

ABSENTEEISM CORRELATED TO PREDICTED VO2 MAXIMUM  
IN SEDENTARY OFFICE WORKERS

by

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#### ABSTRACT

The relationship between absenteeism and physical fitness levels has been used as one of the factors to justify employee fitness programs. The primary purpose of this study was to determine the relationship between absenteeism as measured by the number of sick leave days used (SLDU) and predicted VO<sub>2</sub> maximum, in sedentary office workers (SOW, n=100). The group of sedentary office workers was broken down into two sub-groups based on their job classifications. The two groups were Computer Technical Analysts (CTA, n=31) who tended to be self directed, and Clerks (CLK, n=69) who were basically responsive to others in their daily work. As a preliminary investigation the reasons for sick days were examined using an anonymous self-report questionnaire. Ninety-two percent of the reported sick day leave use was for medical reasons. Therefore the variable, number of sick leave days used, can be seen as a variable relating to health rather than non-medical reasons for absenteeism. The Canada Home Fitness Test was used to measure the predicted VO<sub>2</sub> maximum. SLDU data were provided by the Human Resources Department computer data base for a one year period prior

to the testing. There was a significant negative correlation ( $r = -.24$ ;  $df = 99$ ;  $p < 0.01$ ) between SLDU and predicted VO2 maximum for the subjects overall. However, when the group was divided into two categories relative to job type, it was found that this negative relationship was not sustained for the computer professional (CTA's),  $r = .20$ ;  $df = 30$ ;  $p = .14$ . The negative correlation was sustained for the CLK's  $r = -.31$ ;  $df = 68$ ;  $p < .01$ .

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Dedication

This thesis is dedicated to my Dad, Mr. Edward C. Richter,  
who taught me to finish what I start and to enjoy life.

## Introduction

Improved physical fitness can be the physiological outcome of an effective employee fitness program (Durbeck, et al., 1972; Horne, 1975; Pauly, Palmer, Wright, & Pfeiffer, 1982; Rhodes & Dunwoody, 1980; Shephard, Cox, & Corey, 1981). Blair (1986) reported a 10.4% increase in VO<sub>2</sub> maximum among all the employees of a company with a health promotion program in two years. Physical fitness is defined by the Canada Fitness Survey (1983) to include "several components: cardiovascular endurance, flexibility, muscular endurance and strength, and body composition" (p.21). Cardiovascular endurance, stamina and aerobic fitness are terms used interchangeably in the literature. Wenger (1981) states that aerobic fitness involves a "complex multifactoral mosaic" of physiological functions involving the "cardiovascular and muscular systems.... and their combined efficiency in performing the oxygen transport function" (p.57). Aerobic fitness is assessed using tests which measure maximum oxygen uptake (VO<sub>2</sub> maximum). Thoden, Wilson, and MacDougall, (1982) state that "quantitatively, VO<sub>2</sub> maximum reflects both the athlete's ability to transport oxygen

and his muscles' ability to utilize it". (p.40). It should be noted that direct measurement of VO<sub>2</sub> maximum requires a maximal effort on the part of the subject, while VO<sub>2</sub> maximum can be predicted from a submaximal test. Thoden, et al., (1982) state that "Predictions from submaximal exercise data generally are based on the assumptions that a relationship exists between VO<sub>2</sub> and other more easily measured variables [for example heart rate] during submaximal work, and that extrapolations to maximal work levels can be made to predict the VO<sub>2</sub> max." (p.45).

Wenger, (1981) refers to seven attributes of aerobic fitness:

1. The capability to work at relatively high rates for prolonged periods (over 30 minutes).
2. The capability to resist fatigue.
3. The capability to work at high rates for shorter periods (5-15 minutes).
4. The capability to expend high total amounts of energy.
5. The capability to recover from high rates of work effectively.
6. The perception of well-being.

7. The capability to reduce the detrimental effects of stress. (p.57-60).

Another benefit of high levels of aerobic fitness is a decrease in risk factors associated with cardiovascular disease. (Cooper, 1976; Paffenbarger, Hyde, Wing, & Steinmetz, 1984). Fox and Mathews (1981) state "Two major health problems in the United States and the world are cardiovascular diseases and obesity. Regular exercise training can help reduce their risks." (p.396). Fox & Mathews suggest that the type of regular exercise which helps to reduce risks associated with cardiovascular disease and obesity must be aerobic. The aerobic exercise must elevate the heart rate to a level of 60 - 90% of VO<sub>2</sub> maximum and be maintained at that level for a minimum of fifteen minutes three times a week.

The use of aerobic exercise, as preventive medicine, may help to reduce the high cost of medical care. Participaction (1978) refers to the cost of coronary heart disease in Canada as being "\$1.1 billion in lost wages and production, \$850 million in hospital services; \$200 million in physicians' services; \$130 million in medication. That is a grand total of \$2.28 billion

annually" (p.14). Herzlinger and Schwartz (1985), stated in a Harvard Business Review article that "corporate health costs are rising so fast that, if unchecked, within eight years they will eliminate all profit for the average Fortune "500" company and for the 250 largest nonindustrial companies in this country" (p.68). Further, the direct costs of lost working days in Canada and the United States has been estimated at an excess of 30 billion dollars annually (Steers & Rhodes, 1980). Thus methods which may decrease the costs of medical care and lost working days are of interest to most employers. It has been hypothesized that employee fitness programs may reduce absenteeism, decrease medical care costs, improve morale, and increase productivity. (Donaghue, 1977; Merwin & Northrop, 1982). Morale and productivity variables are difficult to quantify and measure, but absenteeism can be accurately recorded.

Steers and Rhodes (1978) suggest that absenteeism is influenced by a number of factors. Some of these factors can be seen to logically relate to aerobic fitness levels of the employee. They present a process model which is based on two variables; (1) "an employees's motivation to

attend" and (2)"an employees's ability to attend" (p.392).

According to Steers and Rhodes (1978) an employee's motivation to attend is influenced by their job satisfaction, job situation and pressure to attend. Heinzelman and Bagley (1970) stated that "about 40% of the participants [in the employee fitness program] reported a more positive work attitude compared with only 1% of the men in the control group" (p.908). Durbeck et al., (1972) also suggested a "more positive work attitude" was expressed by high adherents to an exercise program as compared to low adherents. Rhodes and Dunwoody (1980) reported that approximately half of subjects participating in the exercise program perceived that "they had an improved outlook towards their job and life in general, and enjoyed their job more and found it less boring" (p.333). From the employee fitness literature one finds an association between job satisfaction and adherence to an exercise program. (Durbeck et al., 1972; Heinzelman & Bagley, 1970; Rhodes & Dunwoody, 1980).

Stress and conflict were suggested to be "important variables of work behavior" (Steers & Rhodes, 1978, p.394). "There is consistent evidence to support the

contention that employee absenteeism may increase with stress and anxiety." (Educational Research Service, 1980, p.39). The physically fit employee [with high levels of aerobic fitness] have felt they "could cope more with the tensions of the job" (Rhodes & Dunwoody, 1980, p.333) had "decreased stress and tension" (Durbeck et al., 1972, p.788) and had "greater ability to deal with stress and tension" (Heinzelman & Bagley, 1970, p.909).

Factors influencing an employee's ability to work cited by Steers and Rhodes (1978) include: (a) illness, (b) accidents, (c) family responsibilities, and (d) transportation problems. Of those factors influencing and employee's ability to attend work, illness is the only one which may be related to aerobic fitness. The Canada Fitness Survey (1981) reports that compared with nonactive Canadians, "active Canadians are healthier, with greater emotional well being and positive self ratings of health" (p.1). Shephard, et al. (1981) report that "high adherents [to the exercise program] were using health care less and having fewer colds as well as fewer absences from work" (p.360). Pravosudov (1978) reports that "The workers taking part in physical activity miss fewer days because

of catarrhal and noncatarrhal diseases than those not engaged in physical training and sports." (p. 264). Overall the literature suggests the hypothesis that physical fitness may be related to absenteeism and sickness.

The assumption that use of the medical care system indicates the quantity of sickness further supports the hypothesis that physical fitness may be related to absenteeism and sickness. In the Quasar Systems' Report (1976) it was stated that "people with higher levels of physical fitness tend to have lower OHIP [Ontario Health Insurance Plan] claims." (p.1). Shephard, Corey, Renzland, and Cox (1982), demonstrated that employees of the experimental company which instituted an employee fitness program tended to have lower medical care costs than the employees at the control company. This finding was not statistically significant and the difference was dependent upon the test company's medical care costs remaining the same while the control company's medical care costs escalated. It should be noted that maintaining costs for medical care at the same level as the previous year's may be a significant saving in medical care

costs. Using the same set of subjects, Cox, Shephard, and Corey (1981) found that high adherents to the exercise program decreased their absenteeism by 22% in a year. Song, Shephard, and Cox (1982), found that high adherents in the employee fitness program tended to have less absenteeism than low adherents. In the study by Song et al. (1982), the comparison of high adherents to low adherents may be between the same population in terms of aerobic fitness level as the two groups were not tested for a significant difference in their predicted VO<sub>2</sub> maximum scores. Baun, Bernacki and Tsai (1986) have noted a trend towards exercisers having less absenteeism than nonexercisers in the first year of an employee fitness program, but the data were statistically nonsignificant. Gettman (1986) reports on the MESA Petroleum Company's Corporate Fitness Program. He found the trend of lower absenteeism rates, and lower medical care costs were associated with higher activity rates over the two years of the study. It should be noted that Gettman did not report the aerobic fitness levels of his subjects, but states "The finding that low absenteeism is related to high activity level or high levels of physical fitness

agrees with other studies." (p.13). The MESA Petroleum Company study is in agreement with other studies (Baun et al., 1986; Shephard et al., 1982; Song et al., 1982) in that high adherent rates to employee fitness programs have been shown to be related to low absenteeism rates. High activity levels have also been related to low absenteeism. (Baun et al., 1986; Shephard et al., 1982; Song et al., 1982). One must use caution in the interpretation of these studies as they failed to evaluate the relationship between aerobic fitness levels and absenteeism, but report that being active, or participating in an employee fitness program, is correlated to decreased absenteeism.

It could be speculated that the subject who is beginning an active lifestyle may have a very poor aerobic fitness level, but participate regularly in the corporate fitness program. The person exercising below their training zone, who does not attain a high level of aerobic fitness but is active and has high adherence to the employee fitness program may also confound the data. The weight lifter is another example of a person with high adherence levels and high activity levels who may not have high aerobic levels. These three situations may

confound the data which assumes that activity or employee fitness centre use are the equivalent of high aerobic fitness levels.

Linden (1969) explored the relationship between absenteeism and physical fitness. He found that customs officers exhibited an inverse relationship between absenteeism and maximal oxygen uptake. Linden (1969) also found that the firemen, and office workers in the study did not demonstrate this relationship. He speculated that the lack of a relationship between absenteeism and physical fitness was possibly due to the small sample size.

Although absenteeism was correlated to aerobic fitness in only one study (Linden, 1969), decreased medical care costs have been related to the introduction of an employee fitness program, (Cox, et al., 1981; and Song, et al., 1982) and to higher levels of physical fitness (Quasar Systems Ltd., 1976). Because of the abundance of literature in which researchers have studied the relationship of employee fitness program's adherence rates to absenteeism, it was decided not to restudy this question.

From the evidence reported in the literature, it can be hypothesized that absenteeism may be related to aerobic fitness levels. Further study of the relationship between absenteeism and aerobic fitness levels may increase the strength of the justification of employee fitness programs. On the basis of this hypothesis, the primary purpose of this study was to determine the correlation between absenteeism, and predicted VO2 maximum in sedentary office workers (SOW). The group of sedentary office workers was broken down into two sub-groups based on their job classifications. The two groups were computer technical analysts (CTA) who tended to be self-directed, and the clerks who were basically responsive to others in their daily work. Steers and Rhodes (1978) suggested that "While sick employees typically do not come to work, it does not follow that healthy employees will attend." (p.404). As the secondary purpose of the study, the reasons for sick leave days were examined.

### Limitations

1. The study is correlational and therefore does not seek to imply cause and effect from the results.
2. All subjects worked for a data processing corporation, this may decrease the external validity of the results.
3. Employees do not necessarily use their sick leave days for illness reasons.
4. Use of sick leave days data is self-reported information and as such is dependent upon the recall memory of the subjects.

## Method

### Subjects

The target population was the British Columbia Systems Corporation's employees who conformed to the delimitations of the study. Subjects worked in the following departments: Administrative Services, Distributed Services, Financial Reporting, Host Services and Technical Analysts. Approval was obtained from British Columbia Systems Corporation and the University of Victoria Human Subjects Committee.

There were 127 potential subjects, who were contacted by letter (Appendix A). Subjects were able to be classified as sedentary office workers. Sedentary is defined by Sykes (1976) in the The Concise Oxford Dictionary of Current English as "characterized by much sitting and little physical activity" (p. 1027). For this study the The Concise Oxford Dictionary of Current English definition of sedentary will be used. It should be noted from casual observation that the work station for the sedentary office worker was sitting at a desk. Subjects worked seven hours in a regular day. Subjects' hours of work were Monday to Friday 8:30 am - 4:30 pm. Subjects

were onsite (4000 Seymour Place) non-managerial employees of British Columbia Systems Corporation. Subjects received six days of sick leave at 100% pay per year. These sick leave days do not require a doctor's certificate.

Of the 127 potential subjects, 100 volunteered to be subjects in the study and signed informed consent forms (Appendix B). The mean age of the subjects was 34.5 years, with a range of 20 years to 57 years. There were 72 males and 28 females in the sample. There were 69 clerks (42 males, 27 females) and 31 computer technical analysts (30 males, 1 female) in the sample. The median age of the sedentary office workers was 34 years.

The position description provided by the Human Resources Department lists typical duties for the clerks and the computer technical analysts. Typical duties of the clerks may include: transcribing a variety of material such as correspondence, memos, reports, handwritten notes, and typed copy using a typewriter or word processing equipment; allocating and monitoring the work of junior clerical employees; replying to or initiating correspondence and/or enquires; arranging details of appointments and travel; receiving visitors, answering

telephones and taking messages; taking and transcribing minutes of meetings; maintaining department, confidential and administrative files; assisting in the development of office procedures. Typical duties for the computer technical analyst may include: performing advanced level technical work in the field of specialization such as distributed data processing, change control, data base management, network services or host software services; providing availability of service by installing, testing and maintaining systems software, hardware and related facilities; monitoring, reviewing, changing improving systems software, hardware and/or installed products; providing technical assistant to colleagues and users in advanced stages of problem determination; developing recommendations and forecasting requirements for future services and products.

#### Instrumentation

The Amerrec Pulse Meter was used to measure heart rate during the Canada Home Step Test. The Amerrec Pulse Meter was correlated with a Beckman electrocardiogram, to ensure reliability, (Appendix C). Each day prior to testing and each hour during testing the record player was

calibrated using a metronome to correct the stepping cadence. The weight scale was calibrated for balance before each weighing.

### Procedure

#### Link System

Anonymity was guaranteed to the subjects and was accomplished by using the Link System. The Link System involved using the appointment schedule for the Canada Home Fitness Test as the link. The Canada Home Fitness Test data sheets were identified by subject number only. The sick leave data sheets were identified by the personal identity number. The use of sick leave days graph had no identification. The one copy of the link was destroyed upon completion of the research.

#### Canada Home Fitness Testing Procedures

Employee fitness programs typically use the Canada Home Fitness Test to assess aerobic fitness levels of participants. (Collis, 1977; Cox et al., 1981; Peepre, 1980). This study also employed the Canada Home Fitness Test, which uses predicted VO<sub>2</sub> maximum to evaluate aerobic fitness. Reasons cited by Shephard, Bailey and Mirwald, (1976) for using the Canada Home Fitness Test to test

aerobic fitness include; (a) low skill level required to take the test, (b) submaximal test, (c) considered physically safe, (d) unthreatening for the participant, and (e) it is an accurate measure of cardiovascular fitness if monitored by an accurate heart rate recording device. Information concerning validation studies supporting the use of the Canada Home Fitness Test as a measure of predicted VO<sub>2</sub> maximum is contained in Appendix D. The results from the Canada Home Fitness Test were used to calculate the subjects' predicted VO<sub>2</sub> maximum using the Jetté formula (Appendix E). Justification for using a single aerobic fitness assessment is contained in Appendix F.

The individuals who administered the Canada Home Fitness Test attended a training clinic prior to gathering data. Three people were trained in addition to the researcher, allowing for one spare. One person greeted the subjects and two people administered the Canada Home Fitness Test, thus two subjects were tested at once.

Subjects made appointments (Appendix G) and were instructed as to the control instructions (Appendix H) one week prior to testing. Tests were performed in the morning

during April 2-7, 1984, at the British Columbia Systems Corporation Employee Fitness Centre.

Subjects were greeted as they entered the Fitness Centre and advised that they could withdraw from the study at any time and were asked to complete a Physical Activity Readiness Questionnaire (Appendix I). Subject numbers were assigned. Weight, with shoes off, was measured in kilograms and recorded on the Aerobic Fitness Test Data Sheets (Appendix J).

Subjects then performed the Canada Home Fitness Test. The Standardized Fitness Test, (Fitness Canada, 1981) protocol was followed for the Canada Home Fitness Test (Appendix K). Due to use of the Amerrec Pulse Metre instead of manual pulse counting, the heart rate monitoring procedure was modified as follows. Heart rate (beats/minute) was recorded at the start of the 10 second pulse count period. Heart rate was again recorded at the end of the 10 second pulse count period. The average was calculated and used as the heart rate for the stage completed. The Physical Fitness Evaluation Chart was modified to read beats/minute (Appendix L).

Sick Leave Data Collection

Permission was obtained from Human Resources to access sick leave data (Appendix M). Human Resources provided the information to the researcher upon receipt of the signed informed consent forms. The informed consent forms were returned to the researcher with the sick leave data.

Weekly time sheets (Appendix N) were completed by each employee and approved by their supervisor. Data were recalled from the Human Resources database for April 1, 1983 through March 31, 1984. Sick leave was recorded in days used per year (See Appendix O).

#### Collection of Reasons for Employees' Sick Leave Use

Upon completion of the Canada Home Fitness Test subjects made appointments for an interview. Interviews were conducted during the week of April 30-May 4, 1984 (Appendix P). The purpose of the interview was to return aerobic fitness level scores to the subjects and to have the subjects complete a bar graph of their use of sick leave days (Appendix Q). Each subject completed their graph for the number of sick leave days used in the previous year. This figure was available to the subjects. Subjects were shown an example of how to fill in their

graph. The purpose of the sample graphs was to decrease the subjects' inhibition in their reporting of non-illness related reasons for using sick leave days.

Aerobic fitness level (Appendix R) and predicted VO<sub>2</sub> maximum for each subject were recorded on their graph.

#### Statistical Analysis

Pearson Product Moment correlations were calculated for SOW, CLK, CTA, for number of sick leave days used with predicted VO<sub>2</sub> maximum. Post hoc Pearson Product Moment correlations were calculated the two groups male clerks and female clerks.

## Results

The means and ranges for the three groups' SLDU and predicted VO2 maximum are presented in Table 1 and 2 respectively. The median SLDU for the SOW was three days per year. The median for predicted VO2 maximum was 39.2 ml/kg/min for the SOW.

The Pearson Product Moment correlation coefficient ( $r = -.24$ ;  $df = 99$ ;  $p < .01$ ) between SLDU and predicted VO2 maximum for SOW was significant. The relationship between SLDU and predicted VO2 maximum was negatively strengthened with the removal of the CTA from the sample. The negative correlation ( $r = -.31$ ;  $df = 68$ ;  $p < .01$ ) between SLDU and predicted VO2 maximum for CLK was significant. For the subgroup CTA there was a nonsignificant relationship between the variables. Post hoc Pearson Product Moment correlational analysis of the clerks who were male ( $n = 39$ ), resulted in  $r = -.09$ ,  $df = 38$ ,  $p = .30$ . For the female clerks ( $n = 29$ ), the post hoc Pearson Product Moment correlation was  $r = -.28$ ,  $df = 28$ ,  $p = .07$ .

The means, standard deviations, and ranges of reasons employees used sick leave days are reported in Table 3. Ninety-two percent of the reported sick day leave use was for medical reasons.

Table 1

Group Means, Standard Deviations and Ranges for Sick  
Leave Days Used

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Group	<u>N</u>	Mean SLDU days	Standard Deviation days	Range days
SOW	100	4.6	6.2	0 - 42
CLK	69	5.0	6.8	0 - 42
CTA	31	3.6	4.3	0 - 17

---

Table 2

Group Means, Standard Deviations, and Ranges for  
Predicted VO<sub>2</sub> maximum

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Group	<u>N</u>	Mean ml/kg/min	Standard Deviation ml/kg/min	Range ml/kg/min
SOW	100	39.2	6.7	22.4 - 56.5
CLK	69	38.2	7.1	22.4 - 56.5
CTA	31	41.3	5.1	29.8 - 52.2

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Table 3

Means and Standard Deviations of Categories of Reasons for Use of Sick Leave Days for Sedentary Office Workers

Use of sick leave	Mean number of SLDU	Standard Deviation	Range
Transportation problems	.00	.00	0.0 - 0.0
Family responsibilities	.13	.44	0.0 - 2.1
Recreation & holidays	.09	.44	0.0 - 4.0
Accidents	.12	.84	0.0 - 8.0
Athletic injuries*	.12	.58	0.0 - 5.0
Allergies*	.16	1.28	0.0 -12.5
High blood pressure*	.02	.21	0.0 - 2.1
Colds & flu*	2.01	2.67	0.0 - 16.0
Stress*	.09	.37	0.0 - 2.1
Back pain*	.09	.57	0.0 - 4.0
Chest pains/heart problems*	.04	.40	0.0 - 4.0
Headaches*	.21	.79	0.0 - 6.0
Menstrual problems*	.02	.14	0.0 - 1.0
Surgery*	.71	4.46	0.0 - 42.0
Other*	.66	3.09	0.0 - 23.9
Total SLDU	4.60	6.20	

Note: \* medical reasons for using sick leave days.

### Discussion

The results of this study indicate that there is a significant relationship between absenteeism and predicted VO2 maximum for sedentary office workers who are clerks. This reinforces the findings of Linden (1969), who studied the relationship between predicted VO2 maximum and absenteeism in customs officers. The correlational nature of this study prohibits making cause and effect statements about the relationship between absenteeism and predicted VO2 maximum.

The CTA's did not exhibit an inverse relationship between absenteeism and predicted VO2 maximum. During interviews, when the use of sick leave data were collected, the CTA's anecdotally mentioned that they did not use their sick leave days when they were sick but came to work anyhow. Brad, (1984) states that, "The computer workers .... have a high degree of personal involvement in the work they are doing." (p.89). It is speculation, but it is possible that the CTA's may not respond to the work environment in the same manner as a clerk.

The computer technical analysts did not show a significant correlation between absenteeism and aerobic

fitness level, and the CTA's were a predominantly male group, with only one female in the group. This prompted concern as to whether the results of the study were influenced by gender. Post hoc Pearson Product Moment correlations were performed on the clerk data which was broken into two groups, male and female. Neither group, male or female yielded a significant correlation. Which allows one to speculate that the relationship between absenteeism and aerobic fitness levels may not be influenced by gender.

The variable absenteeism, was measured by the number of sick leave days used. Of the total incidences of sick leave days used 92.57% were used for medical reasons. (see Table 3 for the list of medical reasons). Therefore the variable, number of sick leave days used, can be seen as a variable relating to health rather than non-medical reasons for absenteeism. It could be inferred that the employees who used more sick leave days had more illness and had higher medical care costs than employees who used less sick leave. While this appears to be logical it is not investigated by this study. Other studies (Gettman, 1986; Quasar, 1976; and Shephard et al., 1982) have shown

a relationship with physically active employees having lower medical care costs than less active employees.

Highly active employees have also been shown to have lower absenteeism rates, when compared with non-active employees (Baun et al., 1986; Gettman, 1986; Shephard et al., 1982; Song et al., 1982). As noted in the introduction one must use caution in the interpretation of these studies as they did not evaluate the relationship between aerobic fitness levels and absenteeism, but report that being active, or having high adherence rates to an employee fitness program is related to decreased absenteeism.

There is not a clear relationship between aerobic fitness levels and absenteeism based on the literature. This study explores the relationship between absenteeism and aerobic fitness levels, based on predicted V02 maximum, not on adherence rates or activity levels as the majority of the literature does. There is a significant relationship between aerobic fitness and absenteeism demonstrated by this study, although it is correlational and cause and effect cannot be implied. It should be noted that a wide range in ages of the subjects exist

which may strengthen the external validity despite the limitation of working for a data processing company. The ability to generalize from the data may be stronger for the CLK's than the CTA's as the clerks' jobs are not much different from clerks employed by other types of businesses. The nature of the work done by a CTA is specific to a data processing company, thus the ability to generalize is low for this subgroup. The use of sick leave days data is self-reported, while this may be a limitation it does show that people use their sick leave days for more than illness reasons. But it should be noted that the majority (92.5%) of the reasons are medically related. This study increases the knowledge of the relationship between absenteeism and aerobic fitness levels, by demonstrating that a significant, but moderate negative correlation exists between the two variables. Therefore, the study might be seen to support the justification of corporate fitness programs.

As this study was correlational, and not experimental, one learns from one's research that a relationship exists between the two variables absenteeism and aerobic fitness level. Therefore a potential

direction for future research would be to explore if there is an influence of aerobic fitness levels on absenteeism. Such a study could be designed to demonstrate that the change in absenteeism is due to improved levels of aerobic fitness and to increased participation in an employee fitness program. The research might also attempt to show that a relationship exists between adherence rates to an employee fitness program and aerobic fitness levels. Thus, if experimental research could demonstrate that by improving an employee's aerobic fitness level, absenteeism rates were lowered, a strong statement could be made to further justify employee fitness programs.

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Appendix A

Invitation to Participate

INVITATION TO PARTICIPATE

DATE \_\_\_\_\_

Dear \_\_\_\_\_ :

The following research has the approval of the Corporation.

I am a graduate student at the University of Victoria working on my Masters of Arts Degree. A requirement of the Degree is a thesis. My thesis topic is 'A Possible Correlation Between Aerobic Fitness and Sick Leave Used'.

This letter is to ask for your voluntary participation in the study. You can withdraw from the study any time you choose to. Your involvement with the study will take approximately 15-20 minutes, just long enough to perform a Canadian Home Fitness Test and be weighed. This test involves stepping up and down a set of stairs in time to the music for a minimum of three minutes and a maximum of nine minutes. This is to measure aerobic fitness. Testing will be done in the morning during April 2-7, 1984. If you have any questions about the test, please give me a call (3924).

The study also involves using your sick leave data. The figure I am interested in is the number of sick days which you used in the past year (April 1, 1983-March 31, 1984).

Finally, in the first week of May you will be asked to participate in a five minute interview. At the interview you will add the use of your sick leave days to a cumulative graph. No identification will be recorded with this information. The data will be used in the context of the study only. It is extremely important to the research that this data be collected. At the interview, the results of your fitness test will be given to you.

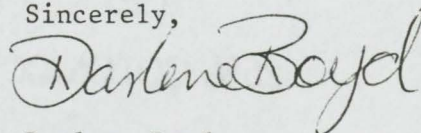
A summary of the results of the study will be mailed to all participants who wish a copy. Please indicate if you would like a copy by checking the appropriate box on the informed consent letter.

Sick leave data, factors influencing use of sick leave days and fitness testing information will be strictly confidential. Anonymity will be guaranteed to all subjects. Your name will not appear on any of the data sheets. Subject numbers will be assigned at the time of testing. Data will be presented in group form only in the research report.

Your participation in the study is important to the usefulness of the results. If you are willing to volunteer for the study, please indicate your consent by signing the enclosed form and returning the signed copy to E105.

Thank you for your cooperation and help.

Sincerely,



Darlene Boyd

Appendix B

Informed Consent

INFORMED CONSENT

FOR

STUDY OF THE CORRELATION BETWEEN AEROBIC  
FITNESS AND SICK LEAVE DAYS USED IN  
SEDENTARY OFFICE WORKERS.

I understand that the purpose of this study is to learn more about the relationship between aerobic fitness levels and sick leave days used.

I confirm that my participation as a subject is entirely voluntary. No coercion of any kind has been used to obtain my cooperation.

I understand that I may withdraw my consent and terminate my participation at any time during the investigation.

I have been informed of the procedures that will be used in the study and understand what will be required of me as a subject.

I understand that all my responses written or oral and my sick leave data, will remain completely anonymous.

I wish to give my cooperation as a subject.

I agree to complete a survey of my reasons for using sick leave days.

(Please check one)

YES, I will participate in the survey.

NO, I will not participate in the survey, but I wish to participate in the CHF Test.

LOCAL \_\_\_\_\_ NAME (PLEASE PRINT) \_\_\_\_\_

DATE \_\_\_\_\_ SIGNATURE \_\_\_\_\_

Yes, I would like a copy of the summary of results from the study.

Appendix C

Correlation of Amerrec Pulse Meter to ECG

## Appendix C

Correlation of Amerrec Pulse Metre to Beckman ECG

Due to the large amount of time required to prepare subjects for the electrocardiogram, the Amerrec Pulse Metre was used to measure heart rate. Heart rates were recorded simultaneously with the Beckman electrocardiogram and the Amerrec pulse metre while performing the Canada Home Fitness Test. The data were correlated, yielding  $r = .97$ . There was no significant difference between the two sets of data on a paired t-test. There were ten subjects who each performed three stages of the test, making a total data set of thirty.

Appendix D

Validation of the Canada Home Fitness Test

## Appendix D

### Validation of the Canada Home Fitness Test

Scientific validation of the Canada Home Fitness test by Shephard et al. (1976) yielded an  $r=0.72$  (p.677) when correlated to the Astrand bicycle ergometer test. Jette, Campbell, Mongeon and Routhier (1976) validated the Canada Home Fitness Test with direct measurement of maximum VO<sub>2</sub> and developed the prediction formula for VO<sub>2</sub> maximum. Jette et al. (1976) found that "the difference between these values [predicted VO<sub>2</sub> maximum and actual VO<sub>2</sub> maximum] was not significant (p<.01, paired t-test)" (p.682).

Jette et al. (1976) and Shephard et al. (1976) found that manual pulse counting to be an unreliable method to use to measure heart rate, and have suggested the use of an electrocardiogram for reliable heart rate measures.

The third edition of the Standardized Test of Fitness Operations Manual (1986), states that when predicting VO<sub>2</sub> maximum "The calculator may: 1) underestimate the VO<sub>2</sub> Max. for fit participants, for females in the 20-29 years age group and for heavy individuals; 2) overestimate the VO<sub>2</sub> Max. for unfit participants."(p.15). Fitness Canada has

convened an Ad Hoc Canadian Standardized Fitness Test Advisory Committee, which has made recommendations for "research to improve and extend the application of the CAFT". (p.15) It should be noted that Shephard, Cox, Corey and Smythe (1979) stated "that prediction procedures are more useful in dealing with populations than with individuals." (p.208). Thus for the purposes of this study the Canada Home Fitness Test and the Jette prediction formula would be a valid method of assessing aerobic fitness levels.

## Appendix E

Jette Prediction Formula for VO2 maximum

## Appendix E

Jette Prediction Formula for VO2 maximum

Predicted VO2 maximum =

$$42.5 + 16.6(\text{VO}_2) - 0.12(\text{W}) - 0.12(\text{H}) - 0.24(\text{A})$$

VO2 = average oxygen cost of last completed exercise stage (in litres/minute) derived from Table I.

W = body weight (in kilograms).

H = post exercise heart rate (in beat/ minute).

A = age (in years).

Table I

Stage	Males	Females
1	1.1391	0.9390
2	1.3469	1.0434
3	1.6250	1.3213
4	1.8256	1.4325
5	2.0660	1.6267
6	2.3453	1.7867
7	2.7657	-----

Appendix F

Justification for Using a Single Aerobic Fitness Test

## Appendix F

Justification for Using a Single Aerobic Fitness Test

Rhodes and Dunwoody (1980) used the Canada Home Fitness Test and the Jette prediction formula for VO<sub>2</sub> maximum in their study of 'Physiological and Attitudinal Changes in those Involved in an Employee Fitness Program'. The control group of subjects for this research did not show a significant change in predicted VO<sub>2</sub> maximum over a six month time period. In the Canadian Fitness and Lifestyle Project (Peepre, 1980) the control subjects showed a significant change in their predicted VO<sub>2</sub> maximum. The change in VO<sub>2</sub> maximum was not large enough to alter their placement in the 5-way classification scheme of the Canadian norms. The Quasar Systems Ltd. (1976) study was a cross-sectional design. A single aerobic test was used to correlate 20 months of Ontario Health Insurance Plan data to aerobic fitness. Aerobic fitness was measured using the Astrand bicycle ergometer test and predicted VO<sub>2</sub> maximum was calculated.

The literature suggests that a single aerobic fitness test can be used to indicate aerobic fitness of the subject for the previous.

Appendix G

Appointment Calendar

CALENDAR OF APPOINTMENTS

DATE	TIME	SUBJECT NO.	PIN	NAME	AGE	M. F.	LOCAL
	8:30	1					
	8:30	2					
	8:45	3					
	8:45	4					
	9:00	5					
	9:00	6					
	9:15	7					
	9:15	8					
	9:30	9					
	9:30	10					
	9:45	11					
	9:45	12					
	10:00	13					
	10:00	14					
	10:15	15					
	10:15	16					
	10:30	17					
	10:30	18					
	10:45	19					
	10:45	20					

Appendix H

Control Instructions

## Appendix H

## Control Instructions

"The subjects should not exercise prior to the testing session. The subject should not consume alcohol for six hours prior to the test, nor eat, smoke or drink tea or coffee for at least two hours. Preferably, the test should be taken in the morning with the subject having eaten a light breakfast at least two hours before the test."

(Canadian Standardized Test, 1981, p.5).

Appendix I

PARQ

**Physical Activity Readiness  
Questionnaire (PAR-Q)\***

NAME OF PARTICIPANT \_\_\_\_\_

DATE \_\_\_\_\_

# PAR Q & YOU

PAR-Q is designed to help you help yourself. Many health benefits are associated with regular exercise, and the completion of PAR-Q is a sensible first step to take if you are planning to increase the amount of physical activity in your life.

For most people physical activity should not pose any problem or hazard. PAR-Q has been designed to identify the small number of adults for whom physical activity might be inappropriate or those who should have medical advice concerning the type of activity most suitable for them.

Common sense is your best guide in answering these few questions. Please read them carefully and check (✓) the  YES or  NO opposite the question if it applies to you.

YES NO

1. Has your doctor ever said you have heart trouble?
2. Do you frequently have pains in your heart and chest?
3. Do you often feel faint or have spells of severe dizziness?
4. Has a doctor ever said your blood pressure was too high?
5. Has your doctor ever told you that you have a bone or joint problem such as arthritis that has been aggravated by exercise, or might be made worse with exercise?
6. Is there a good physical reason not mentioned here why you should not follow an activity program even if you wanted to?
7. Are you over age 65 and not accustomed to vigorous exercise?

If  
You  
Answered

## YES to one or more questions

If you have not recently done so, consult with your personal physician by telephone or in person BEFORE increasing your physical activity and/or taking a fitness appraisal. Tell your physician what questions you answered YES to on PAR-Q or present your PAR-Q copy.

### programs

After medical evaluation, seek advice from your physician as to your suitability for:

- unrestricted physical activity starting off easily and progressing gradually.
- restricted or supervised activity to meet your specific needs, at least on an initial basis. Check in your community for special programs or services.

## NO to all questions

If you answered PAR-Q accurately, you have reasonable assurance of your present suitability for:

- A GRADUATED EXERCISE PROGRAM – a gradual increase in proper exercise promotes good fitness development while minimizing or eliminating discomfort;
- A FITNESS APPRAISAL – the Canadian Standardized Test of Fitness (CSTF).

### postpone

If you have a temporary minor illness, such as a common cold.

\* Developed by the British Columbia Ministry of Health. Conceptualized and critiqued by the Multidisciplinary Advisory Board on Exercise (MABE). Translation, reproduction and use in its entirety is encouraged. Modifications by written permission only. Not to be used for commercial advertising in order to solicit business from the public.

Reference: PAR-Q Validation Report, British Columbia Ministry of Health, 1978.

Produced by the British Columbia Ministry of Health and the Department of National Health & Welfare.

Appendix J

Aerobic Fitness Testing Data Sheets

A E R O B I C F I T N E S SD A T A C O L L E C T I O N

SUBJECT NO. \_\_\_\_\_ DATE \_\_\_\_\_

SEX \_\_\_\_\_ WEIGHT \_\_\_\_\_ kg.

CANADA HOME FITNESS TEST

<u>STAGE</u>	<u>H.R. START 10 SEC.</u>	<u>H.R FINISH 10 SEC.</u>	<u>AVERAGE</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Predicted Max  $VO_2$  \_\_\_\_\_ ml/kg/min.

\_\_\_\_\_ % tile \_\_\_\_\_ rating

Sick Leave Data:

\_\_\_\_\_ DAYS USED PER YEAR - April 1, 1983 - March 31, 1984

Appendix K

Canada Home Fitness Test Protocol

Appendix K  
(Fitness Canada, 1981, 2nd ed.)

## Test of Cardio-Respiratory Fitness

### General

The Canadian Home Fitness Test, a double step test, was selected as the field test to measure the cardio-respiratory fitness of the subject. In order to appreciate the dimensions of this test you should be familiar with the following literature:

Bailey, D.A. et al. Validation of a self-administered home test of cardio-respiratory fitness. *Can. J. Appl. Sports Sci.*, 1, 67, 1976.

Shephard, R.J. et al. Development of the Canadian Home Fitness Test. *Can. Med. Assoc. J.*, 114, 675, 1976.

Jetté, M. et al. The Canadian Home Fitness Test as a predictor of aerobic capacity. *Can. Med. Assoc. J.*, 114, 680, 1976.

Jetté, M. An exercise prescription program for use in conjunction with the Canadian Home Fitness Test. *Can. J. Public Health*, 66, 461, 1975.

### Equipment:

Stethoscope, sphygmomanometer, tape recorder and CHFT tapes (or record player and CHFT record), timer, steps.

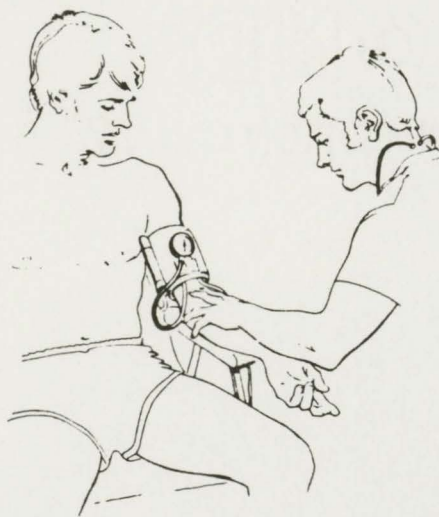
### Procedure

*Preliminaries:* Have the subject remove his/her shoes, sit and rest for five minutes. Use a comfortable chair with arm rests. During this time, question the subject to ensure that all pre-testing instructions have been followed and briefly explain how the test is to be conducted and for what purposes.

### Blood Pressure (Optional)

Some test administrators may find it difficult or are unable to measure blood pressure accurately. Unless administrators are capable and are familiar with the influence of exercise upon blood pressures, they would be advised to omit the measurement of blood pressure.

**Sphygmomanometer application:** Apply the blood pressure cuff to the subject's left arm. The cuff should be wrapped firmly and smoothly around the arm with the lower margin 2 - 3 cm above the antecubital space. The arm should be comfortable, supported with the lower edge of the cuff at heart level and at an angle of 0° - 45° from the trunk. The subject will wear the cuff throughout the step test. If it tends to slip, tape it to the shoulder.



Release the cuff pressure at a rate of approximately 2 mm per second.

The systolic pressure level is determined by the first perception of sound (first Korotkoff sound).

The diastolic fourth-phase level (D<sub>4</sub>) is determined when the sounds cease to be tapping in quality and are fully muffled.

Deflate the cuff to zero pressure.

Record visually the *resting* systolic and diastolic fourth phase (D<sub>4</sub>) to the nearest 2 mmHg in the appropriate space as follows:

Systolic

Diastolic (D<sub>4</sub>)

**Measurement of the resting heart rate and blood pressure:** Determine the resting heart rate with the stethoscope using a 15 second count five minutes after the subject has been seated and record in beats/min. in the space provided as follows:

Then measure the blood pressure as follows:

Position the stethoscope in your ears with the ear piece pointing forward.

Locate and note the brachial artery at the antecubital space by palpation.

Rapidly inflate the cuff to a level above the radial palpatory pressure. Quickly position the diaphragm of the stethoscope over the brachial artery. Apply minimum amount of pressure so as not to distort the artery. The diaphragm should be in complete contact with the skin. The stethoscope should not touch the cuff or its tubing.



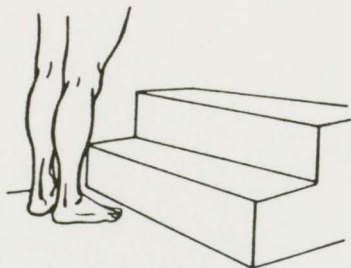
In the event the resting heart rate of a subject is above 100 b/min., and/or the resting systolic blood pressure is over 150 mmHg, and/or the fourth phase diastolic is over 100 mmHg, wait an additional five minutes and take the readings again. The subject should be excluded from the cardio-respiratory fitness test if the values are still above the criteria. Explain briefly that the heart rate and/or blood pressure readings are slightly out of the range for which the test was designed. Advise the subject to consult with his/her physician before attempting the test.

Blood pressures may be taken after the final stage of the step test. This is performed to monitor the subject's return to pre-test blood pressure values. No additional tests should be administered if values greatly exceed pre-test results.

**Step testing sequence and cadence:**  
 Demonstrate and have the subject practice the stepping sequence described below.

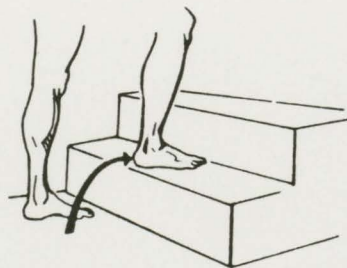
**START:**

Stand in front of the first step, feet together.



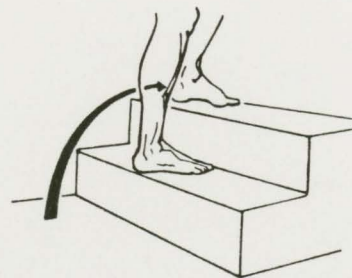
**1. STEP:**

Place your right foot up on the first step.



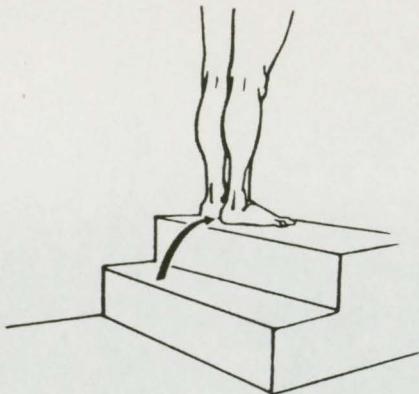
**2. STEP:**

Bring your left foot up to the second step.



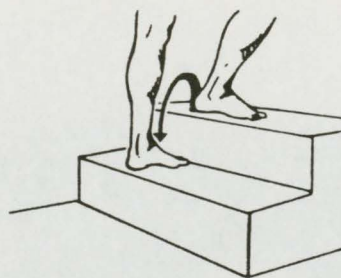
**3. UP.**

Bring your right foot up on the second step, feet together.



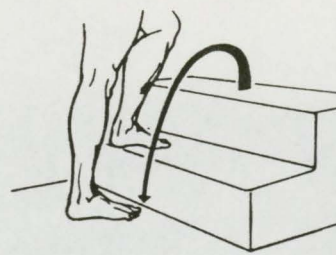
**4. STEP:**

Start down with your left foot to the first step.



**5. STEP:**

Bring your right foot down to the ground level.



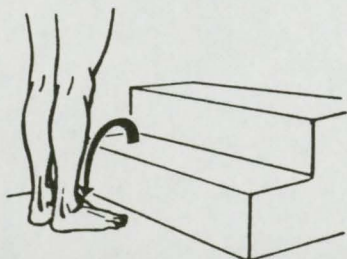
**6. DOWN:**

Bring your left foot to the ground level, feet together.

STEP - STEP - UP!  
 STEP - STEP - DOWN!

UP - 2 - 3! DOWN - 2 - 3!

UP - 2 - 3! DOWN - 2 - 3!



Have the subject practice the starting sequence, first without the music and then with the music, but no more than twice each time. Ensure that the subject places both feet completely on the second step and that the legs are completely extended and back upright during this phase of the movement. During the test ensure that the subject maintains the proper cadence. Count and/or step a few steps with subjects who are experiencing difficulty.

*Starting exercise.* Determine the starting stepping exercise of the subject, based on age, using the following table:

Age	Starting Exercise	
	Males	Females
60 and over	1 (66)*	1 (66)
50-59	2 (84)	1 (66)
40-49	3 (102)	2 (84)
30-39	4 (114)	3 (102)
20-29	5 (132)	3 (102)
15-19	5 (132)	4 (114)

\* (Stepping Tempo in steps per minute.)

The subject should then be informed that the first stepping exercise is three minutes in duration. The subject will cease to step when the music stops and remain motionless. Indicate that upon completion of this first stage you will inform the subject if he/she is to stop or continue for a second stage.

*Post-exercise heart rate - first stage only.* Start the tape recorder (or record player) and have the subject perform the first stage of the test. Observe the subject for signs of intolerance.\* When the music stops have the subject remain motionless. Determine the post-exercise heart rate with the stethoscope. Start counting on the command word COUNT and continue counting until the command word STOP. (A 10-second timing sequence).

\*dizziness, unusual fatigue, angina, staggering, distressful breathing, nausea, and facial expressions that indicate difficulty in maintaining the cadence.

DO NOT stop the tape (or record player) during the test. Pulse counting pauses have been recorded on the tape. It is imperative that the tape (or record player) continue operating for the duration of the test. Pulse counting and determination of the subject's ability to complete the next stage must be accomplished during the timed interval between the musical stepping tempos.

The determination of an accurate post-exercise heart rate is the critical measurement for deciding if the subject should continue to another stage and to predict maximum oxygen consumption ( $\dot{V}O_2$  max.). Quickly determine if the subject is to continue or stop the test. The subject is not to continue if the heart rate is equal to or exceeds these Ceiling Post-Exercise Heart Rates (10 seconds count):

Age	Ceiling Post-Exercise Heart Rates (10 sec.)	
	after 1st stage	after 2nd stage
60 and over	24	23
50-59	25	23
40-49	26	24
30-39	28	25
20-29	29	26
15-19	30	27

*Completing a second or third stage.* If there are no contraindications, have the subject complete a second stage. Repeat the measurements as for the first stage. Determine if the subject is to continue for a third and final stage.

*Final post-exercise heart rates.* After the subject has completed a third and final stage of stepping, or when the test has been terminated on the basis of post-exercise heart rate measurement (while standing), have the subject sit down.

*Blood pressure measurements (Optional).* Record the systolic and diastolic ( $D_4$ ) pressure readings between the thirty-second (0:30) and first minute (1:00) post-exercise period. Record the final blood pressure readings between the two-minute thirty-second (2:30) and the three-minute (3:00) post-exercise period. Record a final post-exercise heart rate between three-minutes (3:00) and three-minute thirty-seconds (3:30) post-exercise, using the stethoscope.

*Discontinuation of the test.* The examiner will discontinue the step test if the subject begins to stagger, complains of dizziness, extreme leg pain, nausea, chest pain, or shows facial pallor. Have the subject lie down, check his heart rate and blood pressure. Request assistance from a nurse or physician if the subject does not seem to recuperate after a few minutes. If necessary, have someone call an ambulance.

If it becomes obvious that the subject is unable to maintain the proper cadence after the first minute of stepping, step with the subject. If the difficulty in stepping appears to be related to some physiological dysfunction discontinue the test. Suggest that the C.H.F.T. could be retaken later at a mutually convenient time.

*Note:* An overall summary of the C.H.F.T. procedure may be found in the Appendix: Physical Fitness Evaluation Chart.

**Physical Fitness Evaluation  
Chart: CHFT**

This chart summarizes the administration and interpretation of the step test. In a mass testing situation, test administrators may find it easier to use a two-stage rather than a three-stage test. The three-stage test however is mandatory if predictions of maximal oxygen consumption are computed rather than the categorical fitness categories — undesirable, minimum or recommended.

(Fitness Canada, 1981, 2nd ed.)

Appendix K

62

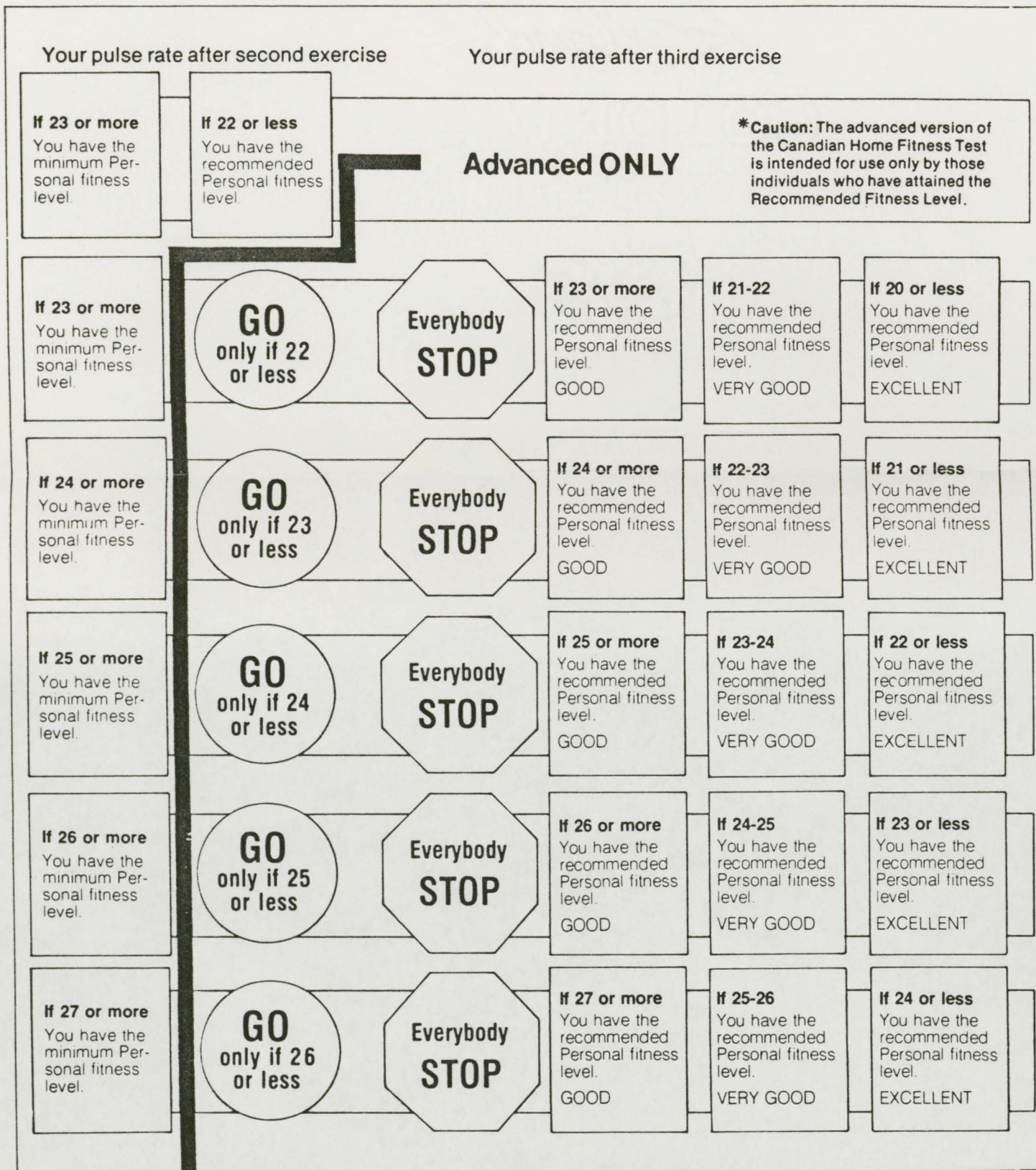
Age group	Start Start at stepping exercise No		Your pulse rate after first exercise			
	Male	Female	STOP	Interpretation	GO	STOP
60's	1	1	STOP if 24 or more	If 24 or more You have an undesirable Personal fit- ness level.	GO only if 23 or less	Everybody STOP
50's	2	1	STOP if 25 or more	If 25 or more You have an undesirable Personal fit- ness level.	GO only if 24 or less	STOP if 23 or more
40's	3	2	STOP if 26 or more	If 26 or more You have an undesirable Personal fit- ness level.	GO only if 25 or less	STOP if 24 or more
30's	4	3	STOP if 28 or more	If 28 or more You have an undesirable Personal fit- ness level.	GO only if 27 or less	STOP if 25 or more
20's	5	3	STOP if 29 or more	If 29 or more You have an undesirable Personal fit- ness level.	GO only if 28 or less	STOP if 26 or more
15-19	5	4	STOP if 30 or more	If 30 or more You have an undesirable Personal fit- ness level.	GO only if 29 or less	STOP if 27 or more

Note: All pulse rate scores have been standardized for eight inch (20.3 cm) steps.

Test administrators should use their discretion when testing subjects 70 years of age and older. Enquiries should be made about their daily activity habits in addition to the use of PAR-Q. Unless hand-rails are available on the testing steps, the test administrator should step with older subjects as a precaution against falls.

(Fitness Canada, 1981, 2nd. ed.)

Appendix K



Appendix L

Modified Physical Fitness Evaluation Chart

## Appendix L

Modified Physical Fitness Evaluation Chart

Age	M	F	End of first stage STOP if....	end of second stage STOP if....
60	1	1	141	138
50	2	1	148	135
40	3	2	154	141
30	4	3	166	153
20	5	3	172	153
15-19	5	4	178	159

Appendix M

Proposal to British Columbia Systems Corporation

2 February 1984  
Submitted by: Darlene Boyd

PROPOSAL TO STUDY THE RELATIONSHIP BETWEEN SICK LEAVE AND  
FITNESS LEVELS IN TECHNICAL ANALYSTS AT B.C.S.C.

The objective of this research is to study the correlation of sick leave and fitness levels. Correlational statistics for the group will be used. Individual data and relationships will not be studied. The technical analysts at B.C.S.C. is the preferred group for the study. Participation will be voluntary. The goal is 90-100% participation. Subjects will be required to sign consent forms to:

- 1) take the fitness test, and
- 2) allow the researcher access to sick leave data.

Anonymity will be guaranteed to the subjects. All subjects will have a research number which will appear on all data collection forms. No other identification will appear on the data collection forms. Individual data collection forms will not be made available to B.C.S.C. A list which matches subject number to PIN will be kept by the researcher. This list will enable the researcher to match sick leave and fitness test scores. When the thesis is completed the list will be destroyed.

The fitness test will take a half-hour per individual. Tests will NOT be administered on company time. Lunch hours may be utilized. All subjects will complete a PARQ and sign a B.C.S.C. waiver prior to testing. The fitness test will include a cardiovascular test, grip strength, flexibility test (sit and reach), 60 second sit-ups, skinfolds, height and weight. Subjects will also complete a physical activity survey at the time of testing. Subjects wishing fitness program counselling will be able to make appointments at the test time. Testing procedures will require the use of the Fitness Centre and some of B.C.S.C.'s fitness testing equipment. Testing will be done at non-prime time hours for the Fitness Centre.

To collect the sick leave data, the researcher will need to be trained how to recall the information from the computer. Once trained, all data will be collected by the researcher. Permission to access the Human Resources sick leave records will be required before proceeding with the study.

This research will be used to satisfy the requirements for a Master of Arts Thesis. Upon completion and acceptance of the Thesis, a copy will be made available to the Corporation.

Appendix N

Time Sheet



Appendix O

Reporting of Sick Leave Days

## Appendix O

### Reporting of Sick Leave Days

The employees working at BCSC are members of the B.C. Government Employees Union. The Union contract (Appendix S) allows employees time away from work other than holidays. Time may be taken off work for these reasons: (a) bereavement of immediate family, (b) marriage of the employee, (c) attend wedding of the employee's child, (d) birth or adoption of the employee's child, (e) serious household domestic emergency, (f) moving household furniture and effects, (g) attend a formal hearing to become a Canadian citizen, (h) attend funeral as pallbearer or mourner, (i) court appearance of employee's child, (j) illness of child, (k) court appearance as juror or witness, (l) sick leave.

Sick leave is defined as absence from work due to illness. It should be noted that at BCSC the reporting of sick leave days is by the honour system. The first six days is at 100% pay rate and are uncertified. After six days, a doctor's certificate may be required, and the employee's wage drops to 75%.

Appendix P

Interview Schedule

INTERVIEW SCHEDULE

DATE	TIME	NAME	LOCAL
	8:30		
	8:40		
	8:50		
	9:00		
	9:10		
	9:20		
	9:30		
	9:40		
	9:50		
	10:00		
	10:10		
	10:20		
	10:30		
	10:40		
	10:50		
	11:00		
	11:10		
	11:20		

Appendix Q

Bargraph for Interview

---

 SELF REPORTED USE OF SICK LEAVE DAYS

Fitness Level \_\_\_\_\_

Please colour in the appropriate number of squares for each reason. 1 square = 1 day.

 -----  
 Reasons/Days                    1   2   3   4   5   6   7   8   9   10  
 -----

 Transportation  
 problems  
 -----

 Family  
 responsibilities  
 -----

 Recreation &  
 holidays  
 -----

 Accidents  
 -----

 Athletic injuries  
 -----

 Allergies  
 -----

 High blood pressure  
 -----

 Colds & flu  
 -----

 Stress  
 -----

 Back pain  
 -----

 Chest pains/  
 heart problems  
 -----

 Headaches  
 -----

 Menstrual problems  
 -----

 Surgery  
 (please specify)  
 -----

 Other  
 (please specify)  
 -----
 

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Appendix R

Canada Home Fitness Test Norms

Standardized Test of Fitness

Appendices

### Norms and Percentile Scores by Age Groups for Maximal Oxygen Consumption (ml/kg/min.)

Age (Yr.)	17 - 19		20 - 29		30 - 39		40 - 49		50 - 59		60 - 65	
	Males <sup>1</sup>	Females <sup>2</sup>	Males <sup>1</sup>	Females <sup>2</sup>	Males <sup>1</sup>	Females <sup>2</sup>	Males <sup>1</sup>	Females <sup>2</sup>	Males <sup>1</sup>	Females <sup>2</sup>	Males <sup>1</sup>	Females <sup>2</sup>
Excellent	≥ 62	≥ 43	≥ 57	≥ 41	≥ 49	≥ 38	≥ 43	≥ 35	≥ 40	≥ 32	≥ 36	≥ 28
Good	55-61	40-42	51-56	38-40	45-48	35-37	40-42	31-34	36-39	27-31	32-35	25-27
Minimum	49-54	37-39	45-50	34-37	40-44	31-34	36-39	28-30	32-35	23-26	28-31	21-24
Below minimum	43-48	34-36	39-44	31-33	35-39	28-30	32-35	24-27	28-31	18-22	24-27	17-20
Poor	≤ 42	≤ 33	≤ 38	≤ 30	≤ 34	≤ 27	≤ 31	≤ 23	≤ 27	≤ 17	≤ 23	≤ 16

Percentile	Age (Yr.)											
	17 - 19		20 - 29		30 - 39		40 - 49		50 - 59		60 - 65	
100	67.9	46.2	63.1	44.5	54.0	41.6	47.4	38.7	43.8	36.3	40.1	32.1
95	60.8	42.7	56.2	40.5	48.7	37.7	42.9	34.5	39.2	31.2	35.6	27.8
90	59.4	42.0	54.9	39.7	47.6	37.0	42.0	33.7	38.3	30.2	34.7	27.0
85	57.7	41.1	53.2	38.7	46.3	36.0	40.9	32.6	37.2	28.9	33.6	25.9
80	56.6	40.6	52.2	38.1	45.5	35.5	40.3	32.0	36.5	28.2	32.9	25.3
75	55.7	40.2	51.4	37.7	44.8	35.0	39.7	31.5	35.9	27.6	32.3	24.8
70	54.9	39.8	50.6	37.2	44.3	34.5	39.2	31.0	35.4	27.0	31.8	24.3
65	54.3	39.4	50.0	36.8	43.7	34.2	38.8	30.6	35.0	26.5	31.4	23.9
60	53.5	39.0	49.3	36.4	43.2	33.8	38.3	30.2	34.5	26.0	30.9	23.4
55	52.9	38.8	48.7	36.1	42.7	33.4	37.9	29.8	34.1	25.5	30.5	23.1
50	52.2	38.3	48.0	35.7	42.2	33.1	37.5	29.4	33.6	25.0	30.1	22.6
45	51.5	38.1	47.4	35.3	41.7	32.7	37.0	29.0	33.2	24.6	29.6	22.2
40	50.9	37.7	46.8	35.0	41.2	32.4	36.6	28.7	32.8	24.1	29.2	21.9
35	50.2	37.4	46.1	34.6	40.7	32.0	36.2	28.2	32.3	23.6	28.7	21.4
30	49.5	37.0	45.4	34.2	40.2	31.6	35.8	27.8	31.9	23.1	28.3	21.0
25	48.7	36.6	44.7	33.8	39.6	31.2	35.3	27.4	31.4	22.5	27.8	20.5
20	47.8	36.2	43.8	33.3	38.9	30.7	34.7	26.8	30.8	21.9	27.2	20.0
15	46.7	35.7	42.8	32.7	38.1	30.1	34.0	26.2	30.1	21.1	26.6	19.4
10	45.0	34.8	41.1	31.7	36.8	29.1	32.9	25.2	29.0	19.9	25.4	18.3
5	43.6	34.1	39.8	30.9	35.8	28.4	32.0	24.4	28.1	18.9	24.5	17.5
0	36.5	30.6	33.0	27.0	30.4	24.5	27.5	20.2	23.5	13.8	20.0	13.2

<sup>1</sup>1977 Canadian Public Health Association project (5,578 subjects)<sup>2</sup>1977 Canadian Public Health Association project (3,381 subjects)

Appendix S

B.C. Government Employees Union Contract

time shall be made only after all other employees concerned have made their initial selection.

- b) Regular vacations shall have priority over banked vacation time during the prime-time vacation period.

#### **18.12 VACATION SCHEDULES**

- a) Vacation schedules will be circulated and posted by April 1 of each year.
- b) An employee who does not exercise his seniority rights within two (2) weeks of receiving the vacation schedule shall not be entitled to exercise those rights in respect to any vacation time previously selected by an employee with less seniority.
- c) An employee who voluntarily transfers to another work location where the vacation schedule has already been completed will not be entitled to exercise his seniority rights with respect to that vacation schedule. However, every effort will be made to grant vacation at the time of the transferred employee's choice.
- d) An employee transferred by the Employer shall maintain his vacation period and no other employee's vacation time shall be affected thereby.

#### **18.13 VACATION CREDITS UPON DEATH**

Earned but unused vacation entitlement shall be made payable, upon termination due to death, to the employee's dependent(s), or where there is no dependent, to the employee's estate.

#### **ARTICLE 19 - SHORT TERM ILLNESS AND INJURY AND LONG TERM DISABILITY**

Employees shall be entitled to coverage for short term illness and injury and long term disability in accordance with Appendix 1, which will be subject to review and revision during the period of this Agreement by negotiations between the parties.

#### **ARTICLE 20 - SPECIAL AND OTHER LEAVE**

##### **20.01 BEREAVEMENT LEAVE**

In the case of death in the immediate family, an employee not on leave of absence without pay shall be entitled to special leave, at his regular rate of pay, from the date of death to and including the day of the funeral with, if necessary, an allowance for immediate return travelling time. Such leave shall normally not exceed five (5) working days.

Immediate family is defined as an employee's parent; wife; husband; child; brother; sister; father-in-law; mother-in-law; and any other relative permanently residing in the employee's household or with whom the employee permanently resides. In the event of the death of the employee's grandparent; grandchild; son-in-law; daughter-in-law; brother-in-law; sister-in-law, the employee shall be enti-

ted to special leave for one (1) day for the purpose of attending the funeral. If an employee is on vacation leave at the time of bereavement, the employee shall be granted bereavement leave and be credited the appropriate number of days to vacation leave credits.

#### 20.02 SPECIAL LEAVE

- a) Where leave from work is required, an employee shall be entitled to special leave at his regular rate of pay for the following:
- 1) Marriage of the employee  
- three (3) days
  - 2) Attend wedding of the employee's child  
- one (1) day
  - 3) Birth or adoption of the employee's child  
- one (1) day
  - 4) Serious household or domestic emergency  
- one (1) day
  - 5) Moving household furniture and effects  
- one (1) day
  - 6) Attend his formal hearing to become a Canadian citizen  
- one (1) day
  - 7) Attend funeral as pall-bearer or mourner  
- one-half (1/2) day
  - 8) Court appearance for hearing of employee's child  
- one (1) day
- b) Two (2) weeks notice is required for leave under a) 1), 2), 5), and 6).
- c) For the purpose of a), 2), 4), 5), 6), 7), and 8), leave with pay will be only for the work day on which the situation occurs.
- d) For the purpose of determining eligibility for special leave under a) 5), an employee will qualify if he is maintaining a self-contained household and if he is changing his place of residence which necessitates the moving of household furniture and effects during his normal working hours, and if he has not already qualified for special leave under a) 5) on two (2) occasions within the preceding twelve (12) months.

#### 20.03 FAMILY ILLNESS

- a) In the case of illness of a child of an employee, and when no one at the employee's home other than the employee can provide for the needs of the ill child, the employee shall be entitled, after notifying his supervisor, to use up to a maximum of two (2) days paid leave at any one time for this purpose.

- b) The maximum length specified for each circumstance shall not be exceeded; however, the leave may be granted more than once for the same circumstance within a calendar year, providing the total family illness leave, plus leave granted under Articles 20.01 and 20.02, does not exceed ten (10) working days per calendar year, unless additional special leave is approved by the Employer.
- c) The Employer may request a report from a qualified medical practitioner when it appears that a pattern of consistent absence is developing.

#### **20.04 FULL-TIME UNION OR PUBLIC DUTIES**

The Employer shall grant, on written request, leave of absence without pay:

- a) for employees to seek election in a municipal, provincial, or federal election;
- b) for employees selected for a full-time position with the Union or any body to which the Union is affiliated for a period of one (1) year;
- c) for employees elected to a public office for a maximum period of five (5) years.

#### **20.05 LEAVE FOR COURT APPEARANCES**

- a) The Employer shall grant paid leave to employees, other than employees on leave without pay, who serve as jurors or witnesses in a court action, provided such court action is not occasioned by the employee's private affairs.
- b) In cases where an employee's private affairs have occasioned a court appearance, such leave to attend a court shall be without pay.
- c) An employee in receipt of his regular earnings while serving at court shall remit to the Employer all monies paid to him by the court, except travelling and meal allowances not reimbursed by the Employer.
- d) Time spent at court by an employee in his official capacity shall be at his regular rate of pay.
- e) Court actions arising from employment requiring attendance at court shall be with pay.
- f) In the event an accused employee is jailed pending court appearance, such leave of absence shall be without pay.

#### **20.06 LEAVE FOR WRITING EXAMINATIONS**

Leave of absence with pay shall be granted to allow employees time to write examinations for courses approved by the Employer.

VITA

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Absenteeism Correlated to Predicted VO<sub>2</sub> Maximum in Sedentary Office Workers

Author

Darlene Boyd

Feb. 27, 1987.

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