Your guide to wellness at the workplace. Washington, D.C.

Hettler, B., Elsenrath, D., Leafgren, F. (1980). Lifestyle assessment questionnaire. University of Wisconsin at Stevens Point, Institute for Lifestyle Improvement, Stevens Point, Wisconsin.

Hoeger, W.K. (1988). Principles and Labs for Physical Education and Wellness. Colorado: Morton Publishing Co.

Hoeger, W.K. (1987). Health Promotion Programs. Colorado: Morton Publishing Co.

Howard, J., Mikalachki, A. (1979). Fitness and employee productivity. Canadian Journal of Applied Sport Sciences. 4, 3, September, 191-198.

Isaac, S., Michael, W.B. (1977). Handbook in Research and Evaluation. San Diego: Edits Publishers.

Jetté, M. (1981). Standardized Test of Fitness, Operations Manual. Fitness and Amateur Sport, Ministry of Supply and Services, Ottawa.

Johnson, B.L., Nelson, J.K. (1986). Practical measurements for evaluation in physical education. Minnesota: Burgess Publishing.

Johnson, J. (1986). Wellness and occupational therapy. The American Journal of Occupational Therapy. 40, 11, 753-754.

Kruse, K., Calden, M.E. (1986). Compliance to a clinically prescribed exercise program. Fitness in Business. October, 57-61.

Larsen, J.H., Wilson, S.M., Beley, R. (1988). The Assessment of faculty wellness in a university wellness program. American Journal of Health Promotion, Volume 2, Number 3, 20-30.

Leafgren, F.L. (1986). Developing Campus Recreation and Wellness Programs. San Francisco: Jossey-Bass Publishers.

McNeil, A., Prentice, M.C., Servatius, S.A. (1982). Use test results to boost interest in your fitness program. Here's how a law enforcement program agency used extensive test results. Athletic Purchasing and Facilities. 6, 11, 22-26.

Manning, S. (1985). Evaluating corporate wellness and promotion programs: The cases of Johnson & Johnson corporation and Metropolitan Life Insurance companies. Health Matrix, 3, 2, 28-34.

Melby, C.L., Lyle, R.M., Hyner, G.C. (1988). Beyond blood pressure screeing: A rational for promoting the primary prevention of hypertension. American Journal of Health Promotion, Volume 3, Number 2, 5-11.

Morgan, W.P., O'Connor, P.J. Exercise and mental health. In Dishman, R.K., Exercise adherence. Its impact upon public health. Human Kinetics, Champaign, Illinois.

Moulson-Lichfield, M., Freedsom, P.S. (1986). Physical training programs for public safety personnel. Clinics in Sports Medicine, 5, 3, 571-587.

National Wellness Institute. (1986). Workplace Wellness Notebook. University of Wisconsin: Stevens Point.

Nelson, B., Nelson J. (1979). Practical Measurements for Evaluation in Physical Education. Burgess Publishing Co.

O'Donnel, M.P., Ainsworth, T. (1984). Health promotion in the Workplace. New York: John Wiley and Sons.

Oldridge, N.B. (1984). Compliance and dropout in cardiac exercise rehabilitation. Journal of Cardiac Rehabilitation. 4, 166-177.

Parkinson, R. and Associates. (1982). Managing Health Promotion in the Workplace. Guidelines for Implementation and Evaluation. Mayfield Publishing Co., 1-8, 43, 63-113.

Patton, R., Corry, J., Gettman, L., Schavee, Graf. J. (1986). Implementing Health/Fitness Programs. Champaign: Human Kinetics Publisher, 1-20.

Pollack, M., Foster, C., Salisbury, R., Smith, R. (1982). Effects of a YMCA starter fitness programl Physician and Sportsmedicine, 10, 1, 89-100.

Popham, W.J., Sirotnik, K.A. (1973). Educational Statistics. Use and Interpretation. New York: Harper and Row Publishers.

Price, C.S. (1978). Police physical fitness is subject of new film, workshops, and publications. The Police Chief, 45, 1, 18-19.

Richardson, G., Felts, M. (1988). Computerized health appraisal instruments. Health risk appraisals versus lifestyle improvement. Fitness in Business, 2, 4, 145-152.

Richter, J. Reliability and validity of the lifestyle assessment questionnaire. (1988). Measurement of Nursing Outcomes. C. Waltz, O. Strickland, Editors, Springer, New York.

Ritchie, D. (1985). Setting up a wellness plan. Association Management, September, 123-126.

Ross, W.D., Ward, R. (1984). The O-Scale System. An Instructional Manual for Slim Guide Skinfold Caliper and Other Techniques for Determining O-Scale Categories of Adiposity and Proportional Body Weight. Rosscraft Ltd.

Rossi, P., Freeman, H., Wright, S. (1979). Evaluation: A Systematic Approach. Beverly Hills: Sage Publishers.

Rudnicki, J., Glassford, G., Burgess, A. (1986). Employee Fitness and Lifestyle Programs. The State of the Art. Unpublished Manuscript, University of Alberta, 4.

Rudnicki, J., Wankel, L.M. (1988). Employee fitness program effects upon long-term fitness involvement. Fitness in Business. February, 123-129.

Sacks, J.J., Krushat, W.M., Newman, J. (1980). Reliability of the health hazard appraisal. American Journal of Public Health. 70, 7, July, 730-732.

Sarason, I.G. and Associates. (1979). Helping police officers to cope with stress: A cognitive-behavioral approach. American Journal of Community Psychology, 7, 6, 593-603.

Schwartz, R., Rollins, P. (1985). Measuring the cost benefit of wellness strategies. Business and Health, October, 24-26.

Seaward, B.L. (1988). From corporate fitness to corporate wellness. Fitness in Business. 2, 5, April, 182-186.

Shephard, R., Corey, P., Renzland, P., Cox, M. (1982). The influence of an employee fitness program upon medical care costs. Canadian Journal of Public Health, 73, July/August, 259-263.

Shephard, R., Cox, M., Corey, P. (1981). Fitness program participation: Its effect on worker performance. Journal of Occupational Medicine, 23, 5, 359-363.

Shephard, R.J. (1985). Motivation: The key to fitness compliance. The Physician and Sportsmedicine. 13, 7, July, 88-101.

Shephard, R.J. (1987). The economic benefit of health and fitness programs. Fitness in Business, 100-105.

Spilman, M., Goetz, A., Shultz, J., Bellingham, R., Johnson, D. (1986). Effects of a corporate health promotion program. Journal of Occupational Medicine, 28, 4, 285-289.

Stephens, T. (1985). health lifestyles for all by the year 2000. health Promotion. Fall.

Survey Research Center. Institute for Social Research. (1976). Interviewer's Manual. University of Michigan, Ann Arbor.

Tampson, P. (1988). Franklin international: A facility based wellness program adapted to serve a small white and blue collar population. American Journal of Health Promotion. 2, 3, Winter, 39-46.

Taylor Fitz-Gibbons, C., Morris, L. (1978). How To Design A Program Evaluation. Beverly Hills: Sage Publications.

Thomas, J.R., Nelson, J.K. (1985). Introduction to Research in Health, Physical Education, Recreation and Dance. Champaign: Human Kinetics Publishers.

Vogt, T. (1981). Risk assessment and health hazard appraisal. Annual Review of Public Health, 2, 31-47.

Wagner, E.H., Berry, W.L., Schoenback, V.J., Graham, R.M. (1982). An assessment of health hazard appraisal/health risk appraisal. American Journal of Public Health, 72, 347-351.

Walker, S. (1981) A Survey of Corporate Fitness Programs. Master Thesis, Middle Tennessee State University.

Wankel, L.M. (1985). Personal and situational factors affecting exercise involvement: The importance of enjoyment. Research Quarterly for Exercise and Sport, 56, 3, 275-282.

Wankel, L.M. (1987). Enhancing motivation for involvement in voluntary exercise programs. Advancement in Motivation and Achievement: Enhancing Motivation, 5, 239-286.

Wanzel, R.S., Danielson, R.R. (1977). Improve adherence to your fitness program. Recreation Management, 20, 5, 16-19; 34-37.

Ward, A., Morgan, W.P. (1984). Adherence patterns of healthy men and women enrolled in an adult exercise program. Journal of Cardiac Rehabilitation. 4, 143-152.

Warwick, P.V. (1975). Statistical Package For The Social Sciences, 2nd Edition, McGraw Hill, New York, 515-519.

Wolf, T.M., Randall, H.M., Faucett, J.M. (1990). A health promotion program for medical students: Louisiana State University Centre. American Journal of Health promotion, Volume 4, Number 3, 193-202.

Wood, E.A., Olmstead, G.W., Craig, J.L. (1989). An evaluation of lifestyle risk factors and absenteeism after two years in a worksite health promotion program. Journal of Health Promotion, Volume 4, Number 2, 128-133.

Wood, S., Dreitner, R. Friedman, G. (1982). Cost-effective wellness screening: A case study of 4524 law enforcement officers. Journal of Police Science, 10, 3, 273-278.

APPENDIX A

THE AEROBIC WELLNESS PRESCRIPTION AND PERSONAL FITNESS APPRAISAL

UVIC

SPORT AND FITNESS CENTRE

PERSONAL FITNESS APPRAISAL

PREPARED FOR

RCMP WELLNESS PROGRAM

FEBRUARY 1989

PHYSICAL CHARACTERISTICS

AGE _____ YRS

BODY WEIGHT _____ KG _____ LBS

HEIGHT _____ CM _____ INS

ANTHROPOMETRIC MEASURES

In body composition one should consider proportionality (body mass) and adiposity. We can evaluate these components by measuring height, weight and the thinckness of various skinfold sites.

Proportionality indicates how heavy you are for your height with values ranging from 1 to 9. A 1 means you are very light for your height and a score of 9 means you are very heavy for your height. Your score for proportionality is _____. Being heavy for your height is fine as long as you are not overfat.

The second component looks at adiposity. We measured the thickness of your subcutaneous fat (under the skin), giving a general indication of your body fat. This was measured through an adiposity scale of 1 to 9. A score of 1 means you have very little fat and a score of 9 means you have an excessive amount of fat. Your adiposity score is _____.

We also considered the sum of your skinfolds. Your score of _____ mm placed you in the _____ percentile for your age and sex. A percentile of 70 means that 70 people out of 100 have more subcutaneous fat than you do and 30 people have less.

Being overfat means that your energy intake (food) has exceeded your daily energy output (exercise) and fat has accumulated at a rate of 1 pound for every excess 3500 kcal or 1 kilogram for evry 7700 kcal Therefore, one must use 3500 kcal of energy in order to lose 1 pound of fat.

TABLE 1. APPROXIMATE ENERGY COST OF VARIOUS ACTIVITIES

SPORT OR ACTIVITY	KCAL/MIN	KCAL/30 MIN
Cycling	5.0	150
Golf	5.9	150
Tennis	7.0	210
Swimming	9.0	270
Jogging	13.0	390
Walking	6.0	180
(Use your caloric wheel)		

CARDIORESPIRATORY FITNESS

Cardiorespiratory (C-R) fitness or endurance is demonstrated by your ability to perform prolonged types of exercise. Good examples of this type of exercise are walking, jogging, swimming and bicycling. C-R endurance reflects the efficiency of the lungs, the heart, the blood vessels and the muscles in the uptake, transport and use of oxygen for producing energy. It is the single most important component of physical fintnes.

One of the best indicators of C-R fitness is maximal oxygen consumption (VO2 max). This measurement determines the maximal amount of oxygen your body can use in one minute. Based on your heart rate, the cycle test predicted your VO2 max to be _____lmin or _____ml/kg/min. This score places you in the _____ percentile for Canadians of your age and sex.

FITNESS PRINCIPLES

To benefit optimally from exercise, basic fitness principles should be followed. It is best to start at an easy pace, and work towards the following goals:

Frequency: Regular exercise at least three times per week is necessary to obtain and maintain an acceptable level of fitness. Fitness cannot be stored over time. Inactivity leads to fitness loss; activity leads to fitness gains.

Intensity: Optimal intensity is exercising within your target heart rate zone. The upper limit of your target heart rate zone is _____bpm or _____b/10 sec. and the lower limit is _____bpm or _____b/10 sec. Low intensity activity (_____bpm) with longer duration is most beneficial for caloric expenditure. Higher intensity activities (_____bpm) produce faster cardiovascular fitness improvements.

Time: To obtain a training effect from your activity you must sustain your target heart rate for 20 minutes, and preferably longer. Adequate duration is especially important for cardiovascular health and weight control.

Type: The type of activity must involve large muscle groups so that your heart rate can be elevated.

FLEXIBILITY

Flexibility is the ability to move the joints of the body through wide ranges of motion without undue strain on the muscles and connective tissues. Good flexibility is required to perform various physical movements and activities with ease and without risk of injury. When stretching, exercises should be performed slowly and smoothly to prevent injury of muscle soreness. Remember to hold the stretch for 20 seconds. The sit and reach test measures your hamstring and lower back flexibility. Your score of _____cm places you in the _____ percentile for Canadians of your age and sex.

MUSCULAR STRENGTH AND ENDURANCE

Muscular strength and endurance promote good muscular tone, which can prevent such ailments as chronic low back pain. To increase muscular strength, resistance should be moderately increased as strength improves in order to maximize strength gains. For endurance enhancement, the number of repititions should be gradually increased.

Muscular strength is the amount of force that a given muscle can generate in one maximal contraction. The grip strength test gives a good indication of your forearm strength. Your maximumcombined grip strength was _____kg. This places you at the _____ percentile when compared to Canadians of your age and sex.

Muscular endurance is the ability of a muscle to contract continuously and/or repeatedly against a set resistance. Abdominal muscular endurance was rated according to the number of curl ups completed. You completed _____ curl ups. Acceptable abdominal endurance would mean you could complete 25 curl ups. Push-ups are used to measure the muscular endurance of your upper bocy. You completed _____ push-ups placing you in the _____ percentile when compared to other canadians of your age and sex.

BEFORE YOU BEGIN A REGULAR EXERCISE PROGRAM HERE ARE A FEW IMPORTANT FITNESS CONCEPTS TO CONSIDER:

(1) Start at a level that is safe and enjoyable, and progress towards your optimal activity levels.

(2) A proper warm-up helps prepare the joints and muscles for exercise, and should include stretching exercises and low intensity activity.

(3) After exercise, a cool down aids in returning heart rate to normal resting levels and assists in the removal of waste materials. It is good to keep moving after exercising so blood pooling does not occur.

(4) Include at lease one rest day in your weekly schedule. Rest is important for maintaining health, and allows your body to rebuild after exercise.

(5) Remember when working out to drink water every 20 minutes so that you remain hydrated.

(6) Avoid saunas and whirlpools for at least one hour after exercising.

The Aerobic Wellness Prescription (20-29 yrs)

1. Your starting stage is indicated for you.
2. The times and distances are the targets for you to complete before you move on to the next stage. Progress to these in small steps.
3. When you can complete 70 points/week for males and 60 for females you are at the wellness goal. Keep up this quantity and quality of exercise to maintain your fitness.
4. You can select your daily exercise from any of the activities as long as you stay within your present stage of fitness.
5. We ask that you exercise four times per week, with a minimum of two of the four times from the chart below.

STAGE	FREQUENCY #	TIME TARGET (MIN)	DISTANCE (MILES)	TYPE	POINTS/SESSION
1	3	32:00	2.0	walk	4.5
2	3	48:00	3.0	walk	7.2
3	4	26:00	2.0	walk/jog	6.2
4	4	24:00	2.0	walk/jog	7.0
5	4	22:00	2.0	jog	7.9
6	4	20:00	2.0	jog	9.0
7	4	25:00	2.5	jog	11.5
8	4	23:00	2.5	jog	12.3
9	4	30:00	3.0	jog	14.0
10	4	27:00	3.0	jog	15.3
11	4	25:00	3.0	jog	16.3
12	4	32:00	3.5	jog	17.6
1	3	30:00	5.0	cycle	3.5
2	3	25:00	5.0	cycle	4.5
3	4	20:00	5.0	cycle	6.0
4	4	26:00	6.0	cycle	6.8
5	4	24:00	6.0	cycle	7.5
6	4	30:00	7.0	cycle	8.4
7	4	27:45	7.0	cycle	9.0
8	4	35:00	8.0	cycle	9.5
9	4	34:00	8.0	cycle	10.0
10	4	32:00	8.0	cycle	10.5
11	4	36:00	9.0	cycle	12.0
12	4	34:00	9.0	cycle	12.8
			(yards)		
1	4	15:00	400	swim	2.2
2	4	13:00	400	swim	2.5
3	4	15:00	500	seim	3.2
4	4	13:00	500	swim	4.0
5	4	18:00	600	swim	4.2
6	4	16:00	600	swim	4.7
7	4	19:00	700	swim	5.9
8	4	21:00	800	swim	7.3
9	4	23:00	900	swim	8.7
10	4	25:30	1000	swim	10.3
11	4	23:30	1000	swim	10.8
12	4	26:30	1100	swim	12.0

The Aerobic Wellness Prescription (30-49 yrs)

1. Your starting stage is indicated for you.
2. The times and distances are the targets for you to complete before you move on to the next stage. Progress to these in small steps.
3. When you can complete 70 points/week for males and 60 for females you are at the wellness goal. Keep up this quantity and quality of exercise to maintain your fitness.
4. You can select your daily exercise from any of the activities as long as you stay within your present stage of fitness.
5. We ask that you exercise four times per week, with a minimum of two of the four times from the chart below.

STAGE	FREQUENCY #	TIME TARGET (MIN)	DISTANCE (MILES)	TYPE	POINTS/SESSION
1	3	34:00	2.0	walk	4.1
2	3	42:00	2.5	walk	5.4
3	3	50:00	3.0	walk	6.8
4	4	25:00	2.0	walk/jog	6.8
5	4	24:00	2.0	walk/jog	7.0
6	4	22:00	2.0	jog	7.9
7	4	20:00	2.0	jog	9.0
8	4	26:00	2.5	jog	10.9
9	4	25:00	2.5	jog	11.5
10	4	31:00	3.0	jog	13.4
11	4	29.00	3.0	jog	14.4
12	4	32:00	3.5	jog	17.6
1	3	20:00	4.0	cycle	3.3
2	3	18:00	4.0	cycle	3.8
3	4	24:00	5.0	cycle	4.8
4	4	22:00	5.0	cycle	5.3
5	4	20:00	5.0	cycle	6.0
6	4	26:00	6.0	cycle	6.8
7	4	24:00	6.0	cycle	7.5
8	4	30:00	7.0	cycle	8.3
9	4	28:00	7.0	cycle	9.0
10	4	33:30	8.0	cycle	10.0
11	4	32:00	8.0	cycle	10.5
12	4	36:00	9.0	cycle	12.0
			(yards)		
1	4	12:00	300	swim	1.6
2	4	10:00	300	swim	1.9
3	4	13:00	400	swim	2.6
4	4	12:00	400	swim	2.8
5	4	14:00	500	swim	3.7
6	4	13:00	500	swim	4.0
7	4	16:00	600	swim	4.7
8	4	19:00	700	swim	5.9
9	4	22:00	800	swim	7.1
10	4	22:30	900	swim	9.0
11	4	25:00	1000	swim	10.3
12	4	23:30	1000	swim	10.8

The Aerobic Wellness Prescription (50 + yrs)

1. Your starting stage is indicated for you.
2. The times and distances are the targets for you to complete before you move on to the next stage. Progress to these in small steps.
3. When you can complete 70 points/week for males and 60 for females you are at the wellness goal. Keep up this quantity and quality of exercise to maintain your fitness.
4. You can select your daily exercise from any of the activities as long as you stay within your present stage of fitness.
5. We ask that you exercise four times per week, with a minimum of two of the four times from the chart below.

STAGE	FREQUENCY #	TIME TARGET (MIN)	DISTANCE (MILES)	TYPE	POINTS/SESSION
1	3	34:00	2.0	walk	4.1
2	3	42:00	2.5	walk	5.4
3	3	50:00	3.0	walk	6.8
4	4	25:00	2.0	walk/jog	6.8
5	4	24:00	2.0	walk/jog	7.0
6	4	22:00	2.0	jog	7.9
7	4	20:00	2.0	jog	9.0
8	4	26:00	2.5	jog	10.9
9	4	25:00	2.5	jog	11.5
10	4	31:00	3.0	jog	13.4
11	4	29:00	3.0	jog	14.4
12	4	27:00	3.0	jog	15.3
1	3	20:00	4.0	cycle	3.3
2	3	18:00	4.0	cycle	3.8
3	4	24:00	5.0	cycle	4.8
4	4	22:00	5.0	cycle	5.3
5	4	20:00	5.0	cycle	6.0
6	4	26:00	6.0	cycle	6.8
7	4	24:00	6.0	cycle	7.5
8	4	30:00	7.0	cycle	8.3
9	4	28:00	7.0	cycle	9.0
10	4	33:30	8.0	cycle	10.0
11	4	32:00	8.0	cycle	10.5
12	4	36:00	9.0	cycle	12.0
			(yards)		
1	4	12:00	300	swim	1.6
2	4	10:00	300	swim	1.9
3	4	13:00	400	swim	2.6
4	4	12:00	400	swim	2.8
5	4	14:00	500	swim	3.7
6	4	13:00	500	swim	4.0
7	4	16:00	600	swim	4.7
8	4	19:00	700	swim	5.9
9	4	22:00	800	swim	7.1
10	4	22:30	900	swim	9.0
11	4	25:00	1000	swim	10.3
12	4	23:30	1000	swim	10.8

Alternate Aerobic Activities

NOTE: With intermittent sport activities, the time goal is for continuous exercise. Do not include breaks in play, etc.

STAGE	FREQUENCY #	TIME TARGET (MIN)	TYPE	POINTS/SESSION
1	4	15:00	squash	2.2
2	4	20:00	squash	3.0
3	4	25:00	squash	3.8
4	4	30:00	squash	4.5
5	4	35:00	squash	5.2
6	4	40:00	squash	6.0
7	4	45:00	squash	6.8
8	4	50:00	squash	7.5
9	4	55:00	squash	8.2
10	4	60:00	squash	9.0
11	4	66:00	squash	10.0
12	4	72:00	squash	11.0

NOTE: With intermittent sport activities, the time goal is for continuous exercise. Do not include breaks in play, etc.

STAGE	FREQUENCY #	TIME TARGET (MIN)	TYPE	POINTS/SESSION
1	4	15:00	soccer	2.2
2	4	20:00	soccer	3.0
3	4	25:00	soccer	3.8
4	4	30:00	soccer	4.5
5	4	35:00	soccer	5.2
6	4	40:00	soccer	6.0
7	4	45:00	soccer	6.8
8	4	50:00	soccer	7.5
9	4	55:00	soccer	8.2
10	4	60:00	soccer	9.0
11	4	66:00	soccer	10.0
12	4	72:00	soccer	11.0

NOTE: With intermittent sport activities, the time goal is for continuous exercise. Do not include breaks in play, etc.

STAGE	FREQUENCY #	TIME TARGET (MIN)	TYPE	POINTS/SESSION
1	4	15:00	bsktball	2.2
2	4	20:00	bsktball	3.0
3	4	25:00	bsktball	3.8
4	4	30:00	bsktball	4.5
5	4	35:00	bsktball	5.2
6	4	40:00	bsktball	6.0
7	4	45:00	bsktball	6.8
8	4	50:00	bsktball	7.5
9	4	55:00	bsktball	8.2
10	4	60:00	bsktball	9.0
11	4	66:00	bsktball	10.0
12	4	72:00	bsktball	11.0

Alternate Aerobic Activities

NOTE: With intermittent sport activities, the time goal is for continuous exercise. Do not include breaks in play, etc.

STAGE	FREQUENCY #	TIME TARGET (MIN)	TYPE	POINTS/SESSION
1	4	15:00	hockey	2.2
2	4	20:00	hockey	3.0
3	4	25:00	hockey	3.8
4	4	30:00	hockey	4.5
5	4	35:00	hockey	5.2
6	4	40:00	hockey	6.0
7	4	45:00	hockey	6.8
8	4	50:00	hockey	7.5
9	4	55:00	hockey	8.2
10	4	60:00	hockey	9.0
11	4	66:00	hockey	10.0
12	4	72:00	hockey	11.0

NOTE: This program is designed for aerobic dance or other exercises done to music. Heart rates are based on a 10 second count x 6.

STAGE	FREQUENCY #	TIME TARGET (MIN)	HEART RATE	TYPE	POINTS/SESSION
1	3	12:00	100-110	dance	2.4
2	3	15:00	100-110	dance	3.0
3	3	18:00	110-120	dance	3.6
4	3	21:00	110-120	dance	4.2
5	3	24:00	120-130	dance	4.6
6	3	27:00	120-130	dance	5.4
7	3	30:00	130-140	dance	6.0
8	3	33:00	130-140	dance	6.6
9	3	36:00	130-140	dance	7.2
10	3	39:00	140-145	dance	7.8
11	3	42:00	140-145	dance	8.4
12	3	45:00	140-145	dance	9.0

NOTE: This is a listing of the bonuses you get for warm-up, cool-down, calisthenics, circuit weight training, and strength weights.

ACTIVITY	TIME (min)	POINTS
Warm-up	5	1
Cool-down	5	1
Calisthenics	5	.25
Circuit Training	5	.85
Strength Training	5	1.3

AEROBIC FITNESS CATEGORIES

IF YOU ARE LOOKING FOR A CHALLENGE TO COMPLEMENT YOUR FITNESS PROGRAM, WE HAVE WHAT YOU ARE LOOKING FOR. REMEMBER YOUR OBJECTIVE IS TO GET THE REQUIRED NUMBER OF POINTS PER WEEK, NOT TO EXERCISE IN ANY PARTICULAR WAY OR AT ANY SPECIFIC SPEED AND INTENSITY!!!

The following chart contains aerobic fitness categories and the points per week needed to achieve success and a good wellness level. Keep track of your points in your diary and at the end of the three months turn them into your detachment wellness coordinator and you will receive a lapel pin for your efforts.

FITNESS CLASSIFICATION	AVERAGE POINTS PER WEEK		TOTAL POINTS	
	MEN	WOMEN	MEN	WOMEN
GOLD	51+	41+	510+	410+
SILVER	32-50	27-40	320-500	270-400
BRONZE	21-31	16-26	210-310	160-260

YOU SHOULD BE TRYING TO ACHIEVE A MINIMUM OF 27 (WOMEN) AND 32 (MEN) POINTS PER WEEK.

APPENDIX B

THE NUTRITION INTERVENTION

FoodTrack™

NUTRITION BY DESIGN

Are your food choices on track? Try the Foodtrack System to improve your food pattern and get on track. It's simple and you make the choices!

STEP 1: KEEP TRACK!

List below everything you ate and drank yesterday. While your diet may vary from day to day, checking what you ate yesterday will help you learn the FoodTrack™ System.

Include all meals and snacks. The cheeseburger example below shows the amount of detail to list.

FOODS EATEN (amount)	Milk & Milk Products	Breads & Cereals	Meat & Alternates	Fruits & Vegetables	Extra Foods
EXAMPLE: Cheeseburger (1 meat patty, bun, slice of cheese, relish, mayonnaise)					○
Bowl Cereal					○
½ cup milk					○
2 Glass Juice					○
2 whole wheat bread.					○
2 tablespoons jam					○
					○
SERVING TOTALS					

STEP 2: CALCULATE YOUR FOOD SERVINGS

Convert the foods you listed into servings using the SERVINGS CHART below. Enter this into the SERVINGS COLUMN on the left. Write the SERVING TOTAL at the bottom of each column.

Extra Foods may be noted by checking the circles in the SERVINGS COLUMN and totalling the checks.

SERVINGS CHART

Servings for the cheeseburger example are circled.

MILK & MILK PRODUCTS	SERVING
Milk (skim, 2%, whole), buttermilk, chocolate milk or reconstituted evaporated milk (1 cup/250 mL)	1
Milkshake (1½ cup/375 mL)	1
Yoghurt (plain or fruit-flavoured) (¾ cup/175 mL)	1
Soup made with milk (1 cup/250 mL)	1
Cheese (1½ oz./45 g)	1
Cheese (1 slice)	½
Cottage Cheese (1 cup/250 mL)	½
Ice Cream (¾ cup/175 mL)	½
Pudding or custard made with milk (½ cup/125 mL)	½

BREADS & CEREALS	SERVING
Bread (1 slice)	1
Pancake or waffle (1 medium)	1
Roti, chapati or tortilla (1)	1
Crackers (4-6)	1
Cold Cereal (unsweetened or presweetened) (¾ cup/175 mL)	1
Cooked Cereal (½ cup/125 mL)	1
Popcorn (plain) (1½ cup/375 mL)	1
Cooked Rice (1 cup/250 mL)	2
Muffin (1 large)	2
Hamburger or weiner bun (1)	2
English muffin or bagel (1)	2
Pita or naan (1)	2
Macaroni, spaghetti or other pasta (1 cup/250 mL)	2
Bannock or scone (2 oz./60 g)	2

[redacted] sour cream,

EXTRA FOODS
Cinnamon bun, cake, cookie, croissant, danish, donut, buttered popcorn.

MEAT, FISH, POULTRY & ALTS.	SERVING
Meat, fish or poultry (e.g. beef, pork, lamb, veal, game, fish, liver, kidney, chicken, turkey, shellfish) (3 oz./90 g)	1
Cooked dried beans, peas or lentils (1 cup/250 mL)	1
Nuts, seeds (½ cup/125 mL)	1
Cottage Cheese (½ cup/125 mL)	1
Hard Cheese (2 oz./60 g)	1
Luncheon Meat Slice (1 oz./30 g)	½
Sausage, weiner (1)	½
Bacon (4 slices)	½
Egg (1)	½
Peanut Butter (2 Tbsp./30 mL)	½
Tofu (3½ oz./100 g)	½

FRUITS & VEGETABLES	SERVING
Whole, medium fruit or vegetable (e.g. apple, banana, carrot, celery stalk, cob of corn, potato) (1)	1
Small fruits (e.g. apricot, plum) (2)	1
Raw or cooked fruits or vegetables (e.g. broccoli, cabbage, canned fruit, cherries, grapes, leafy greens, french fries) (½ cup/125 mL)	1
Fruit or vegetable juice (fresh, frozen or canned) (½ cup/125 mL)	1
Tomato Sauce (¾ cup/175 mL)	1
Mixed Salad (1 cup/250 mL)	2

[redacted]

EXTRA FOODS Fruit drinks, fruit pie, jam, ketchup, gelatin desserts, relishes, olives, pickles, potato chips, corn chips.

[redacted] sauces, honey, syrup, [redacted] wine, spirits.

STEP 3: TRANSFER TOTALS

Transfer your SERVING TOTALS from the SERVINGS COLUMN in Step 2 to the boxes below.

How do you compare to the Canada Food Guide recommendations? 150

Check ☑ which of the following statements applies to you.

- ☐ You *are* eating the recommended number of servings in each group and you're on track! These servings provide the basis for a nutritionally sensible eating pattern.
- ☐ You are *not* eating all the recommended servings. Step 4 will help you plan easy changes. Go to Step 4. (Remember, the recommended servings provide only 1000-1400 calories.)
- ☐ You are eating *more* than the recommended servings.

If you are normal weight and active, you need these additional calories.

EXAMPLE:	MILK AND MILK PRODUCTS	
	RECOMMENDED	2
	YOUR TOTAL	½
	STILL REQUIRED	1½

MILK AND MILK PRODUCTS	
RECOMMENDED SERVINGS *Adolescents and pregnant and lactating women	2 (3-4*)
YOUR TOTAL	
NUMBER STILL REQUIRED	

BREADS AND CEREALS	
RECOMMENDED SERVINGS	3-5
YOUR TOTAL	
NUMBER STILL REQUIRED	

MEAT, FISH, POULTRY AND ALTERNATES	
RECOMMENDED SERVINGS	2
YOUR TOTAL	
NUMBER STILL REQUIRED	

FRUITS AND VEGETABLES	
RECOMMENDED SERVINGS	4-5
YOUR TOTAL	
NUMBER STILL REQUIRED	

CHECK ON EXTRAS

Extra Foods are [illegible]

We all enjoy them as compliments to our diet – the key is moderation.

Review the Extra Foods checked in the SERVINGS COLUMN.

Are there food group choices which you could substitute for some of these extras?

Consider [illegible] in Step 4.

STEP 4: DESIGN YOUR PLAN

Plans make things happen!

Select a food group you need to improve. (Begin by improving just one food group. Small steps are important.)

Review the foods listed for the group you have chosen. Write in your food choices to complete the number of servings you require.

EXAMPLE:

PLAN FOR MILK AND MILK PRODUCTS
(Food Group)

SERVINGS STILL REQUIRED: 1½

PLAN: WILL REPLACE LUNCH TIME COFFEE WITH ½ GLASS MILK AND HAVE YOGHURT FOR EVENING SNACK

PLAN FOR _____
(Food Group)

SERVINGS STILL REQUIRED: _____

PLAN: _____

_____

_____

IS YOUR PLAN ON TRACK?

Think about your plan. Ask yourself the following questions:

- When will you start? _____
- Where will you be? ☐ at home ☐ at work/school ☐ in a restaurant ☐ Other _____
- What problems might interfere? ☐ rushed for time ☐ too expensive ☐ not available ☐ forgetting to buy it ☐ family doesn't like it ☐ weekend schedule ☐ Other _____
- How will you overcome these problems?

To further refine your food choices look for the FoodTrack™ – Fine Tuning series.

FoodTrack

NUTRITION BY DESIGN

INNOVATION IN NUTRITION EDUCATION™

BC DAIRY FOUNDATION

FoodTrack™

FOLLOW-UP

Mark the number of servings you need from each food group.

✓ Track your food group servings for a day with a crayon or grease pencil. Wipe and reuse.

MILK & MILK PRODUCTS	☐	☐	☐	☐						
MEAT, FISH POULTRY & ALTS.	☐	☐								
FRUITS & VEGETABLES	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BREADS & CEREALS	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
EXTRA FOODS the key is moderation	○	○	○	○	○	○	◎	◎	◎	◎

Plans make things happen! Select a food group you need to improve.
Make a plan for specific foods and when you'll eat these foods.

These servings are the minimums recommended for adults. Together they provide 1000-1100 calories

These servings are for people who need extra energy and/or nutrients (Active adults, pregnant and lactating women and adolescents.)

INNOVATION IN NUTRITION EDUCATION
DAIRY FOUNDATION

Test Print #3© B.C. DAIRY FOUNDATION
prepared with the assistance of Ontario Milk Marketing Board,
in consultation with PARTICIPaction,
and North Shore Health Dept.

APPENDIX C

THE TESTING-TEAM TRAINING PROGRAM

TESTING TEAM TRAINING PROGRAM

Workshop I

- Introduction to research project
- Body composition
- PWC 170 test

Workshop II

- Introduction to Lifestyle Assessment Questionnaire
- Body composition review
- Sit up, push up and grip strength tests
- Body composition calculations

Workshop III

- Introduction to RCMP information
- Review sit up test
- Body composition calculation
- PWC 170 calculation

Workshop IV

- Counselling
- Emergency procedures

APPENDIX D

THE CLINICAL HEALTH SCREENING

R.C.M.P. VICTORIA SUBDIVISION - MEDICAL EXAMINATION SUMMARY

The purpose of this summary is to provide details on the employee's health status.

NAME: _____ BD: _____ AGE: _____

DETACHMENT/UNIT: _____ REG.# _____ RANK: _____

P/S# _____

CURRENT ACTIVITIES (SPORTS) _____

CURRENT MEDICAL PROBLEMS: _____

_____

_____

GENERAL

Pulse (Resting) _____ Height _____

Blood Pressure _____ Weight _____

SYSTEMIC

Eyes _____ Lungs _____

Ears _____ Hernia _____

Nose _____ Abdomen _____

Mouth/Throat _____ Skin _____

Teeth _____ Lymphatics _____

Neck _____ Back _____

Heart _____ Extremities _____

Medications (Rx and non-Rx): _____

Allergies: _____

Limitations: _____

_____

Recommendations: _____

Submaximal Fitness Testing _____

Maximal Fitness Testing _____

Lab Results: Urinalysis _____

Blood: Hg (Chol: HDL, LDL and TRIGLYC) _____

Special Tests: _____

Physician's Name _____ Signature _____

I hereby authorize the release of the above summary to the RCMP and the University of Victoria for research purposes.

Signature _____

APPENDIX E

THE PWC 170 TEST

UNIVERSITY OF VICTORIA

SPORTS AND FITNESS CENTRE

MODIFIED PWC 170/ASTRAND TEST PROTOCOL

1. **PREP SUBJECT**
   - -explain electrodes and isopropyl before you put them on
   - -clean well with isopropyl
   - -electrodes placement goes on as in the diagram
   - -if a shaver is necessary use a new one for each person
   - -the electrodes are attached as follows
     - Red - subjects right
     - Black - subjects left
     - White - centre

2. **BIKE PREP**
   - -check for proper seat height - heel to pedal with knee straight
   - -record # holes showing
   - -tighten toe clips

3. **MENTAL PREP**
   - -calm the subject down, nerves elevate heart rate greatly
   - -be sure to explain the test to the subject
   - -time saver--explain while you are prepping them are doing the one minute warm up

4. **TEST PROTOCOL**

   1 one minute warm up @ .5 or 1 kp
   - -purpose of the warm up is to let the body adjust to exercise; it also gives baseline for setting the res.

   2-3 four minute loads
   - -during the four minute workloads aim for the target heart rate ranges
   - -if in doubt be conservative in your settings
   - -remember smaller people require smaller increases in res., larger people require larger increases in res.

   finish with a 2-3 minute warm down
   - -monitor heart rate every minute till it decreases below 100 bpm
   - -it may be necessary to have the person stop cycling for it to decrease below 100 bpm

SUMMARY
- -prep well
- -everyone 1 min warm up, keep subject relaxed
- -depending on warm up heart rate choose workload to achieve HR ranges
- -monitor resistance throughout
- -HR taken in last 20 sec - label the ECG well
- -record/reset revs right at minute
- -finish with a warm down so the heart rate falls below 100 bpm
- **-have fun!**

APPENDIX F

THE ANTHROPOMETRIC MEASURES

ANTHROPOMETRIC PROTOCOLS

ORDER OF TESTS:

1. Body Weight
2. Height i. Standing ii. Stretched
3. Girth Measurements
4. Skinfold Measurements

1. BODY WEIGHT

Equipment:
(a) Spring or beam scale
(b) Wooden board

Procedures:
(a) ensure scale is on a flat surface
    -if the floor is carpeted place a wooden board underneath it
(b) remove shoes and wear light clothing. Men wear shorts, women wear shorts and a t-shirt
(c) stand with feet on center of the scale with weight evenly distributed over both feet
(d) record weight to the nearest 0.1 kg

2. HEIGHT

Equipment:
(a) metric metal wall tape
(b) masking tape
(c) frankfurt plane
(d) wooden board

Procedures:
(a) position tape vertically against the wall
(b) ensure it is straight and starts at the edge of the floor
(c) if the floor is carpeted, use a wooden board for the participant to stand on and place the tape at the top edge of the board
(d) remove footwear
(e) stand erect, heels together, back in contact with wall, arms hang by side, and eyes focused straight ahead

i. Standing Height
   (a) stand as tall as possible with heels in contact with the floor
   (b) set frankfurt plane on vertex of the head firmly in contact with scalp and place the other plane flat against the wall
   (c) the subject takes a deep breath in and the measurement is taken from the bottom edge of the frankfurt plane by making a pencil mark on the masking tape
   (d) the subject steps away and his/her height value is determined to the nearest 0.1 cm.

ii. Stretched Stature
Repeat all procedures as above except:
(a) tester places both thumbs under the subject's chin and surface side of index finger under the mastoid process
(b) ensure the subject's eyes (orbitale) are level with the middle ear fold (tragion), and are focused straight ahead
(c) one tester applies stretch force as the subject breathes in and the other measurer records the stretched height
(d) repeat procedures c-d as above

3. **GIRTH MEASUREMENTS**

Equipment:
(a) anthropometric measuring tape (flexible steel tape)

Procedures:
(a) subject stands erect in a relaxed position with arms hanging at sides
(b) tester holds tape between the thumbs and index fingers with the second finger stabilizing and leveling the tape
(c) the tape is placed at right angles to the bone or body segment
(d) a cross handed measuring technique is used
(e) the tape should be in contact with the skin but should not make an indentation of the skin surface
(f) all measurements are recorded to the nearest 0.1 cm

Cross Handed Technique:
(a) the left hand pulls the tape out of the housing and around the limb and the stub is transfered to the right hand
(b) the right hand crosses the tape and a reading is taken

Four examples of Girth Measurements:

1. Chest Girth
-subject raises both arms and the tester places the tape at mesosternale level (mid level of the sternum, midway between the axilla and horizontal nipple line)
-ensure the tape is perfectly horizontal
-the reading is taken at the end of a normal expiration and the cross over of the tape is positioned medially to the axilla

2. Waist (Abdomen) Girth
-the subject stands erect and the tape is placed at the noticeable narrowing or halfway between the costal border and the iliac crest when the waist line is not apparent
-the cross over technique is used and the measurement is taken to the inside of the iliac crest

3. Gluteal (Hip) Girth
   -the participant stands erect with feet together
   -the tape is placed around the greatest gluteal protuberance and approximately in line with the pubic symphysis
   -the cross over technique is used and the measurement is taken on the lateral side of the hips

4. Thigh Girth
   -the subject stands erect with feet slightly apart, weight evenly distributed over both feet
   -the tape is positioned horizontally around the right thigh one cm below the gluteal line
   -cross handed technique is used to take a measurement on the lateral border of the thigh

4. SKINFOLD MEASUREMENTS

Equipment:
(a) Harpenden or Lange calipers

Procedures:
(a) ensure the subject is relaxed
(b) landmark the appropriate skinfold site and mark it with a "+" (marking site is optional)
(c) grasp the fold of skin and the underlying fat between the thumb and forefinger at the landmark site with the back of the hand facing the tester
(d) keep the jaws of the calipers at right angles to the body surface
(e) place the calipers 1 cm below where the skinfold mark is placed
(f) maintain the pressure of the fingers on the skinfold and release the trigger of the calipers fully
(g) wait 2 seconds after the pressure of the calipers are applied until a measurement is taken
(h) a reading is recorded to the nearest 0.1 millimeters
(i) complete the first set of skinfold measurements from arms down to calf and then obtain a second set of measurements at each skinfold site
(j) if the difference between the first two measurements is greater than 0.4 mm a third measurement is taken, choose the two measures which are closest in value and take the mean of the two measures

$$\text{ie. } 15.8\text{mm} \quad 14.6\text{mm} \quad 14.0\text{mm}$$
$$\frac{14.6\text{mm} + 14.0\text{mm}}{2} = 14.3\text{mm}$$

*if the three values are equidistant apart use the median of all three values. ie. 18.6 19.2 19.8

UNIVERSITY OF VICTORIA

SPORTS AND FITNESS CENTRE

ANTHROPOMETRIC MEASUREMENTS PROTOCOL

Measurement sites:

Triceps
- the participant stands with arms relaxed by the sides
- the skinfold is landmarked the midway point between the acromion and the tip of olecranon
- the midpoint is determined by placing the fifth finger of the left hand on the tip of the right acromion and the fifth finger of the right hand on the tip of the olecranon
- then where the thumbs meet, determine the midpoint

Biceps
- once the tricepts landmark has been determined, the tester eyeballs a horizontal line at the same level as the triceps to the biceps (be careful not to go downwards)

Subscapular
- the participant stands with shoulders relaxed and arms by the sides
- the tester determines the vertebral border of the scapula until the inferior angle is reached
- if the inferior angle is difficult to find, get the subject to move their shoulder forward and backwards
- a mark is made 1 cm beneath the inferior angle, approximately 1 cm medially
- caliper placement will be directly below inferior angle
- the skinfold is raised so it can be measured on a diagonal line with the vertebral border

Iliac Crest
- the participant stands erect with the right arm crossed over the chest to the left shoulder
- the skinfold is measured 3 cm above the iliac crest at the midline of the body so that the fold runs forward and slightly downward

Supraspinale
- the participant stands erect with the right arm crossed over the chest to the left shoulder
- the skinfold is measured 7 cm above anterior superior iliac spine
- the skinfold follows the natural fold running medially at a 45' angle from the horizontal
- if the superior iliac spine is difficult to find get the subject to rotate their foot inwards and outwards

Abdominal
- the participant stands erect with weight evenly distributed on both feet
- the measurement is taken on the left side
- the calipers are placed 1 cm inferior to the thumb and index finger raising the skinfold 5 cm laterally to the midpoint of the navel

Medial Calf
- ensure the subject's knee is flexed 90' with the foot supported
- the skinfold site is marked 1 cm above the maximum girth of the calf so that the fold runs vertically along the midline

Front Thigh
- the subject sits on the edge of the chair with the leg at a 90' angle
- the midpoint of the thigh is determined by landmarking the inguinal crease with the fifth finger of the left hand and the fifth finger of the right hand on the anterior point of the patella
- where the thumbs meet is the midpoint of the thigh were the skinfold should be measured
- the skinfold in some subjects are difficult to grasp so the subject can assist by lifting up the underside of leg upwards

APPENDIX G

THE MODIFIED SIT AND REACH TEST

SIT AND REACH PROTOCOL
(Modified Wells and Dillon Test)

PROTOCOL

*****A person who has lower back problems should not perform this test*****

1. Generally this test is performed after an aerobic fitness test. Before commencing this test, all participants should do a proper warm up by performing the modified hurdlers stretch. Each stretch should be held for 20 seconds and be repeated twice on each leg.

2. The subject sits barefoot with his legs fully extended and the soles of his feet flat against the backboard of the flexometer. The inner edge of the feet and placed 2 cm from the edge of the scale (ie. next to the wooden beam).

3. While flexing forward, the subject MUST keep his knees fully extended, arms evenly stretched, palms down, and head lowered as he pushes the sliding marker down the scale SLOWLY. At maximum flexion, the subject must hold the position for approximately 2 seconds.

4. The test is repeated twice and the highest value is recorded to the nearest 0.5 cm.

5. A trial is not counted if the subject's knees flex or if jerking and bouncing movements are used to push the slide down the scale.

APPENDIX H

THE MUSCULAR STRENGTH AND ENDURANCE TESTS

GRIP STRENGTH PROTOCOL - CSTF

- Have the subject grasp the dynamometer in the appropriate hand.
- Place the dynamometer in the V of the hand, between the thumb and index finger.
- Adjust the grip of the dynamometer so the middle phalange of the finders fits snugly over the handle and takes the weight of the instrument.
- The subject holds the dynamometer in line with the forearm at the level of the thigh, arm extended approximately 45 degrees from the body.
- The dynamometer is then squeezed so as to exert a maximal force.
- Instruct the subject to exhale as they squeeze the dynamomete to avoid build-up of intra-thoracic pressure.
- During the test neither the hand nor the dynamometer should touch the body or any other object.
- Measure both hands alternatively allowing two trials per hand.
- Record the scores for each hand to the nearest kilogram.
- Combine the maximum score for each hand and record.
- Compare to norms.

PUSH UP PROTOCOL - CSTF

*****A person with low back problems should not perform this test*****

MALES - The participant lies on his stomach, legs together. His hands, pointing forward, are positioned beside the shoulders. The subject pushes up from the mat by fully straightening the elbows and using the toes as a pivotal point.

The upper body must be kept in a straight line. The subject returns to the starting position, elbows bent to 90 degrees. Neither the stomach nor thighs should touch the mat.

Push ups are performed slow and controlled and in time with the metrenome (set to 50 beats/min or 25 push ups/min).

FEMALES - The participant lies on her stomach, legs together. her hands pointing forward, are positioned beside the shoulders. The participant pushes up from the mat by fully straightening the elbows and using the knees as the pivotal point.

The upper body must be kept in a straight line. The participant returns to the starting position, elbows bent to 90 degrees. The stomach should not touch the mat

Push ups are performed slow and controlled and in time with the metrenome (set to 50 beats/min or 25 push ups/min).

MALES AND FEMALES

The test is terminated when the participant can no longer complete a push up; when 120 push ups are completed in good form; or on the third warning. A warning is given when one or more of the following are observed:

- the participant is forcibly strining to complete the push up
- the participant is unable to maintain proper form
- the participant cannot keep pace with the metrenome
- the elbows are not bent to 90 degrees or are not completely extended during the push up.

PARTIAL CURL-UP PROTOCOL
Modified from Faulkner and Associates, 1988

1. Align subject so finger tips touch a "0" line on a 12 cm measuring tape.

2. Subject bends knees to 90 degrees.

3. Subject then curls up, while sliding his/her hands along the floor until the finger tips just touch the 12 cm marker, and then return to the starting position.

4. Instruct subject to exhale as they curl up to avoid build-up of intra-thoracic pressure.

5. If the subject can not reach the required 12 cm, the actual distance reached is recorded; but the subject is given a score of 0 for curl-ups performed.

6. The movement is slow and controlled (metrenome set at 40 beats/min. or 20 curl-ups/min.).

7. The test is terminated when 120 curl-ups have been completed or on the third warning. A warning is given when one or more of the following are observed:

   - finger tips do not reach the 12 cm mark
   - subject cannot keep pace with the metrenome
   - subject's heels do not remain in contact with the mat
   - hips are lifted off the mat.

APPENDIX I

THE STANDARDIZED FITNESS TEST RELIABILITY

Health Related Standardized Fitness Tests

PWC170 Test. (Sjostrand, T., 1947)

- Reliability; not reported.
- meets the following general criteria for tests measuring cardiovascular function: a large muscle mass is involved; the work increases in step-wise levels; each level is no longer than six minutes in duration, and the measurement of various parameters while exercising is easily carried out. (CAHPER, 1966).

Anthropometric Measures (Johnson, 1986)

1. Body Mass index

   - low correlation with height, correlates highly but negatively with ponderal index (max. achieved mass).

2. Skinfolds

   - R: r= .90 - .95

Modified sit and reach test (Johnson, 1986).

- R: an r = .94 reported on best of 3 trials.

- Face validity accepted for the test.

Muscular strength and endurance tests.

1. Grip dynamometer test (Johnson, 1986).

   - R: an r = .90 reported.

2. Push up test. (Johnson, 1986).

   - R: none could be found.

   - objectivity of r = .99 reported.

   - Face validity accepted for the test.

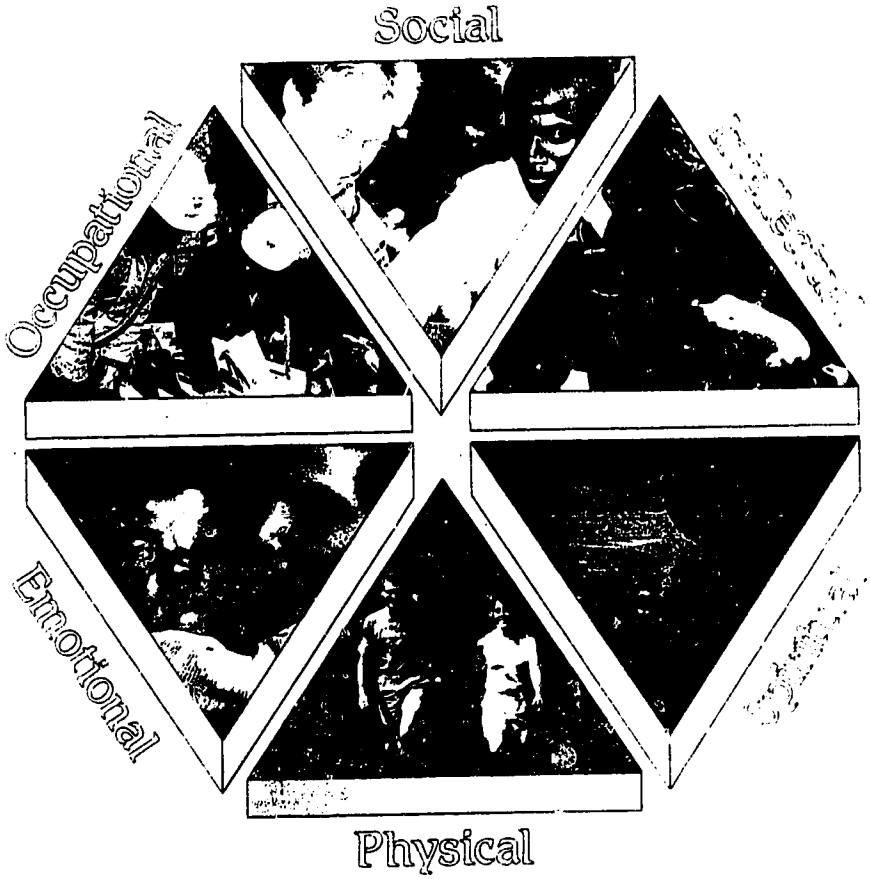
3. Sit up test. (Faulkner et al., 1988)

   - R: none could be found.

   - Fitness Canada has recommended the adoption of this test for Standardized Tests of Fitness.

APPENDIX J

THE LIFESTYLE ASSESSMENT QUESTIONNAIRE (LAQ)



Lifestyle Assessment Questionnaire

5th Edition

Purpose

This assessment tool and the analysis it provides are designed to help you discover how the choices you make each day affect your overall health.

By participating in this assessment process, you will also learn how you can make positive changes in your lifestyle, enabling you to reach a higher level of wellness.

Some of the questions are personal. While you may leave them blank, the more information you provide about your current lifestyle, the more accurately the LAQ can assess your current level of wellness and risk areas.

Confidentiality

The National Wellness Institute, Inc. subscribes to the guidelines established by the Society of Prospective Medicine concerning confidentiality in the use of health risk appraisals and risk reduction systems. These guidelines specifically state that only the participant and health professionals authorized by the participant should receive copies of his/her own health risk appraisal results.

The National Wellness Institute, Inc. strongly encourages all users of the LAQ to strictly follow these guidelines and maintain the confidentiality of all answers.

What is Wellness?

Wellness is an active process of becoming aware of and making choices toward a higher level of well-being. **Remember,** leading a wellness lifestyle requires your **active involvement.** As you gain more knowledge about what enhances your well-being, you are encouraged to use this information to make informed choices which lead to a healthier life.

General Instructions

The enclosed answer sheet is for you to record your answers to the Lifestyle Assessment Questionnaire. Please make certain that you complete all of the information at the top of the answer sheet including your zip code, group code, and social security number. If a group code has not been provided for you, leave this item blank.

Your questionnaire will be scored by an optical mark reading instrument; therefore, please use only a No. 2 (soft) pencil for marking your responses. To assure the most accurate results, follow the instructions shown on the answer sheet. Only your answer sheet needs to be returned for scoring. You may keep this questionnaire.

The Lifestyle Assessment Questionnaire was written by the National Wellness Institute, Inc.'s Board of Directors and Cofounders; Dennis Elsenrath, Ed.D., Bill Hettler, M.D., and Fred Leafgren, Ph.D.

Section 1: PERSONAL DATA

INSTRUCTIONS:

Please complete the following general information about yourself by marking your answers in the appropriate places on the LAQ answer sheet. Please take your time and read each question carefully.

1. Sex
   a) male
   b) female
2. Race
   a) White
   b) Black
   c) Hispanic
   d) Asian
   e) American Indian
   f) other
3. Age
4. Height (feet and inches)
5. Weight (pounds)
6. Body frame size
   a) small
   b) medium
   c) large
7. Marital Status
   a) married
   b) widowed
   c) separated
   d) divorced
   e) single
   f) cohabiting
8. What was the total gross income of your household last year?
   a) under $12,000
   b) $12,000-$20,000
   c) $20,001-$30,000
   d) $30,001-$40,000
   e) $40,001-$50,000
   f) $50,001-$60,000
   g) over $60,000
9. What is the highest level of education you have completed?
   a) grade school or less
   b) some high school
   c) high school graduate
   d) some college or technical school
   e) college graduate
   f) postgraduate or professional degree
10. On the average day, how many hours do you watch television?
    a) 0 hours
    b) 1-3 hours
    c) 4-7 hours
    d) more than 8 hours
11. Where do you live?
    a) in the country
    b) in a city
    c) suburb
    d) small town
12. If you live in a city, suburb, or small town, what is the population?
    a) under 20,000
    b) 20,000-50,000
    c) 50,001-100,000
    d) 100,001-500,000
    e) over 500,000

Section 2: LIFESTYLE

INSTRUCTIONS:

This section will help determine your level of wellness. It will also give you ideas for areas in which you might improve. Some questions touch on very personal subjects. Therefore, if you prefer to skip certain questions, you may. However, the more questions you answer, the more you will learn about your health and how to improve it.

Please respond to these statements using the following responses. If an item does not apply to you, do not mark it.

A Almost always (90% or more of the time)
B Very often (approximately 75% of the time)
C Often (approximately 50% of the time)
D Occasionally (approximately 25% of the time)
E Almost never (less than 10% of the time)

PHYSICAL EXERCISE

Measures one's commitment to maintaining physical fitness.

1. I exercise vigorously for at least 20 minutes three or more times per week.
2. I determine my activity level by monitoring my heart rate.
3. I stop exercising before I feel exhausted.
4. I exercise in a relaxed, calm, and joyful manner.
5. I stretch before exercising.
6. I stretch after exercising.
7. I walk or bike whenever possible.
8. I participate in a strenuous activity (tennis, running, brisk walking, water exercise, swimming, handball, basketball, etc.).
9. If I am not in shape, I avoid sporadic (once a week or less often), strenuous exercise.
10. After vigorous exercise, I "cool down" (very light exercise such as walking) for at least five minutes before sitting or lying down.

NUTRITION

Measures the degree to which one chooses foods that are consistent with the dietary goals of the United States as published by the Senate Select Committee on Nutrition and Human Needs.

11. When choosing non-vegetable protein, I select lean cuts of meat, poultry, fish, and low-fat dairy products.
12. I maintain an appropriate weight for my height and frame.
13. I minimize salt intake.
14. I eat fruits and vegetables, fresh and uncooked.
15. I eat breakfast.
16. I intentionally include fiber in my diet on a daily basis.
17. I drink enough fluid to keep my urine light yellow.
18. I plan my diet to insure an adequate amount of vitamins and minerals.
19. I minimize foods in my diet that contain large amounts of refined flour (bleached white flour, typical store bread, cakes, etc.).
20. I minimize my intake of fats and oils including margarine and animal fats.

21. I include items from all four basic food groups in my diet each day (fruits and vegetables; milk group; breads and cereals; meat, fowl, fish or vegetable proteins).
22. To avoid unnecessary calories, I choose water as one of the beverages I drink.
23. I avoid adding sugar to my foods. I minimize my intake of pre-sweetened foods (sugarcoated cereals, syrups, chocolate milk, and most processed and fast foods).

SELF-CARE

Measures the behaviors which help one prevent or detect early illnesses.

24. I use footgear of good quality designed for the activity or the job in which I participate.
25. I record immunizations to maintain up-to-date immunization records.
26. I examine my breasts or testes on a monthly basis.
27. I have my breasts or testes examined yearly by a physician.
28. I balance the type and amount of food I eat with exercise to maintain a healthy percent body fat.
29. I take action to minimize my exposure to tobacco smoke.
30. When I experience illness or injury, I take necessary steps to correct the problem.
31. I engage in activities which keep my blood pressure in a range which minimizes my chances of disease (e.g., stroke, heart attack, and kidney disease).
32. I brush my teeth after eating.
33. I floss my teeth after eating.
34. My resting pulse is 60 or less.
35. I get an adequate amount of sleep.
36. If I were to have sex, I would take action to prevent unplanned pregnancy.
37. If I were to have sex, I would take action to prevent giving and/or getting sexually transmitted disease.

VEHICLE SAFETY

Measures one's ability to minimize chances of injury or death in a vehicle accident.

38. I do not operate vehicles while I am under the influence of alcohol or other drugs.
39. I do not ride with drivers who are under the influence of alcohol or other drugs.
40. I stay within the speed limit.
41. I practice defensive driving techniques.
42. When traffic lights change from green to yellow, I prepare to stop.
43. I maintain a safe driving distance between cars based on speed and road conditions.
44. Vehicles which I drive are maintained to assure safety.
45. Because they are safer, I use radial tires on cars that I drive.
46. When I ride a bicycle or motorcycle, I wear a helmet and have adequate lights/reflectors.
47. Children riding in my car are secured in an approved car seat or seat belt.
48. I use my seat belt while driving or riding in a vehicle.

DRUG USAGE AND AWARENESS

Measures the degree to which one functions without the unnecessary use of chemicals

49. I use prescription drugs and over-the-counter medications only when necessary.
50. If I consume alcohol, I limit my consumption to not more than one drink per hour and no more than two drinks per day.
51. I avoid the use of tobacco.
52. Because of the potentially harmful effects of caffeine (e.g., coffee, tea, cola, etc.), I limit my consumption.
53. I avoid the use of marijuana.
54. I avoid the use of hallucinogens (LSD, PCP, MDA, etc.).
55. I avoid the use of stimulants ("uppers"– e.g., cocaine, amphetamines, "pep pills," etc.).
56. I avoid the use of nonmedically prescribed depressants ("downers"– e.g., barbituates, quaaludes, minor tranquilizers, etc.).
57. I avoid using a combination of drugs unless under medical supervision.
58. I follow the instructions provided with any drug I take.
59. I avoid using drugs obtained from illegal sources.
60. I understand the expected effect of drugs I take.
61. I consider alternatives to drugs.
62. If I experience discomfort from stress or tension, I use relaxation techniques, exercise, and meditation instead of taking drugs.
63. I get clear directions for taking my medicine from my doctor or pharmacist.

SOCIAL/ENVIRONMENTAL

Measures the degree to which one contributes to the common welfare of the community. This emphasizes interdependence with others and nature.

64. I conserve energy at home.
65. I consider energy conservation when choosing a mode of transportation.
66. My social ties with family are strong.
67. I contribute to the feeling of acceptance within my family.
68. I develop and maintain strong friendships.
69. I do my part to promote a clean environment (i.e., air, water, noise, etc.).
70. When I see a safety hazard, I take action (warn others or correct the problem).
71. I avoid unnecessary radiation.
72. I report criminal acts I observe.
73. I contribute time and/or money to community projects.
74. I actively seek to become acquainted with individuals in my community.
75. I use my creativity in constructive ways.
76. My behavior reflects fairness and justice.
77. When possible, I choose an environment which is free of noise pollution.
78. When possible, I choose an environment which is free of air pollution.
79. I participate in volunteer activities benefiting others.
80. I help others in need.
81. I beautify those parts of my environment under my control.

82. Because of limited resources, I do my part to conserve.
83. I recycle aluminum, glass, and paper products.
84. I involve myself with people who support a positive lifestyle.

EMOTIONAL AWARENESS AND ACCEPTANCE

Measures the degree to which one has an awareness and acceptance of one's feelings. This includes the degree to which one feels positive and enthusiastic about oneself and life.

85. I have a good sense of humor.
86. I feel positive about myself.
87. I feel there is a satisfying amount of excitement in my life.
88. My emotional life is stable.
89. I am aware of my needs.
90. I trust and value my own judgment.
91. When I make mistakes, I learn from them.
92. I feel comfortable when complimented for jobs well done.
93. It is okay for me to cry.
94. I have feelings of sensitivity for others.
95. I feel enthusiastic about life.
96. I find it easy to laugh.
97. I am able to give love.
98. I am able to receive love.
99. I enjoy my life.
100. I have plenty of energy.
101. My sleep is restful.
102. I trust others.
103. I feel others trust me.
104. I accept my sexual desires.
105. I understand how I create my feelings.
106. At times, I can be both strong and sensitive.
107. I am aware when I feel angry.
108. I accept my anger.
109. I am aware when I feel sad.
110. I accept my sadness.
111. I am aware when I feel happy.
112. I accept my happiness.
113. I am aware when I feel frightened.
114. I accept my feelings of fear.
115. I am aware of my feelings about death.
116. I accept my feelings about death.

EMOTIONAL MANAGEMENT

Measures the degree to which one controls and expresses feelings, and engages in effective, related behaviors.

117. I share my feelings with those with whom I am close.
118. I express my feelings of anger in appropriate ways.
119. I express my feelings of sadness in healthy ways.
120. I express my feelings of happiness in desirable ways.
121. I express my feelings of fear in appropriate ways.
122. I compliment myself for a job well done.
123. I accept constructive criticism without reacting defensively.
124. I set appropriate limits for myself.
125. I stay within the limits that I have set.
126. I recognize that I can have wide variations of feelings about the same person (such as loving someone even though you are angry with her/him at the moment).
127. I am able to develop close, intimate relationships.
128. I say "no" without feeling guilty.
129. I would feel comfortable seeking professional help to better understand and cope with my feelings.
130. I reduce feelings of failure by setting achievable goals.
131. I relax my body and mind without using drugs.
132. I can be alone without feeling lonely.
133. I am able to be spontaneous in expressing my feelings.
134. I accept responsibility for my actions.
135. I am willing to take the risks that come with making change.
136. I manage my feelings to avoid unnecessary suffering.
137. I make decisions with a minimum of stress and worry.
138. I accept the responsibility for creating my own feelings.
139. I can express my feelings about death.
140. I recognize grieving as a healthy response to loss.

INTELLECTUAL

Measures the degree to which one engages her/his mind in creative, stimulating mental activities, expanding knowledge, and improving skills.

141. I read a newspaper daily.
142. I read twelve or more books yearly.
143. On the average, I read one or more national magazines per week.
144. When I watch TV, I choose programs with informational/educational value.
145. I visit a museum or art show at least three times yearly.
146. I attend lectures, workshops, and demonstrations at least three times yearly.
147. I regularly use some of my time participating in hobbies such as photography, gardening, woodworking, sewing, painting, baking, art, music, writing, pottery, etc.
148. I read about local, state, national, and international political/public issues.
149. I learn the meaning of new words.
150. I engage in some type of writing activity such as a regular journal, letter writing, preparation of papers or manuscripts, etc.
151. I am interested in understanding the views of others.
152. I share ideas, concepts, thoughts, or procedures with others.
153. I gather information to enable me to make decisions.
154. I listen to radio and/or TV news.
155. I think about ideas different than my own.

OCCUPATIONAL

Measures the satisfaction gained from one's work and the degree to which one is enriched by that work. Please answer these items from your primary frame of reference, (e.g., your job, student, homemaker, etc.).

156. I enjoy my work.

157. My work contributes to my personal needs.
158. I feel that my job in some way contributes to my well-being.
159. I cooperate with others in my work.
160. I take advantage of opportunities to learn new work-related skills.
161. My work is challenging.
162. I feel my job responsibilities are consistent with my values.
163. I find satisfaction from the work I do.
164. I find healthy ways of reducing excessive job-related stress.
165. I use recommended health and safety precautions.
166. I make recommendations for improving worksite health and safety.
167. I am satisfied with the degree of freedom I have in my job to exercise independent judgments.
168. I am satisfied with the amount of variety in my work.
169. I believe I am competent in my job.
170. My co-workers and supervisors respect me as a competent individual.
171. My communication with others in my work place is enriching for me.

SPIRITUAL

Measures one's ongoing involvement in seeking meaning and purpose in human existence. It includes an appreciation for the depth and expanse of life and natural forces that exist in the universe.

172. I feel good about my spiritual life.
173. Prayer, meditation, and/or quiet personal reflection is/are important part(s) of my life.
174. I contemplate my purpose in life.
175. I reflect on the meaning of events in my life.
176. My values guide my daily life.
177. My values and beliefs help me to meet daily challenges.
178. I recognise that my spiritual growth is a lifelong process.
179. I am concerned about humanitarian issues.
180. I enjoy participating in discussions about spiritual values.
181. I feel a sense of compassion for others in need.
182. I seek spiritual knowledge.
183. My spiritual awareness occurs other than at times of crisis.
184. I believe in something greater or that I am part of something greater than myself.
185. I share my spiritual values.

Section 3: HEALTH RISK APPRAISAL

INSTRUCTIONS:

This section is intended to help you identify the problems most likely to interfere with the quality of your life. It will also show you choices you can make to stay healthy and avoid the most common causes of death for a person your age and sex.

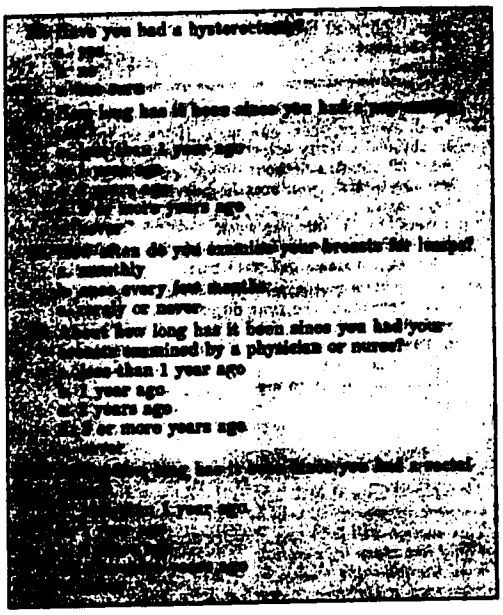
This Health Risk Appraisal is not a substitute for a check-up or physical exam that you get from a doctor or nurse. It only gives you some ideas for lowering your risk of getting sick or injured in the future. It is NOT designed for people who already have HEART DISEASE, CANCER, KIDNEY DISEASE, OR OTHER SERIOUS CONDITIONS. If you have any of these problems and you want a Health Risk Appraisal anyway, ask your doctor or nurse to read this section of the printout with you.

If you don't know or are unsure of an answer, please leave that item blank.

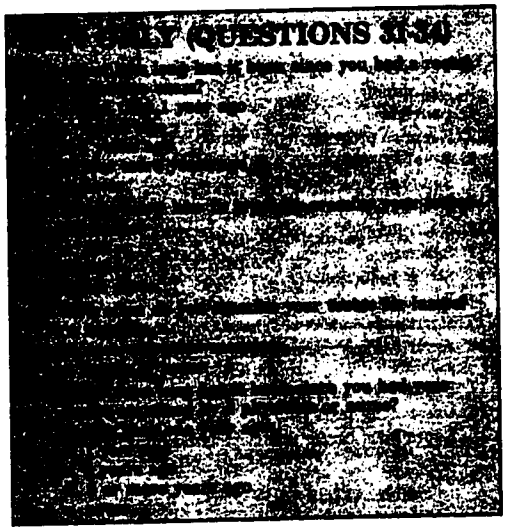
1. Have you ever been told that you have diabetes (or sugar diabetes)?
   a. yes
   b. no
2. Does your natural mother, father, sister or brother have diabetes?
   a. yes
   b. no
   c. not sure
3. Did either of your natural parents die of a heart attack before age 60? (If your parents are younger than 60, mark no).
   a. yes, one of them
   b. yes, both of them
   c. no
   d. not sure
4. Are you now taking medicine for high blood pressure?
   a. yes
   b. no
5. What is your blood pressure now?
   a. _____ systolic (high number)
   b. _____ diastolic (low number)
6. If you *do not* know the number, select the answer that describes your blood pressure.
   a. high
   b. normal or low
   c. don't know
7. What is your TOTAL cholesterol level (based on a blood test)?
   _____ (mg/dl)
8. What is your High Density Lipoprotein (HDL) cholesterol level (based on a blood test)?
   _____ (mg/dl)
9. How many cigars do you usually smoke per day?
   _____
10. How many pipes of tobacco do you usually smoke per day? _____
11. How many times per day do you usually use smokeless tobacco (chewing tobacco, snuff, pouches, etc.)? _____
12. How would you describe your cigarette smoking habits?
    a. never smoked Go to 15
    b. used to smoke Go to 14
    c. still smoke Go to 13

13. How many cigarettes a day do you smoke?
    ___ cigarettes per day Go to 15
14. a. How many years has it been since you smoked cigarettes regularly?
    ___ years
    b. What was the average number of cigarettes per day that you smoked in the 2 years before you quit?
    ___ cigarettes per day
15. In the next 12 months, how many thousands of miles will you probably travel by each of the following? (NOTE: U.S. average = 10,000 miles)
    a. car, truck, or van: ___,000 miles
    b. motorcycle: ___,000 miles
16. On a typical day how do you USUALLY travel? (Check one only)
    a. walk
    b. bicycle
    c. motorcycle
    d. sub-compact or compact car
    e. mid-size or full size car
    f. truck or van
    g. bus, subway, or train
    h. mostly stay home
17. What percent of the time do you usually buckle your safety belt when driving or riding?
    ___%
18. On the average, how close to the speed limit do you usually drive?
    a. within 5 mph of limit
    b. 6-10 mph over limit
    c. 11-15 mph over limit
    d. more than 15 mph over limit
19. How many times in the last month did you drive or ride when the driver had perhaps too much alcohol to drink?
    ___ times last month
20. When you drink alcoholic beverages, how many drinks do you consume in an average day? (If you *never* drink alcoholic beverages, write 0.)
    ___ alcoholic beverages/average day
21. On the average, how many days per week do you consume alcohol?
    ___ days/week

(MEN GO TO QUESTION 31)



WOMEN GO TO QUESTION 35



35. How many times in the last year did you witness or become involved in a violent fight or attack where there was a good chance of a serious injury to someone?
    a. 4 or more times
    b. 2 or 3 times
    c. 1 time or never
    d. not sure

36. Considering your age, how would you describe your overall physical health?
    a. excellent
    b. good
    c. fair
    d. poor
37. In an average week, how many times do you engage in physical activity (exercise or work which lasts at least 20 minutes without stopping and which is hard enough to make you breathe heavier and your heart beat faster)?
    a. less than 1 time per week
    b. 1 or 2 times per week
    c. at least 3 times per week
38. If you ride a motorcycle or all-terrain vehicle (ATV), what percent of the time do you wear a helmet?
    a. 75% to 100%
    b. 25% to 74%
    c. less than 25%
    d. does not apply to me
39. Do you eat some food every day that is high in fiber such as whole grain bread, cereal, fresh fruits or vegetables?
    a. yes
    b. no
40. Do you eat foods every day that are high in cholesterol or fat, such as fatty meat, cheese, fried foods, or eggs?
    a. yes
    b. no
41. In general, how satisfied are you with your life?
    a. mostly satisfied
    b. partly satisfied
    c. not satisfied
42. Have you suffered a personal loss or misfortune in the past year that had a serious impact on your life? (For example, a job loss, disability, separation, jail term, or the death of someone close to you.)
    a. yes, 1 serious loss or misfortune
    b. yes, 2 or more
    c. no

Section 4: TOPICS FOR PERSONAL GROWTH

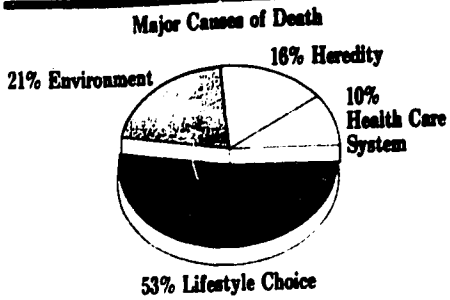
This section will help you identify areas in which you would like more information. In response to your selection from the following topics, we will provide you with resources or services to meet your requests.

Select topics on which you would like information. (Maximum of 4 topics.)

1. Responsible alcohol use
2. Stop-smoking programs
3. Sexuality
4. Gay issues
5. Depression
6. Loneliness
7. Exercise programs
8. Weight reduction
9. Self-breast exam
10. Medical emergencies
11. Nutrition
12. Relaxation
13. Stress reduction
14. Parenting skills
15. Marital or couples problems
16. Assertiveness training (how to say "no" without feeling guilty)
17. Biofeedback for tension headache and pain
18. Overcoming fears (i.e., high places, crowded rooms, etc.)
19. Educational career goal setting/planning
20. Spiritual or philosophical values
21. Communication skills
22. Automobile safety
23. Suicide thoughts or attempts
24. Substance abuse
25. Anxiety associated with public speaking, tests, writing, etc.
26. Enhancing relationships
27. Time-management skills
28. Death and dying
29. Learning skills (i.e., speed reading, comprehension, etc.)
30. Financial management
31. Divorce
32. Alcoholism
33. Men's issues
34. Women's issues
35. Medical self-care
36. Dental self-care
37. Self-testes exam
38. Aging
39. Self-esteem
40. Premenstrual syndrome (PMS)
41. Osteoporosis
42. Recreation and leisure
43. Environmental issues

IMPORTANT— If you have finished completing all sections of the LAQ, please make sure you have answered the questions in Section 1 requesting your sex, race, age, height and weight. Results cannot be generated for the Health Risk Appraisal section without this information.

You and Your Lifestyle Are the Major Determinants for Joyful Living



The circle graph to the left indicates the factors which contribute to your enjoyment and quality of life. While medical professionals contribute to the quality of your life, this graph clearly shows that the majority of those factors which contribute to your well-being are controlled by you. As you make responsible, informed choices, your chances of improving your health and well-being increase.

The LAQ's Role...

We believe this instrument is useful in helping individuals identify the most likely causes of death and disability. More importantly, it identifies those areas of self-improvement which will lead to higher levels of health and well-being.

The areas assessed in the LAQ emphasize the importance of creating a balance among the many different aspects of your lifestyle. Each of these areas affects one another and determines your overall wellness status. Also, each provides an opportunity for learning, making responsible decisions, and personal growth.

We invite you to use the information provided by the LAQ to your best advantage to increase your level of wellness.

Words from the Past

Wellness is a term that has enjoyed growing popularity during the past several decades. Although the term was introduced relatively recently, the concept of prevention has been present for centuries. The following passages provide a brief glimpse of the wellness philosophy through the years. Wellness is a movement which has become a major part of modern culture and is the most important weapon available to combat lifestyle illnesses.

"For many years, while engaged in the practice of medicine, the author of this volume has been more and more impressed with the idea that the causes of suffering, diseases, and premature deaths, which we witness around us on every hand, lie near our own doors ... and that the men and women of today, are, at least, equally as responsible for existing suffering, as those who have gone before them, and often much more so. In fact, he feels satisfied that by far the greatest portion of all the suffering, disease, deformity, and premature deaths which occur are the direct result of either the violation of, or the want of compliance with the laws of our being; calamities, which, were the requisite knowledge possessed by the community, can and should be avoided."

—JOHN ELLIS, M.D., 1859

"It is universally admitted at the present time that preventive medicine is of far greater importance than curative medication, and many of the most eminent members of the profession are devoting themselves exclusively to this branch."

—J. H. KELLOGG, M.D., 1902

"To ward off disease or recover health, men as a rule find it easier to depend on the healers than to attempt the more difficult task of living wisely."

—RENE DUBOS, Ph.D., 1959

"It's what you do hour by hour, day by day, that largely determines the state of your health; whether you get sick, what you get sick with, and perhaps when you die."

—LESTER BRESLOW, M.D., 1969

A National Wellness Institute, Inc.
Publication

National Wellness Institute, Inc.
South Hall, 1319 Fremont Street
Stevens Point, Wisconsin 54481
(715) 342-2172

LIFESTYLE ASSESSMENT QUESTIONNAIRE

DEVELOPMENT AND TESTING

This powerful wellness tool was developed in 1976 by the National Wellness Institute, Inc.'s Board of Directors and Cofounders: Dennis Elsenrath, Ed.D.; Bill Hettler, M.D.; and Fred Leafgren, Ph.D. With their continued leadership, experience, and active involvement, the instrument has undergone advanced study and improvement over the years. As a result, the LAQ continues to set the standard by which other assessment tools are judged.

When the LAQ was first developed, the entire instrument was presented to a panel of health promotion and wellness professionals to verify the validity of the instrument's content.

The Wellness Inventory was the first section of the LAQ to be developed. Professionals working in each of the six wellness dimensions prepared items for the eleven wellness categories–selecting them to assess each dimension in behavioral terms.

Using many years of experience and extensive research from leading professional journals, the authors wrote each statement in the Wellness Inventory with the dual purpose of education and assessment. As a result, the computer printout not only gives individuals an indication of their lifestyle status in each category, but also provides a stimulus for change.

To determine the degree of learning and behavior change that occurred after taking this section of the LAQ, students at the University of Wisconsin-Stevens Point took the LAQ, were provided the Wellness Inventory statements, and were surveyed 9 and 21 months later. Of the students surveyed:

87% reported learning from just completing the LAQ;

65% reported learning to a high or moderate degree;

27% reported that they had made moderate change in lifestyle; and

26% reported making a small degree of change as a result of completing the LAQ.

The LAQ program compares each individual's scores on the Wellness Inventory to two groups. The first group is the one with which the individual took the LAQ. The second is a large pool of people who have taken the LAQ through the National Wellness Institute, Inc. since 1978. This includes individuals from businesses, governmental agencies, health-care organizations, and universities across the United States.

In the second section of the LAQ, the Personal Growth Section, individuals may obtain information in 31 categories. When they indicate which category of information they wish to receive, they receive a printout of pertinent publications. The Institute provides new references periodically to keep the bibliographies current.

LIFESTYLE ASSESSMENT QUESTIONNAIRE

RELIABILITY/VALIDITY RESEARCH EFFORTS

The LAQ has been, and continues to be, a popular and useful tool for research studies around the country. These studies have repeatedly concluded that the LAQ is a valid and reliable measurement tool. A summary of the results from a few of these studies is discussed below.

University of Wisconsin-Stevens Point, Stevens Point, Wisconsin

In 1982, Dennis Elsenrath, Ed.D., and Patricia Fandre, a Master's degree candidate in Counseling, conducted a study to determine the reliability of the LAQ. Thirty-nine parents of incoming UWSP students participated, completing the LAQ twice on days two weeks apart. Test/retest reliability coefficients among the eleven wellness categories ranged from .57 to .87 with an over all coefficient of .76. The test/retest reliability coefficients for the Personal Growth Section was .87. The coefficients for Risk of Death and Medical Alert Sections were .90 and .91 respectively.

University of Northern Colorado, Greeley, Colorado

In December, 1985, another study was completed concerning the reliability and validity of the LAQ. This effort was conducted by Judith M. Richter, R.N., Ph.D., Associate Professor. The sample for the study consisted of 88 junior year, female students who were enrolled in an introductory course in nursing.

Test/retest reliability was established by using 15 subjects who had been randomly selected from a larger group and retesting the subjects after two weeks. Reliability of the subscales ranged from .81 to .97.

Cronbach's coefficient alpha was computed on the wellness scale data to estimate internal consistency reliability. Reliability of the wellness subscales ranged from .67 to .94. Factor analysis was used to gain an estimate of construct validation. Content validity of the tool was established with the evaluation by two experts in measurement and health promotion.

Louisiana State University, Baton Rouge, Louisiana

This study was conducted by Sally Thigpen Freeman, Ph.D., and Gary G. Gintner, Ph.D., between Summer, 1985, and Spring, 1986. The purpose was to examine the criterion validity of the emotional subscales (i.e., Emotional Management and Emotional Awareness and Acceptance) of the LAQ by comparing LAQ scores of students who were in counseling or psychotherapy with students who were not. The hypothesis was that those seeking mental assistance would score lower in the emotional dimensions than the students not in counseling or psychotherapy.

The subjects involved were students enrolled at LSU. They included 63 males and 109 females. Students were assigned to either the experimental or control group on the basis of a self-report question which asked whether they were currently in counseling or psychotherapy.

The prediction that the Emotional Management and the Emotional Awareness and Acceptance subscales would be lower for students in therapy than for students not in therapy was confirmed. This suggests that the LAQ has discriminate criterion for these two subscales. In sum, then, preliminary validation of the LAQ was found.

The primary purpose of this study was to investigate the validity of the LAQ's wellness scales by comparing these scales to external objective measures. These measures included blood pressure, pulse, cholesterol levels, body composition, and flexibility. Additional information including GPA, ACT score, and information obtained from a questionnaire with regard to such things as number of visits to doctors, days of school missed due to illness, and perceptions of one's own physical and mental health was also used to investigate the external validity of the LAQ. This study was conducted in 1987 by Thomas J. DeStefano, Ed.D., and Peter Richardson, Ph.D.

The LAQ was administered to 319 entering college freshman. Of these, 211 were entering a small, private liberal arts college and 108 were entering a large public university. All subjects completed the LAQ and the supplemental questionnaire. For the 211 subjects entering the private liberal arts college, the series of physiological tests described previously were administered by trained health professionals.

Six specific analyses were conducted on the Lifestyle Assessment Questionnaire. These analyses included: intercorrelations for the eleven LAQ wellness scales, factor analysis of the LAQ scales, comparisons of the physical scales, the emotional/growth scales, and of the personal and social responsibility scales to external measures and other variables. Finally, a discriminative analysis of the physical scales with external physiological measures was conducted.

Results of the intercorrelations of the LAQ wellness scales revealed low to moderate correlations for 53 out of 55 comparisons. This indicated that the eleven wellness scales are relatively independent and therefore measuring qualities which are independent of each other.

Results of the correlations between the Physical Dimension scales and the objective physiological measures indicated that individual physical wellness scales are not related to specific objective indicators of an individual's present physiological state. However, it does appear that there is support for a more comprehensive use of the wellness scores. The results of the discriminant analyses suggested that when the physical dimension scores are taken together as a whole and related to more general indicators of health, such as weight loss and body composition, there is considerable support for external validity of the physical scales.

These results may provide support for the premise that healthy body weight and body composition cannot be achieved by one factor alone. Proper weight management requires a balance of good nutritional knowledge and habits, a sufficient and effective exercise program, positive mental vitality, and good general self-care habits.

APPENDIX K

THE INTERVIEW QUESTIONNAIRE

RCMP INTERVIEW QUESTIONNAIRE
RETURNEES GROUP

Which of the following most accurately describes your participation n the RCMP Wellness program? (card 1)

1 a. attended Test1(Feb/Mar'89); attended Test2(June'89); attended Test3(Aug/Sept'89).

2 b. attended Test1(Feb/Mar'89) and Test2(June'89).

3 c. attended Test1(Feb/Mar'89) and Test3(Aug/Sept'89).

4 d. attended Test1(Feb/Mar'89).

A. What factors influenced your decision to participate in the RCMP Wellness program?

Common Reasons	1. influenced	2. no influence
a. to improve overall lifestyle		d. to manage stress
b. to improve fitness level		e. to lose weight
c. to feel better in general		f. concerned about heart disease

B. Are there any other factors which influenced your decision to participate in the RCMP Wellness program? 1. yes -(specify)
2. no -[go to Que.2C]

Specific _____
factors _____
_____

C. Which of these factors **most** influenced you to participate in the RCMP Wellness program? [**Probe:** which influenced the most, second, third?]

Factors: 1. _____
2. _____
3. _____

A. Prior to the start of the RCMP Wellness program were you active in regular physical exercise (three or more times per week)?
1. yes
2. no [go to Que4]

If yes,

B. What activities?	Frequency (x/wk)	Intensity *(rpe card2)	Duration (min/x)
Cardiovascular _____	_____	_____	_____

Strength/Endurance_____ _____ _____ _____

Flexibility _____ _____ _____ _____

C. Did you participate in :

1. High School Sports 1 yes 2 no Activity:_____

2. College Sports 1 yes 2 no Activity:_____

3. Community Sports 1 yes 2 no Activity:_____

4. Individual fitness High School

1 yes 2 no Activity:_____

College

1 yes 2 no Activity:_____

Community

1 yes 2 no Activity:_____

A. Which of the following most accurately describes your current physical exercise habits? (card 3)

1 a.exercise 3 or more times/wk 3 c. no regular exercise

2 b.exercise less than 3 times/wk 4 d. no exercise

[If a or b, go to Que 4B, if c or d go to Que 5.]

B. In which of the following physical activities do you participate on a regular basis (three or more times per week)? (card 4)

1 participate 2 not participate

a. running
b. jogging
c. swimming
d. walking
e. weight train
f. hockey
g. aerobics
h. stretching
i. gardening
j. cycling
k. yoga
l. marshall arts

A.What personal reasons influenced your decision to participate in the RCMP Wellness program? (card 5)

Personal Reasons 1 influenced 2 no influence

a. smoking
b. inactive during free time
e. poor self-image
f. depressed
g. stress
i. peer pressure
j. good family support

c. inactive job
d. overweight
h. lack of self-motivation
k. off duty sick [go to Que 5B]

B. Was the illness work related? 1 yes 2 no If yes, what was the specific illness? _____.
What was the specific cause of the illness? _____
_____.

C. Are there any other **personal reasons**? 1 yes 2 no [go to Que6]
_____
_____
_____

D. Which **personal reasons** most influenced you to participate in the RCMP Wellness program? [Probe: Which influenced you most,2nd,3rd?]

Reasons: 1._____
2._____
3._____

6 A. Which **occupational factors** influenced your decision to participate in the RCMP Wellness program? **(card 6)**

Occupational factors 1 influenced 2 no influence

a. excessive job travel
b. amount of time in court
c. work related injuries
d. demanding work schedule
e. special assignment
f. job transfer

B. Are there any other **occupational factors**? 1 yes 2 no [go to Que6c]
_____
_____
_____

C. Which of these **occupational factors** most influenced you to participate in the RCMP Wellness program? **[Probe:** which influenced you most, 2nd, 3rd]

Factors: 1._____
2._____
3._____

7A. Which of the following **program factors** influenced your decision to participate in the Wellness program? **(card 7)**

Program Factors 1 influenced 2 no influence

a. convenient time/location
b. good program variety
c. individual programs
e. good communication/encouragement
f. enjoyment, fun, variety
g. group comraderie

d. positive peer/spouse feedback

h. regular routine

B. Are there any other **program factors** which influenced your decision to participate?_____

_____

_____

C. Which **program factor** influenced you the most to participate in the RCMP Wellness program? **[Probe:**which influenced you the most, 2nd, 3rd]

Factors: 1._____
2._____
3._____

8A. Which of the following statements most accurately describes your participation in the **Fitness component** of the RCMP Wellness program? **(card 8)**

a. followed the program for the first month
b. followed the program for the first two months
c. followed the program for the first three months
d. followed the program for the first four months
e. followed the program for the first five months
f. followed the program for the first six months
g. did not start the program
h. followed my own program

B. Which of the following statements most accurately describes your participation in the **Nutrition Foodtrak component** of the RCMP Wellness program? **(card 9)**

a. followed the program for the first month
b. followed the program for the first two months
c. followed the program for the first three months
d. followed the program for the first four months
e. followed the program for the first five months
f. followed the program for the first six months
g. did not start the program
h. followed my own program

9. What three factors would you change in the current RCMP Wellness program, that would improve your participation in the program?

Factors: 1. _____
_____
2. _____
_____
3. _____
_____

DEMOGRAPHIC INFORMATION:

SEX
a. male
b. female

AGE

MARITAL STATUS
a. married
b. separated
c. divorced
d. single
e. cohabitating
f. widowed

TOTAL GROSS HOUSEHOLD INCOME
a. under $30000
b. $30001 - $40000
c. $40001 - $50000
d. $50001 - $60000
e. over $60000

EDUCATION LEVEL
a. grade school or less
b. some high school
c. high school graduate
d. some college or technical school
e. college graduate
f. post graduate or professional degree

RCMP INTERVIEW QUESTIONNAIRE
NON-RETURNEES GROUP

1. Which of the following most accurately describes your participation in the RCMP Wellness program? **(card 1)**

1 a. attended Test1(Feb/Mar'89); attended Test2(June'89); attended Test3(Aug/Sept'89).

2 b. attended Test1(Feb/Mar'89) and Test2(June'89).

3 c. attended Test1(Feb/Mar'89) and Test3(Aug/Sept'89).

4 d. attended Test1(Feb/Mar'89).

2. A. What factors influenced your decision to participate in the RCMP Wellness program?

Common Reasons	1. influenced	2. no influence
a. to improve overall lifestyle		
b. to improve fitness level		
c. to feel better in general		
d. to manage stress		
e. to lose weight		
f. concerned about heart disease		

B. Are there any other factors which influenced your decision to participate in the RCMP Wellness program? 1. yes -(specify)
2. no -[go to Que.2C]

Specific factors _____

C. Which of these factors **most** influenced you to participate in the RCMP Wellness program? **[Probe:** which influenced the most, second, third?]

Factors: 1. _____
2. _____
3. _____

3 A. Prior to the start of the RCMP Wellness program were you active in regular physical exercise (three or more times per week)?
1. yes
2. no [go to Que4]

If yes,

B. What activities?	Frequency (x/wk)	Intensity ***(rpe card2)**	Duration (min/x)
Cardiovascular _____	_____	_____	_____
Strength/Endurance_____	_____	_____	_____

Flexibility _____ _____ _____ _____

C. Did you participate in :

1. High School Sports 1 yes 2 no Activity:_____

2. College Sports 1 yes 2 no Activity:_____

3. Community Sports 1 yes 2 no Activity:_____

4. Individual fitness High School

1 yes 2 no Activity:_____

College

1 yes 2 no Activity:_____

Community

1 yes 2 no Activity:_____

4 A. Which of the following most accurately describes your current physical exercise habits? (**card 3**)

1 a.exercise 3 or more times/wk 3 c. no regular exercise

2 b.exercise less than 3 times/wk 4 d. no exercise

[If a or b, go to Que 4B, if c or d go to Que 5.]

B. In which of the following physical activities do you participate on a regular basis (three or more times per week)? **(card 4)**

1 participate 2 not participate

a. running	e. weight train	i. gardening
b. jogging	f. hockey	j. cycling
c. swimming	g. aerobics	k. yoga
d. walking	h. stretching	l. marshall arts

5 A.What **personal reasons** influenced your decision to cease participating in the RCMP Wellness program? **(card 5)**

Personal Reasons 1 influenced 2 no influence

a. smoking	e. poor self-image	i. peer pressure
b. inactive during free time	f. depressed	j. good family support
c. inactive job	g. stress	k. off duty sick **[Probe: go to Que 5B]**
d. overweight	h. lack of self-motivation	

B. Was the illness work related? 1 yes 2 no If yes, what was the specific illness? _____.
What was the specific cause of the illness? _____
_____.

C. Are there any other **personal reasons**? 1 yes 2 no [go to Que6]
_____
_____
_____

D. Which **personal reasons** most influenced you to cease participating in the RCMP Wellness program? [Probe: Which influenced you most,2nd,3rd?]

Reasons: 1._____
2._____
3._____

6 A.Which **occupational factors** influenced your decision to cease participating in the RCMP Wellness program? **(card 6)**

Occupational factors 1 influenced 2 no influence

a. excessive job travel
b. amount of time in court
c. work related injuries
d. demanding work schedule
e. special assignment
f. job transfer

B.Are there any other **occupational factors**? 1 yes 2 no [go to Que6c]
_____
_____
_____

C.Which of these **occupational factors** most influenced you to cease participating in the RCMP Wellness program? **[Probe:** which influenced you most, 2nd, 3rd].

Factors: 1._____
2._____
3._____

7A. Which of the following **program factors** influenced your decision to cease participating in the Wellness program? **(card 7)**

Program Factors 1 influenced 2 no influence

a. inconvenient time/location
b. lack of program variety
c. exercising alone
e. poor communication
f. lack of program leadership
g. lack of program awareness

d. lack of positive feedback
feedback

h. lack of facilities.

B. Are there any other **program factors** which influenced your decision to cease participating?_____

_____

_____

C. Which **program factor** influenced you the most to cease participating in the RCMP Wellness program? **[Probe:**which influenced you the most, 2nd, 3rd].

Factors: 1._____
2._____
3._____

8A. Which of the following statements most accurately describes your participation in the **Fitness component** of the RCMP Wellness program? **(card 8)**

a. followed the program for the first month
b. followed the program for the first two months
c. followed the program for the first three months
d. followed the program for the first four months
e. followed the program for the first five months
f. followed the program for the first six months
g. did not start the program
h. followed my own program

B. Which of the following statements most accurately describes your participation in the **Nutrition Foodtrak component** of the RCMP Wellness program? **(card 9)**

a. followed the program for the first month
b. followed the program for the first two months
c. followed the program for the first three months
d. followed the program for the first four months
e. followed the program for the first five months
f. followed the program for the first six months
g. did not start the program
h. followed my own program

9. What three factors would you change in the current RCMP Wellness program, that would improve your participation in the program?

Factors: 1. _____
_____
2. _____
_____
3. _____
_____

DEMOGRAPHIC INFORMATION:

SEX
a. male
b. female

AGE

MARITAL STATUS
a. married
b. separated
c. divorced
d. single
e. cohabitating
f. widowed

TOTAL GROSS HOUSEHOLD INCOME
a. under $30000
b. $30001 - $40000
c. $40001 - $50000
d. $50001 - $60000
e. over $60000

EDUCATION LEVEL
a. grade school or less
b. some high school
c. high school graduate
d. some college or technical school
e. college graduate
f. post graduate or professional degree

APPENDIX L

THE DESCRIPTIVE QUESTIONNAIRES

1. The Needs Assessment
2. The Nutrition Questionnaire
3. The Six Month Follow-up Questionnaire

ID#: _____

RCMP NEEDS ASSESSMENT FORM

1. Which areas of your lifestyle would you like to improve? Indicate your answer with a check (/).

   a. fitness level _____
   b. nutritional level _____
   c. stress management _____
   d. smoking _____
   e. drugs/alcohol _____
   f. low back care _____
   g. spiritual _____
   h. weight management _____
   i. other _____.

2. What factors may limit the changes you would like to make with your lifestyle?

   _____

   _____

3. If the Division was to offer an agency-sponsored wellness program, would you participate on a regular basis?

   very likely _____ likely _____ not likely _____

4. If a program was offered, which activities would interest you the most, and which times would be most convenient for you to participate?

   Aerobics _____ Jogging _____ Wellness education _____
   Cycling _____ Walking _____ Weight training _____
   Yoga _____ Exercise breaks _____ Group sports _____
   Other (list) _____

   Times: before work _____ mid morning _____ other _____
   lunch time _____ mid afternoon _____
   after work _____ evenings _____

5. Are you currently active in a regular physical activity program? (30 minutes of exercise, 2 times per week or more) yes _____ no _____

   If you answered yes, what activity(s)?

   _____

   _____

6. Total sick days per year: _____

   Sick days by gender: Male _____ Female _____

RCMP NUTRITION QUESTIONNAIRE*

The following questions will provide us with some specific information about your diet and eating habits. Please answer the questions honestly and completely.

SECTION I - YOUR EATING HABITS AND EXTRA CALORIES

1. WHAT do I usually eat?

- ☐ A varied and balance diet that includes only moderate amounts of fat, sugar, and alcoholic beverages.
- ☐ Deep-fat fried and breaded foods.
- ☐ "Extras," such as salad dressings, potato toppings, spreads, sauces, and gravies.
- ☐ Sweets and rich desserts such as candies, cakes, pies.
- ☐ Snack foods high in fat and sodium, such as chips and other "munchies."
- ☐ Cocktails, wine, and beer.

2. HOW MUCH do I usually eat?

- ☐ A single small serving.
- ☐ A large serving.
- ☐ Two servings or more.

3. WHEN do I usually eat?

- ☐ At mealtime only.
- ☐ While preparing meals or clearing the table.
- ☐ While watching TV or participating in other activities.
- ☐ At coffee break.
- ☐ Anytime.

4. WHERE do I usually eat?

- ☐ At the kitchen or dining room table.
- ☐ At restaurants or fast food places.
- ☐ In front of the TV or while reading.
- ☐ Wherever I happen to be when I'm "hungry."

*Behavioral Guidelines for Health and Wellness. Hafen, B., Tilygerson, H., Franksen, K. Morton Publishing Co. 1988

5. WHY do I usually eat?

- ☐ It's time to eat
- ☐ I'm "starved."
- ☐ Foods look tempting.
- ☐ Everyone else is eating.
- ☐ Food will get thrown away if I don't eat it.
- ☐ I'm bored or frustrated.

SECTION II - HOW DOES YOUR DIET RATE FOR VARIETY

Directions: Check the box that best describes your eating habits.

How often do you eat:	Seldom or never	1 or 2 times a week	3 to 4 times a week	Almost daily
1. At least six servings of bread, cereals, rice, crackers, pasta or other foods made from grains (a serving is one slide of bread or 1/2 cup cereal, rice, etc.) per day?	☐	☐	☐	☐
2. Foods made from whole grains?	☐	☐	☐	☐
3. Three different kinds of vegetables per day?	☐	☐	☐	☐
4. Cooked dry beans or peas?	☐	☐	☐	☐
5. A dark green leafy vegetable, such as spinach or broccoli?	☐	☐	☐	☐
6. Two kinds of fruit or fruit juice per day?	☐	☐	☐	☐
7. Two servings (three if teenager, pregnant, or breastfeeding) of milk, cheese, or yogurt per day?	☐	☐	☐	☐
8. Two servings of lean meat, poultry, fish, or alternates such as eggs, dry beans, or nuts per day?	☐	☐	☐	☐

SECTION III - HOW DO YOU SCORE ON FAT?

Directions: Do the foods you eat provide more fat than is good for you. Answer the questions below by checking one box for each question, and see how your diet stacks up.

How often do you eat:	Seldom or never	1 or 2 times a week	3 to 4 times a week	Almost daily
1. Fried, deep-fat fried, or breaded foods?	☐	☐	☐	☐
2. Fatty meats such as bacon, sausage, luncheon meats, and heavily marbled steaks and roasts?	☐	☐	☐	☐
3. Whole milk, high-fat cheeses, and ice cream?	☐	☐	☐	☐
4. High-fat desserts such as pies, pastries, and rich cakes?	☐	☐	☐	☐
5. Rich sauces and gravies?	☐	☐	☐	☐
6. Oily salad dressings or mayonnaise?	☐	☐	☐	☐
7. Whipped cream, table cream, sour cream, and cream cheese?	☐	☐	☐	☐
8. Butter or margarine on vegetables, dinner rolls, and toast?	☐	☐	☐	☐

RCMP WELLNESS PROGRAM
SIX MONTH QUESTIONNAIRE

Please read each question carefully and answer each question as accurately as possible. This is not a test and there are no right or wrong answers. Your answers will be kept in the strictest confidence.

Indicate with a check (✓) the answer which best describes your situation.

1. Prior to the implementation of the wellness program, I exercised

   a. three or more times per week ____
   b. less than three times per week ____
   c. did not exercise ____

2. I am currently exercising

   a. three or more times per week ____
   b. less than three times per week ____
   c. am not exercising ____

3. The type of regular activity I participate in is

   a. cardiovascular ____ running ____
      walking ____
      cycling ____
      jogging ____
      swimming ____

   b. strength/endurance ____ weight training ____
      calisthenics ____
      other ____ _____

   c. flexibility ____ stretching ____
      other ____ _____

4. Once the fitness program prescription was given to me, I

   a. followed the entire prescription ____
   b. followed part of the prescription ____
   c. did not follow the prescription ____
   d. followed my own program ____

5. I participated in the Foodtrak Nutrition program by

   a. attending one of the seminars ____
   b. using the video tape ____
   c. did not attend either a. or b. ____

6. Once the Foodtrak program was implemented I

   a. followed the Foodtrak program ____
   b. followed part of the Foodtrak program ____
   c. did not follow the Foodtrak program ____
   d. followed my own nutrition program ____

RCMP Wellness Program
Six Month Questionnaire

7. The reason I participated in the RCMP Wellness program was

   a. to improve overall wellness ____
   b. to improve my fitness level ____
   c. to feel better in general ____
   d. concerned with cardiovascular heart disease ____
   e. to learn more about stress management ____
   f. to lose weight ____
   g. other ____ _____

8. The main reason for not exercising was

   a. no time, too busy ____
   b. get enough exercise at home or work ____
   c. too lazy ____
   d. not interested, exercise is boring ____
   e. too tired from work ____
   f. too inconvenient ____
   g. lack of facilities ____
   h. exercise is not necessary ____
   i. other ____ _____

9. How many sick days did you miss from work during the six months prior to the implementation of the Wellness program? ____ days.

10. How many sick days have you missed from work since the Wellness program began in February 1989? ____ days.

APPENDIX M

THE THREE-DAY FOOD ANALYSIS

R.C.M.P. Wellness Nutritional Information Guidelines

1. Please complete one *Diet Record Form* for each of the three days.

2. Of the three days you record your diet on please ensure that two of the days are non-work days and one of the days is a work day.

3. Please indicate your Wellness I.D. # (the same # as on your L.A.Q.) on each of the forms.

4. Diet recalls should be turned in to your Detachment Wellness Coordinator by June 19, 1989 at the latest.

5. It is important that you are as accurate as possible when reporting your food quantities, so whenever possible (with home meals this is easier) please measure or weigh. For situations where measuring is impossible here are some guideline estimates:

    a) a 1 inch cube of cheese is approximately 1 oz.
    b) 1/2 of a chicken breast is approximately 4 oz.
    c) a 4x4 inch piece of steak is approximately 6 oz.
    d) 1/2 cup grated cheese (lightly packed) is approximately 1/2 oz.
    e) 1 cup of chili or casserole will take up approximately 1/4 to 1/3 of a full size dinner plate.
    f) a coffee mug will generally hold 10 oz. of liquid.

In general:

* If a food is consumed in pieces (eg. french fries or potatoe chips) count the number of pieces
* If the food is a single quantity try to assess its size (eg. small, medium, large).
* Write it down immediately if possible because it is easy to forget.

Thank-you for your time and effort in completing these forms.

APPENDIX N

CONTROL GROUP PHYSICAL ACTIVITY DESCRIPTION

Control group summary:

Of the 57 subjects tested in the control group, 23 of them are suspect to have made lifestyle changes therefore invalidating them as controls.

20 to 29s:

220 T1: Irregular activity, smokes
T2: Baseball 1X/wd, stopped smoking 1.5 mos. ago
T3: Smoking again, No prgm (baseball 1X/wk) coffee and cigs consumed just prior to test.
V02 increase by .3ml.
Invalid third test due to cigs and coffee. fluctuations in smoking habits makes for a poor control

224 T1: hockey, running
T2: reg. weights, running (1-2X/wk), tennis 1X/wk.
T3: He feels fitter.
V02 increase by 3.9 ml.

229 T1: Running, raquetball, wights, Starting to train for Marathon.
T2: increased running 4-5 miles /day 5-6 X/wk.
T3:
V02 increase by 6.5 ml.

30 to 39s:

202 T1: nc regular exercise, some cycling, swim with kids.
T2: cycling 17 km 3X/wk.
T3: no changes
V02 increase by 2.1 ml.
Definite progression shown in cyling

208 T1: wants to start running.
T2: walking - was on prgm for 1.5 mos.
T3: cycling 2-3X/wk for 30 min.
V02 increase by 1.9 mls.

210 T1: Hockey 1X/wk, walking 10 km/wk
T2: Maintained, more active with yard work etc.
T3:
V02 increase by 5.2 ml.

234 T1: Aerobics @ lunch, walk, run occasionally, Doctor warned of high B.P. and Chol.
T2: Aerobics, biking, running
T3: Holidays
V02 increase by 8.4 ml.
Doctor's warnings may well have provided the motivation and the progression from occasional to regular running and biking would invalidate him as a control.

30 to 39s cont.

237 T1: Triathlete.
T2: More running 5X/wk (6.5-7miles), wts, swim 2-3X/wk.
T3: Running increased 10-15 miles 2-3X/wk, wts, cycling, sit-ups, etc.
V02 increase by 6.4 ml.
Triathlon training more intense in summer season as athletes are trying to peak for races etc. Invalid as a control.

241 T1: Just started prgm 2-3X/wk.
T2: reg. aerobics, active with kids
T3: 1 hr of aerobics 3X/wk.
V02 increase by 14.2 ml.
Progress definitely shown over the three testing sessions.

242 T1: B-ball, touch football, ball hockey.
T2: same
T3: less sports active as team sports ended.
V02 increase by 13.5 ml.

244 T1: biking with kids, walds with wife 3 miles /wk.
T2: bikes 7.5 km to work, cycles with family, better diet.
T3: not exercising much.
V02 increase by 9.3 ml.
Seasonal change accompaning better weather?

250 T1: walk 4X/wk. hockey, some push-ups and sit-ups
T2: same plus rides to work 3-4 X/wk.
T3. seemingly less activity.
V02 increase by 4.3 ml.

252 T1:
T2: Walk/jog 3 miles every day
T3: Yard work, softball, mild diet changes.
V02 increase by 2.9 ml.

253 T1: wants prgm. hockey 1X/wk, jogging
T2: Jog 3X/wk.
T3: no exercise due to injury.
V02 increase by 5 mls.

257 T1: lost 15 lbs with weight watchers. curls 2X/wk
T2: Runs 3 miles 3X/wk, golf 1X/wk, increased activity levels since feb.
T3:
V02 increase by 4.3 ml.
weight loss will affect both relative and absolute V02 as will increase in activity.

258 T1: Runs 3-4X/wk (SWAT team testing every 6 mos.), squash and raquet ball.
T2: sich for 1 mos. worked and abdominals and playing raquet ball.
T3: running 3X/wk.
V02 increase by 7.3 ml.

259 T1: Hockey 2X/wk, relatively active.
T2: ball hockey, golf 1X/wk, plus landscaping.
T3:
V02 increase by 3.9 ml.

260 T1: No activity, plans to start running and ball hockey.
T2: ball hockey, occasional runs, no changes.
T3: running 3X/wk upto 7 miles plus ball hockey.
V02 increase by 10.8 mls.
Adoption of running invalidates him as a control.

269 T1: Jogging 5X/wk, sit-ups, push-ups.
T2: changed eating (lost 10lbs), jogging, stretching, push-ups and sit-ups.
T3: Jogging, bikes to work.
V02 increase by 10 mls.
Activity and weight loss will affect both relative and absolute V02. invalid as a control.

279 T1: badminton 1x/WK for 2 hours, walking 2X/wk for 30 min.
T2: no changes.
T3: yard work.
V02 increase by 5 ml.

40 to 49s:

275 T1: Runs 4 km 3X/wk. coffee prior to test.
T2: Runs 4 mi 2X/wk. no diet changes.
T3:
V02 increase by 10.4 ml.
Coffee would invalidate T1.

276 T1: Started at fitness club when heard of prgm.
T2: No changes.
T3: irregular exercise, circuit training. just started weight watchers.
V02 not specified on chart.

287 T1: stationary bike 7 X /wk, curls 3X /wk plus wts.
T2: walking and riding bike 4-5X/wk.
T3: no changes
V02 increase by 2ml.

Example of the Physical Activity Summary for the Month of January 1989, for One Individual Control Group Subject.

Date	Activity	Duration	Comments
Jan. 1	---	---	180 lbs.
2	statn.bike	11.75 k	
2	cycle	6 km	
3	statn.bike	14.80 k	50 situps
4	rowing	330 strokes	---
5	statn.bike	15.30 k	50 situps
6	run	3.6 k	---
7	rowing	337 strokes	---
8	statn.bike	16 k	100 situps
9	---	---	---
10	run	3.8 k	50 situps
11	statn.bike	18.60 k	---
12	run	4.4 k	---
13	walk/run/row	6 k	---
14	run	4.8 k	---
15	run	5 k	50 situps, 175 lbs.
15	cycle	3.5 mile	20 scrunches
16	statn.bike	19.0 k	25 scrunches
17	run	3.5 mile	20 situps/25 scrunches
18	---	---	---
19	run	3.5 mile	---
20	row	25 min.	---
21	statn.bike	30 min.	---
22	run	3 mile	171 lbs.
22	cycle	3.75 mile	---
23	---	---	---
24	walk/row	30 min.	---
25	---	---	---
26	row	20 min.	---
27	---	---	---
28	---	---	---
29	run	4 mile	170 lbs.
30	row	20 min.	---
31	---	---	---

APPENDIX O

MISCELLANEOUS DOCUMENTATION

INFORMED CONSENT

January 17, 1989

Dear Participant:

We are currently in the process of implementing a research study to investigate the effects of a Wellness Program on Royal Canadian Mounted Police Officers. The research will take place at the University of Victoria, through the School of Physical Education, from February to December, 1989. Participation in the study will include a battery of tests which will consist of:

1. Medical screening ... will take place in a medical facility by designated physicians, and will include blood pressure, blood tests, resting heart rate, and general health.

2. Physical fitness testing ... will take place at the Fitness Testing Centre at the University of Victoria and will include the health related aspects of fitness; body composition, submaximal assessment, cardiovascular fitness, strength, and flexibility.

3. Lifestyle inventory ... will take place at the University of Victoria Fitness Testing Centre. This short written assessment will examine different wellness and lifestyle components.

The tests will be administered at the beginning of the program, at three months, and at six months. The medical screening will take place at the beginning and at one year.

Participation in the study will require approximately two hours of your time each session. Also included in this time will be a counselling session and the prescription of a wellness program for you to follow. You will experience some fatigue as a result of participating in the tests. The Fitness Testing Centre staff are accredited by the Canadian Association of Sports Science.

Your signature on this form, for which you are volunteering, indicates that you understand the nature of the study and the types of testing you will be involved in. Furthermore, if you wish to withdraw from the study at any time, you may do so. As well, you have been informed of the extent of the research. The personal information collected through the research will be kept in confidence and your identity will not be disclosed without your permission. You shall have the opportunity to ask questions before the commencement of the research and at any time during the study.

Subject's Signature: _____

Date: _____

Location: _____

ID# _____

June 13, 1989

Dear (name):

We have just completed the first stage of the Wellness Pilot RCMP Program and I would like to take this opportunity to thank you for your commitment to the project. Without you the program could not be possible.

The second stage of the program, Nutrition, will be commencing the week of June 15, 1989. You have been randomly selected to be part of a smaller group of approximately thirty officers and we would like you to complete the three day food recall you were given during the recent testing program. We would also ask that you have another set of blood analysis completed as part of this group. There will be no cost to you for the blood work and you can have them done at an Island Medical Lab in your area. Your detachment Wellness Coordinator will give you the final instructions and location to have this done. As well, you can give the completed three day food recall to the Wellness Coordinator.

Thank you once again for the effort and patience which you have demonstrated during the past three months. We look forward to having you start your program in September.

Yours in wellness,

Wayne Pealo
Research Assistant

UNIVERSITY OF VICTORIA
P.O. BOX 1700, VICTORIA, B.C., CANADA V8W 2Y2
TELEPHONE (604) 721-8373 TELEX 049-7222

SCHOOL OF PHYSICAL EDUCATION

March 29, 1989

Jim Horn

Dear Jim :

We would like to take this opportunity to thank you for your volunteer participation in the Pilot R.C.M.P. Wellness Research Project. You have been randomly selected and assigned to the **CONTROL GROUP**. This group is extremely important to the research project and it is imperative that you return in three months' time and six months' time for a re-test. The information you provide for us enables us to compare the two research groups and evaluate the changes which take place, if any. We recognize the commitment you have made to the research and the Royal Canadian Mounted Police nationally.

We are looking forward to having you begin your program in six months' time. If you have any specific questions or concerns regarding the project, you may contact your Detachment Wellness Coordinator or Rick Vincent.

Thank you for your time and efforts.

Sincerely,

RCMP WELLNESS RESEARCH TEAM

WP:pen

IIVERSITY OF VICTORIA

PLEASE TYPE THIS AND ALL ACCOMPANYING INFORMATION

:QUEST FOR APPROVAL OF PROPOSED RESEARCH INVOLVING HUMAN SUBJECTS

): Committee on Research and Other Activities Involving Human Subjects
Office of Research Administration, Sedgewick Building

ROM: Dr. H.A. Wenger (Name) _____ (Date)

School of Physical Education (Department) 8386 (Phone Number or Local)

i) Short title of proposed research: The Effects of lifestyle management programs upon R.C.M.P. Officers.

Please attach an outline of the proposed research, with emphasis on the procedures involving human subjects. That is, what are the subjects going to be doing? Include copies of questionnaires, tests, interview schedule, etc.

ii) Who are the subjects?
The officers are from the Nanaimo (n = 75) and Victoria (n = 75) Divisions.

iii) How will the subjects be obtained?
The subjects will be asked to volunteer for the project.

iv) To what extent is the participation of the subjects voluntary? How is this assured, procedurally?
The subjects will initially be contacted through a letter of transmittal explaining the purpose and goals of the study. They will then be asked to volunteer for the investigation.

How is the subject's right to withdraw at any time assured?
The project is of a volunteer nature and subjects may withdraw at their choice.

v) To what extent are appropriate guarantees of anonymity or confidentiality given to the subjects? How is this implemented (e.g., will data records contain names or other means of indentifying individuals)?
All subjects will be assigned a research subject number and subject anonymity will be adhered to for the duration of the project and data will be published as group data.

vi) Is there any possibility of physical, psychological, or other risk in the research? If so, explain in detail, on a separate page; include the necessity for this risk or hazard and the potential value of the research justifying it.
The subjects will be screened using a Par Q as well as each subject will see a physician and have a medical exam before participation in the study.

What safeguards for the subjects, the researcher, and the University are part of the research plan?
Researcher integrity and anonymity are the major safeguards and are an integral part of the design.

. . . 2

(vii) When, and to what extent, is the nature and purpose of the research or study explained to the subjects?

The nature and purpose of the research is explained to the subjects at the outset of the investigation. Consent will be obtained following the explanation and description.

Considering this question and question iv (page 1), when and how is informed consent obtained?
Consent is obtained at the outset of the research through the subject consent form.

(viii) Please list any institutions or organizations involved in the research (e.g., by providing subjects, facilities, or access to data). Also indicate whether their written permission is attached or is to be forwarded to the Committee.
The University of Victoria and the Victoria and Nanaimo RCMP Divisions will be involved with the research.

(ix) Person designating him/herself as in charge of the research:

_____ (Name) _____ (Signature)

Supervisor (if any):

_____ (Name) _____ (Signature)

_____ (Date)

Chairman/Director of Department or School:

DR D. TURKINGTON (Name) D. Turkington (Signature)

88-12-15 (Date)

(x) Additional information, required before final approval can be issued:

- approximate starting and termination dates: Feb 1, 1989 - Dec. 31, 1989.

- names of all persons who will be conducting the research:

APPROVED BY COMMITTEE ON RESEARCH AND OTHER ACTIVITIES INVOLVING HUMAN SUBJECTS:

F. Limbaugh (Chairman's Signature) January 25/1989 (Date)

RCMP WELLNESS DATA FORM

ID#: _____ Date: _____

E. BLOOD CHEMISTRY

Total Cholestrol _____ mg/dl. CHOL

High Density Lipids _____ mg/dl. HDL _____

Low Density Lipids _____ mg/dl.

Triglycerides _____ mg/dl.

F. RESTING HEART RATE & BLOOD PRESSURE

Heart Rate: _____ bpm

Systolic Blood Pressure _____ mmHg.

Diastolic Blood Pressure _____ mmHg.

G. LIFESTYLE ASSESSMENT QUESTIONNAIRE

1. **Wellness Dimensions**
   - a) Physical _____
   - b) Social _____
   - c) Emotional _____
   - d) Intellectual _____
   - e) Occupational _____
   - f) Spiritual _____

2. **Health Risk Appraisal**
   - a) Appraised Health Age _____ yrs.
   - b) Life Expectancy:
     - remaining years ___
     - average remaining years ___
     - achievable remaining years ___

H. WELLNESS SUBCATEGORIES

a) Exercise _____

b) Nutrition _____

c) Self-care _____

d) Vehicle Safety _____

e) Drug Usage _____

f) Social _____

g) Emotional awareness _____

h) Emotional management _____

Composite Score _____

LIFESTYLE ASSESSMENT QUESTIONNAIRE RESEARCH POLICY

1. All requests to use the LAQ in research situations must be submitted in writing to the Assistant Director of Marketing for the National Wellness Institute.

2. All written requests must contain the following information:

   a. A minimum of one paragraph outlining the hypothesis of the study. (What is the study attempting to verify.)

   b. The total number of participants that will be completing the LAQ. If the LAQ is to be administered more than once, a description of the number of people involoved in each administration is required.

   c. Description of the study participants. (i.e., are they students? If so, what age group? From what field of study?)

   d. Time frame. (When will the study begin? What is the anticipated completion date? etc.)

   e. Educational level of the person completing the study. Is it a bachelor's level project? A master's thesis? A doctorate dissertation?

   f. Is a formal written paper summarizing the findings of the study going to be submitted as part of the project? If so, to whom?

   g. The name, title, address, and phone number of the person supervising the project.

3. Once the written proposal is received and reviewed by the Institute's Executive Director, a decision will be made as to whether or not the research proposal can be supported. If supported, a memorandum of understanding will be sent to the researcher (s) for their signature.

LIFESTYLE ASSESSMENT QUESTIONNAIRE RESEARCH POLICY
Page 2

4. The researcher(s) will be expected to return a signed copy of the agreement to the National Wellness Institute before any LAQ's are to be sent to them.

5. The standard fee for processing LAQ's under such research agreements will be $4/LAQ. A group report will be generated at no charge.

6. Under such research agreements individual LAQ results will be mailed to the individual conducting the research. It will be that person's responsibility for distributing the results to individuals participating in the study.

7. Anyone who is granted permission to use the LAQ will be expected to submit a written copy of the study's findings to the National Wellness Institute no later than 90 days after the completion of the project. If a formal paper is to be presented as part of the project, a copy of that paper will be accepted. These should be bound copies in the case of Master's or Doctoral degree documents.

8. The researcher(s) will be expected to give the National Wellness Institute the right to publish a summary of the study's findings should it choose to do so. In publishing such a summary, the National Wellness Institute agrees to give proper credit to those conducting the research.

9. Any proposals which cannot be supported will be sent a letter from the Executive Director explaining the reasons. In addition, they will be encouraged to resubmit with further documentation where appropriate.

10. The Assistant Director for Marketing will maintain a file on all research proposals and will be responsible for any follow-up correspondence that is required.

UVIC SPORT & FITNESS CENTRE - RCMP WELLNESS PROGRAM

ID. #_____ AGE:____ SEX: M/F DATE _____
TIME OF DAY _____

A. PHYSICAL CHARACTERISTICS

WEIGHT:_____KG.; _____LBS. HEIGHT:_____CM.; _____INS.

SKINFOLDS (mm)	TRIAL 1	TRIAL 2	TRIAL 3	MEDIAN STF	MEDIAN O SCALE
TRICEPS					
BICEPS					
SUBSCAPULAR					
SUPRAILIAC					
SUPRASPINALE					
ABDOMINAL					
FRONT THIGH					
MEDIAL CALF					
			TOTALS		

WAIST GIRTH _____cm. SOS _____

HIP GIRTH _____cm. %ILE _____ CATEGORY _____

O-SCALE: ADIPOSITY = SUM OF SIX SITES _____mm X (170.18 cm / STR.HT. _____cm)

= _____ FOR AN ADIPOSITY RATING OF _____

PROPORTIONALITY = WT _____kg X (170.18 cm / STR.HT. _____cm)^3

= _____ FOR A PROPORTIONALITY RATING OF _____

B. CARDIOVASCULAR ENDURANCE

PWC 170 CYCLE TEST (_____ holes showing - seat ht.)

RES (kp)	REVS/4MIN	H.R.	P.O.	VO2/P.O.)

VO2 correction factor____

VO2max _____l/min (abs.)

_____ml/kg/min (rel.)

_____%ile

CATEGORY _____

C. MUSCULAR STRENGTH, ENDURANCE & FLEXIBILITY

Grip Strength (kg): Right (1) _____ (2) _____ Left (1) _____ (2) _____

Best R & L Combined: _____kg. _____%ile CATEGORY: _____

Grip size: _____ Dominant Hand: R L

Push-ups: _____ (max.) _____%ile CATEGORY: _____

Full ____ Modified ____

Sit and Reach: Tr 1 _____cm. Tr 2 _____cm. _____%ile CATEGORY._____

Curl-ups: _____ (max) _____%ile _____ cm reached CATEGORY: _____

D. COMMENTS _____

_____

_____

APPENDIX P
MULTIVARIATE ANALYSIS OF VARIANCE TABLES FOR BETWEEN GROUP COMPARISONS ON RAW SCORE DATA AND PERCENT CHANGE DATA FOR THE EXPERIMENTAL GROUP

15:58:53

* * * * * * * * * * * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * * * * * * * * * * *

45 cases accepted.
0 cases rejected because of out-of-range factor values.
11 cases rejected because of missing data.
2 non-empty cells.

1 design will be processed.

Cell Means and Standard Deviations
Variable .. PHYSICLA

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GROUPS	CONTROL	.070	.108	24	.024	.115
GROUPS	EXPERIME	.112	.148	21	.045	.179
For entire sample		.089	.128	45	.051	.128

Variable .. PHYSICLB

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GROUPS	CONTROL	-.017	.106	24	-.062	.028
GROUPS	EXPERIME	.073	.162	21	.000	.147
For entire sample		.025	.141	45	-.017	.067

Variable .. PHYSICLC

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GROUPS	CONTROL	.051	.148	24	-.011	.113
GROUPS	EXPERIME	.181	.147	21	.114	.248
For entire sample		.112	.160	45	.064	.159

---

* * * * * * * * * * * * * * * * * * A N A L Y S I S O F V A R I A N C E -- DESIGN 1 * * * * * * * * * * * * * * * * * *

EFFECT .. GROUPS
Multivariate Tests of Significance (S = 1, M = 1/2, N = 19 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.17895	2.97860	3.00	41.00	.042
Hotellings	.21795	2.97860	3.00	41.00	.042
Wilks	.82105	2.97860	3.00	41.00	.042
Roys	.17895				

Note.. F statistics are exact.

EFFECT .. GROUPS (Cont.)
Univariate F-tests with (1,43) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PHYSICLA	.02014	.70312	.02014	.01635	1.23166	.273
PHYSICLB	.09131	.77973	.09131	.01813	5.03525	.030
PHYSICLC	.18854	.93301	.18854	.02170	8.68951	.005

* * * * * * * * * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E -- DESIGN   1 * * * * * * * * * * * * * * * * *

EFFECT .. CONSTANT
Multivariate Tests of Significance (S = 1, M = 1/2, N = 19 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.45542	11.42919	3.00	41.00	.000
Hotellings	.83628	11.42919	3.00	41.00	.000
Wilks	.54458	11.42919	3.00	41.00	.000
Roys	.45542				

Note.. F statistics are exact.

- -

EFFECT .. CONSTANT (Cont.)
Univariate F-tests with (1,43) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PHYSICLA	.36946	.70312	.36946	.01635	22.59454	.000
PHYSICLB	.03507	.77973	.03507	.01813	1.93400	.171
PHYSICLC	.60120	.93301	.60120	.02170	27.70766	.000

- -

9728 bytes of memory are needed for MANOVA execution.

* * * * * * * * * * * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * * * * * * * * * * *

45 cases accepted.
0 cases rejected because of out-of-range factor values.
11 cases rejected because of missing data.
2 non-empty cells.

1 design will be processed.

Cell Means and Standard Deviations
Variable .. PHYSICL1 LAQ PHYSICAL SCORE OUT OF 100

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GROUPS	CONTROL	67.000	10.065	24	62.750	71.250
GROUPS	EXPERIME	65.381	10.576	21	60.567	70.195
For entire sample		66.244	10.221	45	63.174	69.315

Variable .. PHYSICL2 LAQ PHYSICAL SCORE OUT OF 100

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GROUPS	CONTROL	71.542	11.898	24	66.518	76.566
GROUPS	EXPERIME	72.143	11.577	21	66.873	77.413
For entire sample		71.822	11.620	45	68.331	75.313

Variable .. PHYSICL3 LAQ PHYSICAL SCORE OUT OF 100

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GROUPS	CONTROL	70.083	12.748	24	64.700	75.466
GROUPS	EXPERIME	76.238	9.110	21	72.091	80.385
For entire sample		72.956	11.503	45	69.500	76.411

---

* * * * * * * * * * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E -- DESIGN   1 * * * * * * * * * * * * * * * * * *

EFFECT .. GROUPS
Multivariate Tests of Significance (S = 1, M = 1/2, N = 19 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.17829	2.96539	3.00	41.00	.043
Hotellings	.21698	2.96539	3.00	41.00	.043
Wilks	.82171	2.96539	3.00	41.00	.043
Roys	.17829				

Note.. F statistics are exact.

- -

EFFECT .. GROUPS (Cont.)
Univariate F-tests with (1,43) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PHVSICL1	29.35873	4566.95238	29.35873	106.20819	.27643	.602
PHVSICL2	4.04802	5936.52976	4.04802	138.05883	.02932	.865
PHVSICL3	424.26825	5397.64286	424.26825	125.52658	3.37991	.073

- -

* * * * * * * * * * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E -- DESIGN   1 * * * * * * * * * * * * * * * * *

EFFECT .. CONSTANT
Multivariate Tests of Significance (S = 1, M = 1/2, N = 19 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.98139	720.90228	3.00	41.00	.000
Hotellings	52.74895	720.90228	3.00	41.00	.000
Wilks	.01861	720.90228	3.00	41.00	.000
Roys	.98139				

Note.. F statistics are exact.

- -

EFFECT .. CONSTANT (Cont.)
Univariate F-tests with (1,43) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PHYSICL1	196276.82540	4566.95238	196276.82540	106.20819	1848.03843	.000
PHYSICL2	231226.71468	5936.52976	231226.71468	138.05883	1674.84189	.000
PHYSICL3	239791.55714	5397.64286	239791.55714	125.52658	1910.28514	.000

- -

8240 bytes of memory are needed for MANOVA execution.

APPENDIX Q

CANNONICAL CORRELATION TABLES
HEALTH-RELATED FITNESS AND PHYSICAL WELLNESS
EXPERIMENTAL GROUP

SIMPLE UNIVARIATE STATISTICS

20 OBSERVATIONS
6 PHYSIOLOGICAL MEASURES
4 LIFESTYLE MEASURES

VARIABLE	MEAN	ST DEV
PDVO2MC	0.0685429735	0.119679473
CURLUPC	0.5136115024	0.723396948
GRIPSTRC	0.0124229692	0.463058797
PUSHUPC	0.3321537950	1.004702977
SUMSKINC	0.2186515568	1.215732540
SITREACC	0.5117497902	1.223220871
EXERCC	0.3684404305	0.344078302
NUTRIC	0.2700421059	0.348449502
PHYSICLC	0.1630720744	0.139324644
SPIRITLC	0.1191476533	0.292276098

CORRELATIONS AMONG THE PHYSIOLOGICAL MEASURES

	PDVO2MC	CURLUPC	GRIPSTRC	PUSHUPC	SUMSKINC	SITREACC
PDVO2MC	1.0000	-0.1233	0.0006	-0.0280	0.0806	-0.1557
CURLUPC	-0.1233	1.0000	-0.3808	0.3206	0.0840	0.3168
GRIPSTRC	0.0006	-0.3808	1.0000	-0.0288	-0.1287	-0.1255
PUSHUPC	-0.0280	0.3205	-0.0288	1.0000	-0.1721	0.9047
SUMSKINC	0.0806	0.0840	-0.1287	-0.1721	1.0000	-0.1548
SITREACC	-0.1557	0.3168	-0.1255	0.9047	-0.1548	1.0000

CORRELATIONS AMONG THE LIFESTYLE MEASURES

	EXERCC	NUTRIC	PHYSICLC	SPIRITLC
EXERCC	1.0000	0.2391	0.6554	0.4558
NUTRIC	0.2391	1.0000	0.4686	0.6423
PHYSICLC	0.6554	0.4686	1.0000	0.5327
SPIRITLC	0.4558	0.6423	0.5327	1.0000

GROUPS=2

SIMPLE UNIVARIATE STATISTICS

CORRELATIONS BETWEEN THE PHYSIOLOGICAL MEASURES AND THE LIFESTYLE MEASURES

	EXERCC	NUTRIC	PHYSICLC	SPIRITLC
PDVO2MC	-0.2171	-0.1463	-0.2913	-0.2228
CURLUPC	-0.0284	0.2978	0.3108	-0.0156
GRIPSTRC	-0.0175	0.1671	-0.0254	-0.1337
PUSHUPC	0.1252	-0.0176	0.6758	-0.0082
SUMSKINC	-0.0021	-0.0541	-0.1119	-0.0855
SITREACC	0.3590	0.0279	0.7037	0.0615

GROUPS=2

CANONICAL CORRELATION ANALYSIS

	CANONICAL CORRELATION	ADJUSTED CANONICAL CORRELATION	APPROX STANDARD ERROR	SQUARED CANONICAL CORRELATION	EIGENVALUES OF INV(E)*H = CANRSQ/(1-CANRSQ) EIGENVALUE	DIFFERENCE	PROPORTION	CUMULATIVE
1	0.960014	0.944047	0.017980	0.921626	11.7594	10.5340	0.8607	0.8607
2	0.742048	0.624784	0.103091	0.550635	1.2254	0.6063	0.0897	0.9504
3	0.618349	0.574404	0.141697	0.382355	0.6191	0.5609	0.0453	0.9957
4	0.234423	0.061697	0.216808	0.054954	0.0581	.	0.0043	1.0000

TESTS OF HO: THE CANONICAL CORRELATION IN THE CURRENT ROW AND ALL THAT FOLLOW ARE ZERO

	LIKELIHOOD RATIO	APPROX F	NUM DF	DEN DF	PR > F
1	0.02055708	3.0757	24	36.0959	0.0011
2	0.26229528	1.2796	15	30.7676	0.2723
3	0.58370260	0.9267	8	24	0.5126
4	0.94504585	0.2520	3	13	0.8585

MULTIVARIATE TEST STATISTICS AND F APPROXIMATIONS
S=4 M=0.5 N=4

STATISTIC	VALUE	F	NUM DF	DEN DF	PR > F
WILKS' LAMBDA	0.02055708	3.076	24	36.0959	0.0011
PILLAI'S TRACE	1.909571	1.979	24	52	0.0201
HOTELLING-LAWLEY TRACE	13.66193	4.839	24	34	0.0001
ROY'S GREATEST ROOT	11.75936	25.479	6	13	0.0001

NOTE: F STATISTIC FOR ROY'S GREATEST ROOT IS AN UPPER BOUND

RAW CANONICAL COEFFICIENTS FOR THE PHYSIOLOGICAL MEASURES

	PHYS1	PHYS2	PHYS3	PHYS4
PDVO2MC	-2.091286712	1.625654987	-0.636668703	-6.474428487
CURLUPC	-0.035774188	1.238245947	-0.661498137	0.432919563
GRIPSTRC	-0.350107090	1.969593202	-0.234146795	-0.515245511
PUSHUPC	1.673381775	-1.088889316	-1.432603087	-0.149456278
SUMSKINC	0.022958544	0.031663942	0.097478942	-0.359684951
SITREACC	-0.675007459	0.924248186	1.653399946	-0.196321834

GROUPS=2

CANONICAL CORRELATION ANALYSIS

RAW CANONICAL COEFFICIENTS FOR THE LIFESTYLE MEASURES

	LIFE1	LIFE2	LIFE3	LIFE4
EXERCC	-2.44520687	1.17225717	2.88620997	-0.60706521
NUTRIC	-1.42955377	3.35454566	-1.16767765	0.83685848
PHYSICLC	10.53113561	0.98278129	0.06692366	0.00135580
SPIRITLC	-0.22881455	-3.92675490	0.24209141	2.94648297

GROUPS=2

CANONICAL CORRELATION ANALYSIS

STANDARDIZED CANONICAL COEFFICIENTS FOR THE PHYSIOLOGICAL MEASURES

	PHYS1	PHYS2	PHYS3	PHYS4
PDVO2MC	-0.2503	0.1946	-0.0762	-0.7749
CURLUPC	-0.0259	0.8957	-0.4785	0.3132
GRIPSTRC	-0.1621	0.9120	-0.1084	-0.2386
PUSHUPC	1.6813	-1.0940	-1.4393	-0.1502
SUMSKINC	0.0279	0.0385	0.1185	-0.4373
SITREACC	-0.8257	1.1306	2.0225	-0.2401

STANDARDIZED CANONICAL COEFFICIENTS FOR THE LIFESTYLE MEASURES

	LIFE1	LIFE2	LIFE3	LIFE4
EXERCC	-0.8413	0.4033	0.9931	-0.2089
NUTRIC	-0.4981	1.1689	-0.4069	0.2916
PHYSICLC	1.4672	0.1369	0.0093	0.0002
SPIRITLC	-0.0669	-1.1477	0.0708	0.8612

GROUPS=2

CANONICAL STRUCTURE

CORRELATIONS BETWEEN THE PHYSIOLOGICAL MEASURES AND THEIR CANONICAL VARIABLES

	PHYS1	PHYS2	PHYS3	PHYS4
PDVO2MC	-0.1635	-0.0576	-0.2823	-0.8073
CURLUPC	0.3465	0.5351	-0.2387	0.3386
GRIPSTRC	-0.1008	0.4558	-0.1538	-0.2675
PUSHUPC	0.9328	0.1777	0.2219	-0.1632
SUMSKINC	-0.1351	0.0253	0.0208	-0.3797
SITREACC	0.7422	0.2738	0.5758	-0.0585

CORRELATIONS BETWEEN THE LIFESTYLE MEASURES AND THEIR CANONICAL VARIABLES

	LIFE1	LIFE2	LIFE3	LIFE4
EXERCC	-0.0293	0.2495	0.9342	0.2535
NUTRIC	-0.0546	0.5923	-0.1196	0.7949
PHYSICLC	0.6467	0.3377	0.5072	0.4587
SPIRITLC	0.0113	-0.1401	0.2670	0.9534

CORRELATIONS BETWEEN THE PHYSIOLOGICAL MEASURES AND THE CANONICAL VARIABLES OF THE LIFESTYLE MEASURES

	LIFE1	LIFE2	LIFE3	LIFE4
PDVO2MC	-0.1569	-0.0428	-0.1745	-0.1892
CURLUPC	0.3326	0.3971	-0.1476	0.0794
GRIPSTRC	-0.0968	0.3382	-0.0951	-0.0627
PUSHUPC	0.8955	0.1318	0.1372	-0.0383
SUMSKINC	-0.1297	0.0188	0.0128	-0.0890
SITREACC	0.7125	0.2032	0.3560	-0.0137

CORRELATIONS BETWEEN THE LIFESTYLE MEASURES AND THE CANONICAL VARIABLES OF THE PHYSIOLOGICAL MEASURES

	PHYS1	PHYS2	PHYS3	PHYS4
EXERCC	-0.0281	0.1851	0.5776	0.0594
NUTRIC	-0.0524	0.4395	-0.0740	0.1863
PHYSICLC	0.6209	0.2506	0.3136	0.1075
SPIRITLC	0.0108	-0.1040	0.1651	0.2235

APPENDIX R

EXAMPLE OF THE LIFESTYLE ASSESSMENT QUESTIONNAIRE - TOP TEN RISK FACTOR DISCREPANCIES FOR THE RCMP OFFICERS

Example of the Lifestyle Assessment Questionnaire - Top Ten Risk Factor Discrepancies for the RCMP Officers

Data Classification	Cause of Death and ranking		Chances per 10,000 of dying over next 10yrs
Normative	1	Heart Attack	1,323
Actual	1	Heart Attack	609
Normative	2	Suicide	216
Actual	2	Suicide	216
Normative	3	Homocide	204
Actual	3	Homocide	204
Normative	4	Other injuries	165
Actual	4	Other injuries	165
Normative	5	Cirrhosis of Liver	96
Actual	5	Cirrhosis of Liver	96
Normative	6	Stroke	78
Actual	6	Motor vehicle crash	71
Normative	7	Motor vehicle crash	71
Actual	7	Alcohol poisoning	53
Normative	8	Alcohol poisoning	53
Actual	8	Lymphoma	52
Novmative	9	Lymphoma	52
Actual	9	Diabetes Mellitus	49
Normative	10	Diabetes Mellitus	49
Actual	10	Colon Cancer	47
Normative	Expected years of remaining life		34 years
Actual	Expected years of remaining life		37 years

A subgroup of twenty subjects' data were examined using both actual cholestrol data and normative cholestrol data and changes were evident. The T-test stastic was used to examine the change, but no significant change ($p < 0.05$) was observed.

Vita

NAME: Wayne George Pealo

PLACE OF BIRTH: North Vancouver, British Columbia

YEAR OF BIRTH: March 4, 1948

POST-SECONDARY EDUCATION:

Langara Community College	1971 to 1973
University of Oregon	1978 to 1978
University of Victoria	1980 to 1982
University of Alberta	1986 to 1990

Degrees, diplomas, etc. awarded, with dates and institutions:

Recreation Diploma	1973	Langara Community College
B.Sc. (Honors)	1978	University of Oregon
M.A. Education	1982	University of Victoria

HONORS AND AWARDS:

University of Oregon, Foreign Student Scholarship, 1978

University of Alberta, Graduate Research Award, 1987

RELATED WORK EXPERIENCE:

Coordinator, Recreational Services, University of Victoria, 1978 to 1987

Coordinator, Cooperative Education, Leisure Studies and Human Performance Programs, University of Victoria, 1987 to 1990

Faculty, Recreation and Tourism Management, Malaspina College, 1990

PUBLICATIONS:

Pealo, W.G., Francis C. Minimum Impact Camping the West Coast: A New Perspective. Outdoor Recreation Research Journal, Spring 1987. Refereed.

Pealo, W.G. (joint publication), Jackson, J.J. The effects of a three week outdoor recreation program on adolescent children. C.A.H.P.E.R. Special Research Edition, 1983. Refereed.

Pealo, W.G. (joint publication), Jackson, J.J. Intramural and Recreation program evaluation. Paper presented at the Thirty-Third Annual National Intramural-Recreation Sports Association Conference, Portland, Oregon, 1982. National.

Pealo, W.G. (joint publication), Dockendorf, M. Community involvement with post-secondary institutions. Paper presented to the Fourth National Canadian Intramural-Recreational Association Conference, Vancouver, B.C., 1982. National.