Predictors of Workplace Absenteeism and Duration of Employment in Cancer Care Workers

By

Amanda Carosi

Thesis submitted in partial fulfillment
of the requirements for the degree of
Masters of Public Health (MPH)

School of Graduate Studies
Lakehead University
Thunder Bay, Ontario

Your file Votre référence
ISBN: 978-0-494-31849-2
Our file Notre référence
ISBN: 978-0-494-31849-2

Abstract

Workplace absenteeism and duration of employment are growing concerns among health care organizations, in terms of high costs, lost productivity, and job turnover. The aim of this study was to identify sociodemographic and work-related factors that predict workplace absenteeism, duration of workplace absenteeism, and duration of employment in cancer care workers. This study included 244 cancer care workers employed by Cancer Care Ontario at the Northeastern Ontario Regional Cancer Centre (NEORCC), Sudbury, Ontario, between January 1st, 1998 and December 31st, 2003. Sickness absence data were obtained from employee attendance records and human resource databases. Logistic regression analyses were used to estimate the risk of high sickness absence (three or more absence events per year), high sickness absence duration (five or more days of absence per year), and high mean duration of absence (1.5 or more days absent per event). A Cox proportional hazards regression model, using duration of employment (in years) as the outcome measure (n=182), was used to estimate the risk of job separation at the NEORCC.

The highest rates of sickness absence were observed during the winter months (January to March) and lowest during the summer months (July to September) (p=0.001). The daily mean rate of sickness absence was lowest on Fridays and highest on Tuesdays, however the difference in sickness absence rates between the days of the week was non-significant. Low job level (odds ratio (OR)=2.54, 95% confidence interval (CI): 1.22-5.27) was associated with a significantly increased risk of sickness absence of three or more absence events per year. Male gender (OR=0.28, 95% CI: 0.13-0.60) and workers employed for a short-term period (less than five years) (OR=0.40, 95% CI: 0.22-0.72)

displayed a significantly lower risk of high sickness absence. Low job level (OR=3.38, 95% CI: 1.57-7.28) was associated with a significantly increased risk of sickness absence of five days or more per year. Male gender (OR=0.32, 95% CI: 0.15-0.70) and workers employed for a short-term period (less than five years) (OR=0.39, 95% CI: 0.21-0.71) had a significantly lower risk of sickness absence duration of five days or more per year. Low job level workers (OR=2.20, 95% CI: 1.01-4.81) had a significantly increased risk of high mean duration, that is, sickness absence of 1.5 days or more per absence event, compared to high job level workers. Clinical workers (OR=9.55, 95% CI: 2.03-44.95) and non-clinical workers (OR=6.01, 95% CI: 1.23-29.38) displayed a significantly increased risk of high mean duration sickness absence compared to administration workers. Workers employed for a short-term period (less than five years) had a significantly lower risk of high mean duration (OR=0.45, 95% CI: 0.25-0.82).

At the end of the study period, 62 (25%) employees had their job separated. Duration of employment from the start date of employment at the NEORCC ranged from 1.06 years to 30.13 years. The mean duration of employment in cancer care workers who remained employed at the NEORCC was 8.98 (SD 5.28) years. Permanent employment (OR= 0.21, 95% CI: 0.12-0.38) was associated with a significantly decreased risk of job separation.

Key words: workplace absenteeism, sickness absence, duration of employment, job separation, healthcare workers

Acknowledgements

I would like to thank Dr. Nancy Lightfoot, of the Regional Cancer Program, Sudbury Regional Hospital, for giving me the opportunity to work with her on this thesis project and providing me with leadership and support throughout the study. I would also like to thank the following people for their guidance and encouragement in this endeavor: Dr. Cameron Mustard, Dr. John Jamieson, Koop Alkema, Colin Berriault, Dr. Michael Conlon, and Dr. William Montelpare.

Table of Contents

List of Figures

List of Tables

Introduction

Workplace absenteeism is major concern of health care settings and organizations (Sibbald et al., 2002). Recent evidence has shown that healthcare workers are 1.5 times more likely to be absent from work due to illness and are generally less satisfied with their jobs than workers in other industries (Sibbald et al., 2002). High absenteeism rates can have devastating effects on the performance of an organization and the health and well being of employees, in terms of productivity, staff employment and replacement, and insurance costs (Roelen et al., 2006; and Libet et al., 2001). The direct costs to an employer during an absence include: sick pay inclusive of the continued payment of employment benefits (e.g., annual leave, pension, insurance, etc.), over-time, costs of over-staffing, management and administration costs, and loss of service provisions (e.g., closure of beds, failure to meet service demands or expectations, costs of recruitment, selection and training, etc.) (Johnson et al., 2003; and D'Souza et al., 2006). In addition, absenteeism increases the workload of other members of staff and presents performance morale issues, high stress levels, and a reduction in organizational efficiency, job satisfaction, and patient care quality (D'Souza et al., 2006; Johnson et al., 2003; Matrunola et al., 1996; Cancer Care Ontario, 2000; and O'Rourke et al., 2000). Workplace absenteeism has also been linked to increased rates of job separation and unemployment (Virtanen et al., 2006).

What is absenteeism?

Absenteeism has been defined as the "allocation of time across non-work activities when an individual is expected to be working (Goodman et al., 1984)." There

are many types of absence, including short-term absence (self-certified or medically certified), long-term sickness absence, unauthorized or persistent lateness, and authorized absences. The reasons for absence include, but are not limited to: sick-leave, annual leave, maternity leave, paternal leave, compassionate leave, bereavement leave, jury duty, educational leave, and paid leave. Sickness absence is a widely known problem and represents one of the most studied types of absence, yet it is the least understood (Eriksen et al., 2003; and Whitaker et al., 2001). Sickness absence refers to absences that are avoidable, habitual, and unscheduled (Statistics Canada, 2005). The dividing line between avoidable and unavoidable absence is difficult to distinguish because sickness absence is reflected not only by the severity of an illness, but by one's perception of ill health and both the ability and motivation to attend work (Becker et al., 1974; Luz and Green, 1997; and Kristensen, 1991). Researchers have described sickness absence as a consequence of ill health, a coping mechanism, a behaviour of social equity, a reaction to organizational injustice, and a consequence of exposure to adverse work-environmental factors (Borritz et al., 2006).

The importance

There is no single cause of sickness absence (Eriksen et al., 2003). Sickness absence is a complex phenomenon that is strongly influenced by various factors other than health (Whitaker, 2001). The causes may be simple, multiple, complex or inter-related (Eriksen et al., 2003; and Statistics Canada, 2005). Health care workers have to cope with a series of social, psychological, physical, organizational factors related to the job (Borritz et al., 2006; Eriksen et al., 2003; and Grunfeld et al., 2000). Stresses in the

health care field include: restructuring of the health care system, an increase in the number and complexity of cases, and a shortage of highly trained professionals (Grunfeld et al., 2000). High job demands, stress levels, and burnout have been associated with increased sickness absence and job turnover rates in health care workers (Grunfeld et al., 2000). The detrimental effects of high sickness absence to the performance of health care organizations, employee health and well-being, and patient quality of care have made it crucial to understand and determine predictors of workplace absenteeism.

Literature Review

A literature review was conducted to determine factors associated with workplace absenteeism. Factors that have been linked to increased rates of sickness absence occur at the macro level, organizational level, and individual level (see Table 1). This paper will examine various factors associated with sickness absence in the workplace, with a main focus in health care settings.

Table 1 Factors that can affect sickness absence (Whitaker, 2001; and Johnson et al., 2003).

Macro Level	Organizational Level	Individual Level
• climate/weather	• the nature of the industry	• age
• region	• working conditions	• gender
• epidemics	• job demands	• occupational status
• ethnic origin	• size of the enterprise	• education
• provision of health care services	• characteristics of the workforce	• job satisfaction
		• length of service
• social insurance systems	• workforce availability	• personality
• sickness certification practices	• industrial relations	• life crises
• taxation	• supervisory quality	• family responsibilities
• pensionable age	• personnel policies	• social support
• social attitudes	• labour turnover	• leisure activities
• economic climate	• shift work	• alcohol intake
• availability of alternative employment	• provision of occupational health services	• the health status of the individual
• unemployment		

Many of these factors have been investigated in a number of different occupational settings including: civil servants (Vahtera et al., 2000), municipal employees (Kivimaki et al., 2000; Nielsen et al., 2006; Vahtera et al., 2004; and Vahtera et al., 2000), post employees (Voss et al., 2003), mixed working populations (Christensen et al., 2005, Piirainen et al., 2003; Mohren et al., 2005; Krantz and Lundberg, 2006; D'Souza et al., 2006; Bultmann et al., 2005; Borritz et al., 2006; Lund et al., 2005; Andrea et al., 2006; and Labriola et al., 2006), and to a less extent, in health care settings and organizations (Virtanen et al., 2006; Ritchie et al; Kivimaki et al., 2000; and Eriksen et al., 2003).

At the macro level, researchers have investigated the impact of severe economic decline and industrial downsizing (Blank and Diderichsen, 1995; Vahtera et al., 1997; Kivimaki et al., 1997; and Kivimaki et al., 2000), unemployment (Knutsson and Goine, 1998), the impact of health promotion programs (Serxner et al., 2001), and the effect of infection control programs (Landstad et al., 2001; Makris et al., 2000; and Tremblay et al., 2005) on sickness absence in the workplace. From an organizational perspective, changes in the psychosocial work environment (Vahtera et al., 2000; Nielsen et al., 2006; and North et al., 1996), organizational change (Ferrie et al., 1998), working conditions (D'Souza et al., 2006), the relationship between job insecurity and work based support (D'Souza et al., 2006; and Virtanen et al., 2003), positive peer group interaction at work, and satisfaction with co-workers (Kivimaki et al., 2000) have been investigated. Factors associated with sickness absence at the individual level, such as: personality, job stress, performance and absenteeism, job satisfaction, working conditions, age, marital status, and gender have been studied (Arsenault and Dolan, 1983; Notenbomer et al., 2006; and

Blank and Diderichsen, 1995). In addition, the influence of psychosocial factors, social support, bullying, stress, burnout, and psychiatric morbidity have been considered (Grunfeld et al., 2000; Hanebuth et al., 2006; and Kivimaki et al., 2000).

Organizational Factors

Organization downsizing is associated with adverse health outcomes and has been shown to increase the risk of workplace absenteeism (Kivimaki et al., 2000; Vahtera et al., 1997; Burke and Greenglass, 1999; Vahtera et al., 2004; and Ferrie et al., 1998). In a longitudinal cohort study of 764 municipal employees of Raisio, Finland, Kivimaki et al. (2000) reported sickness absence rates (from all causes) two times higher (95% CI: 1.54-3.07) after major downsizing, that is, more than 18% reduction of the workforce in an employee's job category, than after minor downsizing, that is, a reduction of less than eight percent of the workforce in an employee's job category. Downsizing was associated with negative changes in work, a reduction in job control and social support, and an increase in job demands and job insecurity and accounted for 49% of the observed increase in sickness absence rates (Kivimaki et al., 2000). The risk of sickness absence has also been shown to vary according to individual factors, such as: age, socioeconomic status, health, place of work, and size and age structure of the staff (Vahtera et al., 1997; and Burke and Greenglass, 1999). In a longitudinal cohort study of 981 local-government employees of Raisio, Finland, increased rates of absenteeism were associated with age over 44 years, a large workplace, poor health before downsizing, and high income (Vahtera et al., 1997). A cross-sectional cohort study by Burke and Greenglass (1999) investigated the effects of hospital restructuring and downsizing in a sample of 1,362 full-

time and part-time nursing staff in Ontario. Full-time employees were more likely to be absent than part-time workers (p=0.001) (Burke and Greenglass, 1999). Full-time nurses also reported greater emotional exhaustion, poorer health, and a lower intention to quit in comparison to part-time nurses.

Adverse working conditions and the physical and psychosocial work environment have been associated with sickness absence (Nielsen et al., 2006; Lund et al., 2005; Trembley et al., 2005; Vahtera et al., 2000; and D'Souza et al., 2006). Extensive research has shown that high physical job demands involving heavy, arduous, and monotonous tasks are related to ill-health and an increased risk of sickness absence, and in many cases are gender specific (Notenbomer et al., 2006; Benavides, 2006; Roelen et al., 2006; Michie and Williams, 2003; Eriksen et al., 2003; Pirrainen et al., 2003; Ishizaki et al., 2006; D'Souza et al., 2006; Kivimaki et al., 2001; Bakker et al., 2001; and Kivimaki et al., 2001). A prospective study conducted by Labriola et al. (2006) associated high sickness absence with work environment exposures involving movements of the arms lifted or hands twisted (OR=1.35, 95% CI: 1.12-1.64), extreme bending or stooping of the back or neck (OR=1.53, 95% CI: 1.25-1.88), and repetitive monotonous work (OR=1.24, 95% CI: 1.00-1.54). The addition of health behaviour and employer characteristics to the model showed significant associations of high sickness absence with current (OR=1.63, 95% CI: 1.34-1.99) and former smoking (OR=1.32, 95% CI: 1.04-1.69), obesity (OR=1.69, 95% CI: 1.18-2.41), female gender (OR=1.32, 95% CI: 1.09-1.59), and increasing age (OR=1.02, 95% CI: 1.01-1.03) (Labriola et al., 2006). Differences in the work environment exposures accounted for 40% of the cases of high sickness absence (Labriola et al., 2006). In a longitudinal study of 2,628 employees of

Sweden Post, complaints about heavy lifting and monotonous movements increased the risk of high incidence of sickness absence in both men and women (Voss et al., 2001). For heavy lifting, an OR 1.70 (95% CI: 1.22-2.39) was reported for women and an OR 1.70 (95% CI: 1.20-2.41) for men (Voss et al., 2000). For monotonous movements, the risk estimates were OR 1.42 (95% CI: 1.03-1.97) and OR 1.45 (95% CI: 1.08-1.95) for women and men, respectively (Voss et al., 2000). Among women, the strongest association with high incidence of sickness absence was bullying at the workplace (OR=1.91, 95% CI: 1.31-2.77) (Voss et al., 2000). Among men, the strongest association with high incidence of sickness absence was for those who reported anxiety about reorganization of the workplace (OR=1.93, 95% CI: 1.34-2.77). The reporting of occupational health problems and symptoms, as well as illness and injury rates, are primarily a result of social and economic factors that affect women and men differently (Johnson et al., 2003).

Substantial evidence has associated low job control with sickness absence (Voss et al., 2001; Eriksen et al., 2003; Aronson, 1989; Kivimaki et al., 1997; Labriola et al., 2006; Ishizaki et al., 2006; Kondo et al., 2006; Nielsen et al., 2004; Nielsen et al., 2006; Christensen et al., 2005; and Vahtera et al., 2000). Factors associated with job control and sickness absence include: decision latitude, decision authority, predictability, and skill discretion (Nielson et al., 2006; Nielson et al., 2004; Christensen et al., 2005; Nielson et al., 2006; and Lund et al., 2005). In a case-control study of 447 hospital physicians (251 male and 196 female) and 466 controls (female head nurses and ward sisters), low opportunities for job control and poor teamwork were strong contributors of sickness absence among physicians, while a feeling of being overloaded was stronger in

the control group (Kivimaki et al., 2001). Problems in teamwork were associated with long-term absences (more than three days) in physicians more than any other work characteristic (Kivimaki et al., 2001). Feeling overloaded increased the risk of short-term absences (less than three days) in male physicians and increased the risk of short and long-term absences in the control group (Kivimaki et al., 2001). Nielsen et al. (2004) and Christensen et al. (2005) used previously collected data from the Intervention Project on Absence and Well-being (IPAW), a controlled intervention study of Denmark, to investigate the association of psychosocial work environment factors with sickness absence. The studies examined 52 Danish workplaces in three organizations: municipal care, technical services, and a pharmaceutical company with a two year follow-up period (Nielsen et al., 2004; and Christensen et al., 2005). Low job control, in terms of high predictability and low decision authority was associated with an increased risk sickness absence (Nielson et al., 2004; and Christensen et al., 2005). A prospective cohort study conducted by Nielsen et al. (2006) estimated the etiologic fraction associated with psychosocial work environment factors in relation to sickness absence. Psychological demands, decision authority, skill discretion, social support from colleagues or supervisors, predictability, and meaning of work were assessed (Nielsen et al., 2006). Low levels of decision authority (12%), social support (8%), psychological demands (29%), and predictability (5%) were significantly associated with sickness absence (Nielsen et al., 2006). Skill discretion, support from colleagues, and meaning of work were associated with sickness absence, but to a less extent (Nielsen et al., 2006). Low supervisor support, low predictability, low meaning at work, and high skill discretion predicted short periods of absence (one to ten working days) and high decision authority,

low supervisor support, low predictability, and high psychological demands predicted long periods of absence (more than ten days) (Nielsen et al., 2006). Substantial research has linked high emotional demand, role conflict, low reward, poor management quality, and low job satisfaction with high sickness absenteeism (Lund et al., 2005; Siu, 2002; O'Rourke et al., 2000; Haun et al., 2002; and Andrea et al., 2003).

Job strain has been associated with sickness absence (Kondo et al., 2006; and Ishizaki et al., 2006). In a prospective cohort study conducted by Ishizaki et al. (2006), high frequency sickness absence was associated with work environments of high stress, low job control, and low support. Work characteristics were assessed using the Job Content Questionnaire (JCQ) and the Generic Job Stress questionnaire (GJSQ) of the National Institute for Occupational Health and Safety. The study included 20,464 males and 3,617 female Japanese employees of nine different companies and factories (a light metal factory, three electrical manufacturing factories, two steel products factories, a heavy-metal products factory, an automobile plant, and a car products factory) (Ishizaki et al, 2006), with a two year follow up period. In a similar study, Kondo et al. (2006) administered the same JCQ questionnaire to 528 Japanese employees to assess the relationship between job strain and short-term sickness absence. Job strain was associated with increased risk of sickness absence, particularly, sickness absence of five days or longer per year (OR=3.02, 95% CI: 1.00-9.16).

Burnout is the result of an overload or lack or resources in the psychosocial work environment (Toppinen-Tanner et al., 2005). Studies have shown that high stress work environments are positively associated with sickness absence and high staff turnover rates (Toppinen-Tanner et al., 2005; and Borritz et al., 2006). In a cross-sectional study

of human service employees, conducted by Borritz et al. (2006), burnout was associated with an increased risk of sickness absence frequency and duration. Changes in burnout levels predicted changes in sickness absence such that decreases in burnout predicted a decrease in sickness absence. Similar results were shown for workers in health care settings (Grunfeld et al., 2000). In a cross-sectional study of 961 cancer care workers of eight regional Cancer Centres in Ontario, staff reported increased stress levels and burnout, and many were considering leaving or decreasing their work hours (Grunfeld et al., 2000). Interestingly, the physician group had the highest prevalence of psychosocial morbidity and components of burnout (Grunfeld et al., 2000).

Individual Factors

Age is considered to be a major determinant and predictor of sickness absence (Labriola, et al., 2006; Roelen et al., 2006; and Pirrainen et al., 2003). Research has indicated an inverse relationship between age and sickness absence frequency (Voss et al., 2001; Marmot et al., 1995; North et al., 1993; and Sharp et al., 1995). In a sample of 2628 employees of Sweden Post, employees in older age groups (31 to 40, 41 to 50, and greater than 50 years) had a significantly lower risk of high sickness absence, that is, two or more events of absence per year, than employees of the youngest age group (less than 31 years of age) (Voss et al., 2001). Conversely, sickness absence duration, that is, the total number of days of absence per person, has been positively associated with age (Labriola et al., 2006; Sharp et al., 1995; Blank et al., 1995; and Nielsen et al., 2006). Illness or disability represents the main health complaint and reason for absences among workers of increasing age (Labriola et al., 2006; and Statistics Canada, 2005).

The relationship between gender and sickness absenteeism has been largely shown in studies of National Health Service employees and workers in different employment sectors. Research has shown that females are more likely to experience sickness absence than males (Ritchie et al., 1999; Nielsen et al., 2006; Mastekaasa and Olsen, 1998; Ishizaki et al., 2006; Lana et al., 2005; Labriola et al., 2006; Pirrainen et al., 2003; Voss et al., 2001; and Nielson et al., 2006). The difference in the rates of sickness absence between the genders is related to biological differences, working conditions, the dependence of children, pregnancy, maternity leave, and family responsibilities associated with female roles (Statistics Canada, 2005; Johnson et al., 2003; and Akerlind et al., 1996).

There is some evidence to suggest that marital status and the presence of dependent children are associated with sickness absenteeism (Kivimaki et al., 2001; Ishizaki et al., 2006; Nielsen et al., 2006; and Statistics Canada, 2005). In a cross-sectional study of 20,464 male and 3,617 mixed Japanese employees, male divorced workers had a significantly increased risk of high sickness absence (six days or more per year) (OR=2.22, 95% CI: 1.62-3.04), compared to married, single, and widowed employees (Ishizaki et al., 2006). Nielsen et al. (2006) surveyed 2,730 mixed employees of 52 Danish worksites in Demark, which included three organizations: a pharmaceutical company, municipal workplace, and technical services of the municipality. Couples with children under the age of seven years had the highest risk (OR=6.38, 95% CI: 5.86-6.90) of short-term absence, that is, an absence duration of one to ten days per absence event, whereas single parents had the highest risk (OR=0.42, 95% CI: 0.27-0.57) of long-term absence, that is, an absence duration of more than ten days per absence event, than other

family types (i.e., single with no children, couple with no children, couple with children over seven years of age, and couple with children under seven years of age) (Nielsen et al., 2006). Cohabitating parents with children above the age of seven years had the lowest risk of both short (OR=4.77, 95% CI: 4.35-5.18) and long-term absence (OR=0.25, 95% CI: 0.17-0.32) (Nielsen et al., 2006).

Smoking (Labriola et al., 2006; Ishizaki et al., 2006; Lana et al., 2005; and Eriksen et al., 2003), alcohol consumption (Ishizaki et al., 2006), and physical health (Labriola et al., 2006; and Eriksen et al., 2003) have been related to sickness absenteeism. Current and former smokers have an increased risk of sickness absence compared to individuals who have never smoked (Labriola et al., 2006; Ishizaki et al., 2006; Lana et al., 2005; and Eriksen et al., 2003). In a case control study of 292 health care workers of the Canary Islands, Spain, the risk of sickness absence was 50% higher in smokers (OR=1.51, 95% CI: 1.06-2.14) than in non-smokers (Lana et al., 2005). In a prospective study of 4,556 mixed Danish workers, both current (OR=1.61, 95% CI: 1.32-1.96) and former smokers (OR=1.32, 95% CI: 1.03-1.68) displayed an increased risk of high sickness absence, that is, more than 6 days absent (Labriola et al., 2006). Labriola et al. (2006) also demonstrated an increased risk of sickness absence (OR=1.57, 95% CI: 1.09-2.25) among obese employees (body mass index (BMI) over 30%. A lower risk of sickness absence was associated with individuals with lower BMI's and those who engaged in regular aerobic or gym activity (Eriksen et al., 2003; and Labriola et al., 2006). The relationship between sickness absence and alcohol consumption was demonstrated in a study of 20,464 male and 3,617 female mixed Japanese workers (Ishizaki et al., 2006). Alcohol consumption was calculated in terms of ethanol volume

consumed per week; individuals who consumed less alcohol (i.e., one to 350 grams per week) had lower rates of sickness absence than workers who drank excessively (i.e., more than 350 grams per week) (Ishizaki et al., 2006).

Employment status and type, in terms of full-time, part-time, permanent, and or temporary employment, have been related to sickness absence. A prospective cohort study of sickness absence among 12,900 employees of four National Health Service trusts of the United Kingdom revealed higher rates of sickness absence among full-time workers compared to part-time workers (Ritchie et al., 1999). Permanent employees had higher rates of sickness absence and were more likely to be absent from work than temporary or fixed-term employees (Virtanen et al., 2006; Ritchie et al., 1999; Ferrie et al., 1998; Virtanen et al., 2003; Knutsson and Goine, 1998; and North et al., 1996), and the presence of a union, benefits, and job security are often of significance in this context (Statistics Canada, 2005). In a prospective cohort study of 19,093 temporary and 41,530 permanent public sector employees in Finland, temporary employees with high sickness absence were at the highest risk of immediate unemployment and unemployment three years later (Virtanen et al., 2006).

Several occupational studies have demonstrated an inverse association between socioeconomic status and sickness absence (Allebeck and Mastekaasa, 2004; North et al., 1993; Pirrainen et al., 2003; Ishizaki et al., 2006; Nielsen et al., 2006; and Kujala et al., 2006). A longitudinal study of 1,524 blue-and white-collar employees in a German manufacturing plant revealed that the total days of sickness absence were doubled for workers in the below median income range (less than 3000€) than for workers above the median income range (more than 3000€) (Hanebuth et al., 2006).

A number of studies have shown variations in sickness absence by industry (Ishizaki et al., 2006; Pirrainen et al., 2003; Kivimaki et al., 2001; Vaananen et al., 2004; and Melchoir et al., 2005). In a cross-sectional study of 4,209 mixed occupations (i.e., technical and scientific work, health and social work, managerial, administrative and clerical work, commercial work, agricultural work, transport and communication work, construction work, electrical and manufacturing work, industrial work, and service work) in Finland, industrial workers and health and social care workers reported the highest rates of sickness absence (more than five days of absence per year), whereas commercial occupations reported the lowest (Pirrainen et al., 2003). Sickness absence increased according to organizational size (Pirrainen et al., 2003).

Several occupational studies have indicated an inverse relationship between sickness absence and occupational grade (Ishizaki et al., 2006; Pirrainen et al., 2003; and Kivimaki et al., 2001). A longitudinal study of 8,847 men and 2,886 women, from the French Gazel Cohort study of a National Gas and Electricity Company in France, revealed absence rates two times higher in manual workers (95% CI: 1.63-2.62) and office clerks (95% CI: 2.21-3.44) than managers (Melchoir et al., 2005). Men were more likely to work as manual workers, report numerous postural complaints, and report absence due to musculoskeletal problems; whereas women were more likely to work in white collar jobs, suffer from work-related stress, and display susceptibility to psychiatric sickness absence (Melchoir et al., 2005). In a prospective study of 12,900 health care workers of four National Health Service trusts in the United Kingdom, medical and dental staff were shown to have the lowest frequency rates of absence and lowest number of absence events (Ritchie et al., 1999). The longest mean duration per absence event was

experienced by ancillary staff and the shortest by laboratory and estate and pharmacy staff (Ritchie et al., 1999). Long-term absence, that is, more than seven days, was most frequent among maintenance staff and least among pharmacy staff (Ritchie et al., 1999). Short-term absence, that is, less than seven days, was apparent for all occupations (Ritchie et al., 1999).

There has been some evidence to suggest that employees may lengthen their weekends by voluntary absenteeism (Libet et al., 2001; Chadwick-Jones et al., 1973, and Vahtera et al., 2001), a phenomenon known as blue Monday absence, recuperation absence, or extended weekend absence (Muchinsky, 1977; and Eisenberger, 1989). In a prospective study of 27,541 permanent full-time municipal employees of Finland, employees had an increased risk of sickness absence on Mondays (OR=1.44, 95% CI: 1.40-1.47) and Fridays (OR=1.87, 95% CI: 1.83-1.91) than any other day of the week. The research surrounding these findings is controversial and few studies have accounted for variability in daily variation of absence due to shift work and social contextual influences (e.g., incidence of pay day, weekend social habits, etc.).

Limitations and Methodological Problems

The review of literature covered a wide range of factors associated with sickness absence among different occupational groups and employment sectors (i.e., civil servants, industrial workers, municipal employees, post workers, mixed occupations, etc.), however is limited in empirical evidence attempting to relate various factors associated with sickness absence and duration of employment in health care workers. Much of the research lacked generalization due to inconsistent results and the methodology utilized.

Methodological considerations included: the study design (e.g., longitudinal, cross-sectional, etc.), the data collection tool utilized (e.g., questionnaire, employer registers, employee attendance records, etc.), the sample size, the outcome measure utilized (e.g., sickness absence frequency, sickness absence duration, mean duration, etc.), and the type of analysis utilized (e.g., Poisson regression, Logistic regression, Cox proportional hazards, etc.). Cross-sectional or longitudinal study designs are commonly used in studies of sickness absence, however are inappropriate to identify causal relationships (Whitaker et al., 2001). Questionnaire data have the advantage of providing a description of the sample and are useful in understanding relationships and causal processes, however are limited to the questions addressed, self report, and recall bias (Matrunola et al., 1996). Other data collection tools include: employer registers and large human resource databases which have reduced bias in comparison to questionnaire data, but are dependent on the employer having a reliable registration system (Ritchie et al., 1999). Other common limitations of sickness absence studies are a small sample size and heterogeneous sample, both of which reduce generalization of results to larger populations and become problematic when attempting to make comparisons across studies (Matrunola et al., 1996). A prominent problem in research concerning sickness absence is the large number of different outcome measures (e.g., frequency, incidence, duration, mean duration, absence rate, etc.) and variation in terminology used by different authors (Alexanderson et al., 2004; and Borg et al., 2006). In the literature, the most common way to measure sickness absenteeism was by the sickness absence rate, that is, the total number of sickness days divided by the number of people or person-days in the study group. This measure has been shown to have major disadvantages, in particular,

isolated cases of long sickness absence can have a major impact on results especially if the study group is small (Voss et al., 2001). As a result, there is substantial variation in sickness absence rates according to various factors across studies. Despite the importance and magnitude of the problem of workplace absenteeism, there is a paucity of scientific evidence identifying various factors as predictors of workplace absenteeism and duration of employment, especially in the area of health care workers. More research is needed in health care settings and organizations which adhere to minimum scientific standards, such as adequate study design, sufficiently large samples, and valid outcome measures.

The Present Study

The aim of this study is to identify predictors of workplace absenteeism, workplace duration of absenteeism, and duration of employment in cancer care workers employed at the NEORCC, in Sudbury, Ontario over a six year period.

Objectives

Major Objective

- To identify predictors of workplace absenteeism and duration of employment in cancer care workers

Specific Objectives

- To determine the risk of high sickness absence according to a variety of sociodemographic and work-related factors

- To determine the risk of high sickness absence duration according to a variety of sociodemographic and work-related factors

- To determine the risk of high mean duration sickness absence according to a variety of sociodemographic and work-related factors

- To identify patterns in sickness absence by season

- To identify patterns in sickness absence by day of the week

- To determine the risk of job separation according to age, gender, employment type, job level, sub-program, and sickness absence

Methods

Ethics and Privacy Confidentiality

The research protocol was written by Dr. N. Lightfoot and was approved through the Tri-Council Research Ethics Board of the Sudbury Regional Hospital. Voluntary consent for participation of NEORCC employees in the study was obtained via email prior to commencement of the study. Employees of NEORCC received an email regarding passive consent for the study which outlined: the purpose of the research study, the researchers involved, and the rights of study participants. Employees who did not wish to participate in the study or those who wanted to withdraw from the study at any time were required to email the executive assistant of human resources. All individual information was stored in locked cabinets behind locked doors when not in use at the NEORCC. Data were held in a secure, stand-alone database which was password protected behind firewalls. All investigators and research assistants associated with this study were required to sign oaths of confidentiality.

Study Participants

The inclusion criteria used were cancer care workers of the NEORCC with twelve months cumulative work experience or more between January 1st, 1998 and December 31st, 2003. Only employees eligible for benefits (including sick leave) were included in the study (i.e., 0.6 full-time equivalents or more). Summer students, graduate students, doctoral students, and other students were excluded. We identified 285 cancer care workers employed by Cancer Care Ontario of the NEORCC, Sudbury, Ontario, between January 1st, 1998 and December 31st 2003. Those having less than twelve months

cumulative work experience ($n=25$) and workers no longer considered employees of NEORCC ($n=6$) were excluded. Ten employees did not give consent to participate in the study. The final study group consisted of 244 employees.

Data collection

Employee attendance records were used to retrieve the following information: employee identification number, occupational title, job level, employment type (permanent or temporary), sub-program, date of employment commencement, reason for absence (i.e., paid leave, sick leave, paid vacation, statutory holiday, educational leave, bereavement leave, jury duty, days absent from work for a work-related health condition compensated by the Ontario Workplace Safety and Insurance Board, unpaid leave of absence, unpaid sick leave, floater holiday, maternity leave, Christmas, and paid union business), season and day of the week the absence occurred, start and end dates of absence, percentage of hours worked per week, and the total number of hours away for each absence between January 1st, 1998 and December 31st, 2003. Employee identification numbers were used to link employee information (i.e., date of birth, gender, and employment separation (where applicable)) from human resource databases and personnel files to the dataset.

Occupational titles were used to categorize employees of various occupations into one of three sub-programs: clinical, non-clinical, and administration. Job level (nine to thirty-one), based on income and employment grade, was dichotomized as follows: low job level (nine to sixteen, less than $60,000) and high job level (17 to 31, more than $60,000). Low job level workers included support workers, supervisors, and

professionals. High job level workers included directors, managers, professionals, provincial directors, senior managers, and senior professionals. Percentage of hours worked was used to determine employment status: 0.6 full-time equivalent or greater represented 'part-time' employment and 1.00 full-time equivalent represented 'full-time' employment. Age at first absence was calculated using date of birth. Duration of employment was calculated from the start date of employment until job separation at the NEORCC or the end of the study period, whichever came first. Duration of employment was dichotomized as follows: zero to five years represented 'short-term' employment and more than five years represented 'long-term' employment.

In accordance with existing hospital regulations, each employee absence must be forwarded to employers, listing start and end dates, to be recorded in the attendance records. Short-term absences (three days or less) are self-reported by employees who indicate the duration and reason for absence to their supervisor. Absences exceeding three days require a medical certificate from a physician. For each participant, recurrent absences within five days of another absence were considered the same event. For season, any absence that extended over two seasons was recorded as the season in which the absence began.

To determine seasonal variation trends, calendar months were grouped into four three-month seasons. The seasons were defined as follows: January to March represented 'winter,' April to June represented 'spring,' July to September represented 'summer,' and October to December represented 'fall.' Total days of sickness absence for each study participant were aggregated by each three-month period and used to calculate the mean sickness absence (days) by season.

For each study participant, we calculated the total number of sickness absence events separately for each day of the week an absence occurred. The dependent variable was the mean number of absence events per day of the week away, irrespective of duration.

The duration of employment for each study participant was calculated from the first date of employment at the NEORCC, in years. The occurrence of job separation between January 1st, 1998 and December 31st, 2003 was defined as an event. Date of birth was used to calculate the age of employees (n=244) at commencement of employment. All of the participants' sickness absences between January 1st, 1998 and December 31st, 2003 were included. The independent variables considered were: gender, age, employment type, job level, sub-program, and sickness absence (duration and frequency).

Definitions

Three measures of sickness absence (sickness absence, sickness absence duration, and mean duration of sickness absence) were calculated and have been used in earlier research to define sickness absence (Viratnen et al., 2006; Seccombe, 1995; Bakker et al., 2003; and Ritchie et al., 1999).

An average measure of sickness absence was calculated as follows: [total number of absence events during the study period/total number of contracted days during the study period] x 365 days. The number of contracted days represented 'days at risk' during the study period. From this measure, the number of days absent for reasons other than sickness (e.g., sick-leave, annual leave, maternity leave, paternal leave,

compassionate leave, bereavement leave, jury duty, educational leave, and paid leave), were subtracted (Virtanen et al., 2006). The distribution of values was dichotomized as follows: zero to three events represented 'low' sickness absence and three or more events represented 'high' sickness absence. Sickness absence calculated the average number of absence events per person per year over the study period, regardless of the length of each absence.

Sickness absence duration is the total length of time an individual is absent over a specified period of time, regardless of the number of absence events (Bakker et al., 2003). Absence duration is a crude measure of sickness absence and is used to highlight patterns of absence that many warrant further examination. (Bakker et al., 2003). An average duration of sickness absence per year was calculated as follows: [total number of sickness absence days during study period/number of contracted days worked during study period] x 365 days (Virtanen et al., 2006). The distribution of values was dichotomized: zero to five days of absence per year represented 'low' sickness absence duration and five or more days of absence per year represented 'high' sickness absence duration. This threshold value has been used in earlier research to identify patterns of duration in sickness absence (Kondo et al., 2004).

Mean duration of sickness absence is defined as the average length of time an employee is absent per absence event (Ritchie et al., 1999). This measure encompasses both frequency and duration measures and serves to identify patterns of short and long-term periods of absence. For each employee, we calculated the mean duration of absence as follows: total number of sickness absence days/total number of absence events. The distribution of values was dichotomized: zero to 1.5 days represented 'low' mean

duration sickness absence, 1.5 or more days represented 'high' mean duration sickness absence.

Statistical Analysis

Statistical analyses were conducted with the Statistical Package for Social Sciences (SPSS) version 12.0. Descriptive statistics of sickness absence according to sociodemographic and work-related factors were computed for each study participant. Univariate analyses were performed using the Pearson chi-square test and the Fisher's exact two-tailed test. Continuous variables were categorized. We collapsed categories with few cases (less than five), or zero cells, to increase the number of cases in the categories of the independent variables, as suggested by Hosmer and Lemeshow (2000). This was done to prevent undesirable numerical outcomes from occurring (i.e., wide confidence intervals) in the logistics regression analysis (Hosmer and Lemeshow, 2000). Multivariate logistic regression models were built using the traditional approach which included any variable whose univariate test had a p-value <0.05 and all variables of known clinical importance in the final model (Hosmer and Lemeshow, 2000). The rationale for minimizing the number of variables in the model is that the resultant model is more likely to be numerically stable and is more easily generalized (Hosmer and Lemeshow, 2000). Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated using logistic regression analysis to estimate the risk of high sickness absence frequency, duration, and mean duration according to sociodemographic and work-related factors. We also considered various interactions of sociodemographic and work-related factors.

Seasonal and Daily Variation

Percentiles and frequency distributions of sickness absence were computed by season (four three-month periods) and day of the week (Monday to Friday) and were expressed using the mean and standard error. Analysis of Variance (ANOVA) was used to compare the effects of seasonal and daily variation in sickness absence. Levene's test of homogeneity of variance was performed to test for differences in the variance of the population (Basant, 2002). The Scheffé Post Hoc procedure was used to compare the mean difference in sickness absence within season and days of the week (Basant, 2002).

Duration of employment

Simple frequencies and percentages were generated for employees whose job was separated from NEORCC and for workers who remained employed at the NEORCC. Univariate analyses were performed using the Pearson Chi-Squared test, Fisher's exact two-tailed test, and the independent sample *t*-test for comparing the means. Cox proportional hazards regression analysis was performed to estimate the risk of job separation in cancer care workers employed at the NEORCC and to identify factors associated with an employee's likelihood of remaining at the NEORCC. The final model was examined for interaction effects.

Results

Valid data for sickness absence was obtained for 244 employees, whose mean age was 38.6 ± 8.1 years. In total, 3,982 sickness absence events (paid and unpaid sick leave) were recorded, with 8,020.58 workdays absent over the entire study period. Paid sick-leave accounted for 98.4% of total sickness absence events. On average, cancer care workers reported 3.93±3.20 absence events per year and 7.62±9.08 sickness absence days per year. Each absence event had a mean duration of 2.19±6.08 days per absence event. Nine percent of workers had no recorded sickness absence. A sub-analysis was performed to determine characteristic differences among workers with no recorded sickness absence versus employees with at least one sickness absence over the study period, however the results were insignificant.

The distribution of sociodemographic and work-related characteristics of the study participants, recorded at baseline appear in Table 2. The majority of employees were less than 40 years of age and were female. The majority of employees were permanent employees, full-time workers, clinical workers, low job level workers, and were employed at the NEORCC for more than five years. The mean duration of employment was 8.4 ± 5.3 years.

Table 2 Sociodemographic and work-related characteristics of the study participants (n=244 cancer care workers)

Characteristic	Participants *n* (%)
Age (years)	
<40	136 (55.7)
40+	108 (44.3)
Gender	
Male	55 (22.5)
Female	189 (77.5)
Employment type	
Permanent	191 (78.3)
Temporary	53 (21.7)
Employment status	
Part-time	35 (14.3)
Full-time	209 (85.7)
Job level	
Low	184 (75.4)
High	58 (24.6)
Sub-program	
Clinical	146 (59.8)
Non-Clinical	79 (40.2)
Administration	19 (7.8)
Employment duration (years)	
<5	93 (38.1)
5 +	151 (61.9)

Predictors of sickness absence: univariate analysis

The distribution of high sickness absence for sociodemographic and work-related factors appears in Table 3. Younger employees (less than 40 years of age) (p= 0.01) and low job level workers (p=0.00) were significantly associated with sickness absence of three or more events per year. Males were less likely to have high sickness absence (p= 0.00) compared to females. Workers employed at NEORCC for a long-term period (five years or more) were associated with high sickness absence (p=0.01) compared to workers employed at NEORCC for a short-term period (less than five years). High frequency sickness absence was more common in permanent employees versus temporary employees, full-time workers versus part-time workers, and clinical and non-clinical

workers versus administrative workers, however the association was not statistically significant.

Table 3 High sickness absence (sickness absence of three or more events per year) versus low sickness absence (less than three events per year): univariate analyses of sociodemographic and work-related factors (*n*=244)

Variable	High sickness absence		Low sickness absence	
	n	%	n	%
Age *				
<40	82	63.1	53	46.9
40+	48	36.9	60	53.1
Gender *				
Male	14	10.8	41	36.3
Female	116	89.2	72	63.7
Employment type				
Permanent	106	81.5	84	74.3
Temporary	24	18.5	29	25.7
Employment status				
Part-time	15	11.5	20	17.7
Full-time	115	88.5	93	82.3
Job level *				
Low	114	87.7	70	63.1
High	16	12.3	41	36.9
Sub-program				
Clinical	81	62.3	64	56.6
Non-Clinical	38	29.2	41	36.3
Administration	11	8.5	8	7.1
Employment duration * (years)				
<5	39	30.0	53	46.9
5+	91	70.0	60	53.1

* Significant results ($p < 0.05$), by Fisher's exact two-tailed test or Pearson's chi-square test.

Table 4 displays the distribution of high sickness absence duration for sociodemographic and work-related factors. Permanent employment ($p = 0.03$) and low job level workers ($p = 0.00$) were significantly associated with high sickness absence duration of five days or more per year. Males were less likely to have high sickness absence duration ($p=0.00$) compared to females. Workers employed at NEORCC for a long-term period (five years or more) were significantly associated with high sickness absence duration ($p=0.001$) compared to workers employed for a short term period, that

is, less than five years duration. High sickness absence duration was more common among younger employees, that is, less than 40 years of age, and for clinical and non-clinical workers versus administrative workers, and less common among part-time versus full-time, however the associations were not statistically significant.

Table 4 High sickness absence duration (sickness absence of five days or longer per year) versus low sickness absence (less than five days of absence per year): univariate analyses of socio-demographic and work-related factors (*n*=244)

Variable	High sickness absence duration		Low sickness absence duration	
	n	%	n	%
Age (years)				
<40	73	60.8	63	50.8
40+	47	39.2	61	49.2
Gender *				
Male	12	10.0	43	34.7
Female	108	90.0	81	65.3
Employment type *				
Permanent	101	84.2	90	72.6
Temporary	19	15.8	34	27.4
Employment status				
Part-time	13	10.8	22	17.7
Full-time	107	89.2	102	82.3
Job level*				
Low	107	89.2	77	63.1
High	13	10.8	45	36.9
Sub-program				
Clinical	73	60.8	73	58.9
Non-Clinical	38	31.7	41	33.1
Administration	9	7.5	10	8.1
Employment duration (years) *				
<5	33	27.5	60	48.4
5 +	87	72.5	64	51.6

* Significant results ($p< 0.05$), by Fisher's exact two-tailed test or Pearson's chi-square test.

The distribution of high mean duration sickness absence for sociodemographic and work-related factors is shown in Table 5. Males were less likely to have high sickness absence averaging more than 1.5 days of absence per event (p=0.003). High mean duration sickness absence was associated with permanent employment (p=0.003) and low job level workers (p=0.009), and more common in clinical and non-clinical workers (p=0.003) than administrative workers. Workers employed for a long-term

period (five years or more) were significantly associated with a high mean duration sickness absence (p=0.002) compared to workers employed for a short-term period. High mean duration of sickness absence was less common among younger workers and part-time employees, however the associations were not statistically significantly.

Table 5 High mean duration sickness absence (sickness absence of 1.5 days or more per absence event) versus low mean duration sickness absence (less than 1.5 days per absence event): univariate analyses of sociodemographic and work-related factors (*n=244*)

Variable	High mean duration sickness absence		Low mean duration sickness absence	
	n	%	n	%
Age (years)				
<40	51	49.0	85	60.7
40+	53	51.0	55	39.3
Gender *				
Male	14	13.5	41	29.3
Female	90	86.5	99	70.7
Employment type *				
Permanent	91	87.5	100	71.4
Temporary	13	12.5	40	28.6
Employment status				
Part-time	12	11.5	23	16.4
Full-time	192	88.5	117	83.6
Job level*				
Low	88	84.6	96	69.6
High	16	15.4	42	30.4
Sub-program *				
Clinical	72	69.2	74	52.9
Non-Clinical	30	28.8	49	35.0
Administration	2	1.9	17	12.1
Employment duration (years) *				
<5	28	26.9	65	46.4
5 +	76	73.1	75	53.6

* Significant results (p< 0.05), by Fisher's exact two-tailed test or Pearson's chi-square test.

Predictors of sickness absence: multivariate analyses

The ORs and 95% CIs of high sickness absence for sociodemographic and work-related factors are shown in Table 6. Younger employees, that is, those less than 40 years of age (OR=2.17, 95% CI: 1.21-3.87) and low job level workers (OR=2.54, 95% CI: 1.22-5.27) were associated with a significantly increased risk of sickness absence of more than three events per year. Males had a significantly lower risk of sickness absence

(OR=0.28, 95% CI: 0.13-0.60) compared to females. Workers employed at the NEORCC for a short-term period (less than five years) displayed a significantly lower risk of high sickness absence (OR=0.40, 95% CI: 0.22-0.72) than workers employed for a long-term period, that is, more than five years duration.

Table 6 High sickness absence (sickness absence of three events or more per year): multivariate analyses of socio-demographic and work-related factors (n=244)

Variable	High sickness absence	
	OR	**(95% CI)**
Age (years)		
<40	2.17	(1.21-3.87)
40+	1	
Gender		
Male	0.28	(0.13-0.60)
Female	1	
Job level		
Low	2.54	(1.22-5.27)
High	1	
Employment Duration (years)		
<5	0.40	(0.22-0.72)
5+	1	

Abbreviations: OR = odds ratio; 95% CI = 95% confidence interval.

Table 7 displays the ORs and 95% CIs of high sickness absence duration for sociodemographic and work-related factors. Low job level workers (OR=3.38, 95% CI: 1.57-7.28) had a significantly increased risk of sickness absence of more than five days per year. Male gender (OR=0.32, 95% CI: 0.15-0.70) and workers employed for a short-term period (less than five years) (OR=0.39, 95% CI: 0.21-0.71) displayed a significantly lower risk of sickness absence duration of five days or more per year. Younger employees, that is, those less than 40 years of age, and permanent employees were associated with an increased risk of high sickness absence duration, however the results were non-significant.

Table 7 High sickness absence duration (sickness absence of five days or longer per year): multivariate analyses of socio-demographic and work-related factors (*n=244*)

Variable	High sickness absence duration	
	OR	**(95% CI)**
Age (years)		
<40	1.70	(0.95-3.07)
40+	1	
Gender		
Male	0.32	(0.15-0.70)
Female	1	
Employment Type		
Permanent	1.93	(0.95-3.92)
Temporary	1	
Job Level		
Low	3.38	(1.57-7.28)
High	1	
Employment Duration (years)		
<5	0.39	(0.21-0.71)
5+	1	

Abbreviations: OR = odds ratio; 95% CI = 95% confidence interval.

The ORs and 95% CIs of high mean duration sickness absence according to sociodemographic and work-related factors are shown in Table 8. Low job level workers (OR=2.20, 95% CI: 1.01-4.81) had a significantly increased risk of sickness absence averaging more than 1.5 days of absence per event. Clinical workers (OR=9.55, 95% CI: 2.03-44.95) and non-clinical workers (OR=6.01, 95% CI: 1.23-29.38) had a significantly increased risk of high mean duration sickness absence compared to administrative workers but the confidence intervals are very wide. Permanent employees displayed an increased risk of high mean sickness absence duration, and younger employees (less than 40 years of age) and male gender displayed a decreased risk of high mean duration sickness absence, however the results were not statistically significant.

Preliminary analyses showed no interaction between age, gender, job contract, job level, or subprogram in any of the final logistic regression models.

Table 8 High mean duration sickness absence (mean sickness absence of 1.5 days or more per absence event): multivariate analyses of socio-demographic and work-related factors (*n=244*)

Variable	High mean duration sickness absence	
	OR	**(95% CI)**
Age (years)		
<40	0.67	(0.37-1.20)
40+	1	
Gender		
Male	0.47	(0.22-1.03)
Female	1	
Employment Type		
Permanent	2.11	(0.99-4.51)
Temporary	1	
Job Level		
Low	2.20	(1.01-4.81)
High	1	
Subprogram		
Clinical	9.55	(2.03-44.95)
Non-Clinical	6.01	(1.23-29.38)
Administration	1	
Employment duration (years)		
<5	0.45	(0.25-0.82)
5+	1	

Abbreviations: OR = odds ratio; 95% CI = 95% confidence interval.

Seasonal variation

Mean absence rates by season are shown in Figure 1. The highest rates of sickness absence were observed during the winter months (January to March), and lowest during the summer months (July to September) (t=5.72, p=0.001). The Scheffé Post Hoc procedure identified significant difference within the months of winter and summer (p=0.001) and for winter and fall months (p=0.045). There was no significant difference in sickness absence within the winter and spring months.

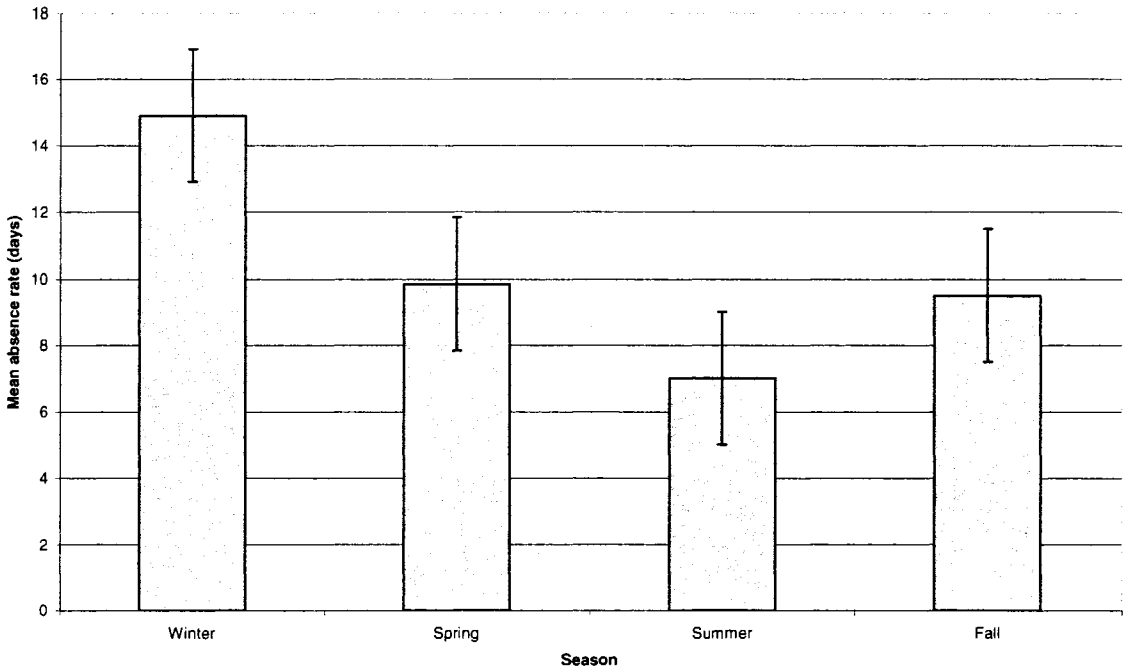

Figure 1 Seasonal variation in sickness absence, expressed as the mean (days) and standard error in cancer care workers over the six year period

Daily variation

Mean absence rates by day of the week are shown in Figure 2. A total of 4,943 days of sick leave (paid and unpaid) were taken between Monday and Friday. Daily variation in sickness absence was as follows: 1044 Mondays (20.1%), 1056 Tuesdays (20.3%), 981 Wednesdays (18.9%), 952 Thursdays (18.3%), and 910 Fridays (17.5%). Only 0.5% of sickness absences occurred on Saturday and Sunday indicating that weekend work was a rare exception. Absences lasting one or more weeks accounted for 3.8% of total sickness absences. One-way ANOVA was used to explore the difference in absence rates by day of the week the absence occurred. The daily mean rate of sickness absence was lowest on Fridays after which it increased and peaked on Tuesdays (Figure 2). Absence rates declined on Wednesday and were similar for the remainder of the

week. There was no significant difference in sickness absence rates between days of the week (t=0.76, p=0.55).

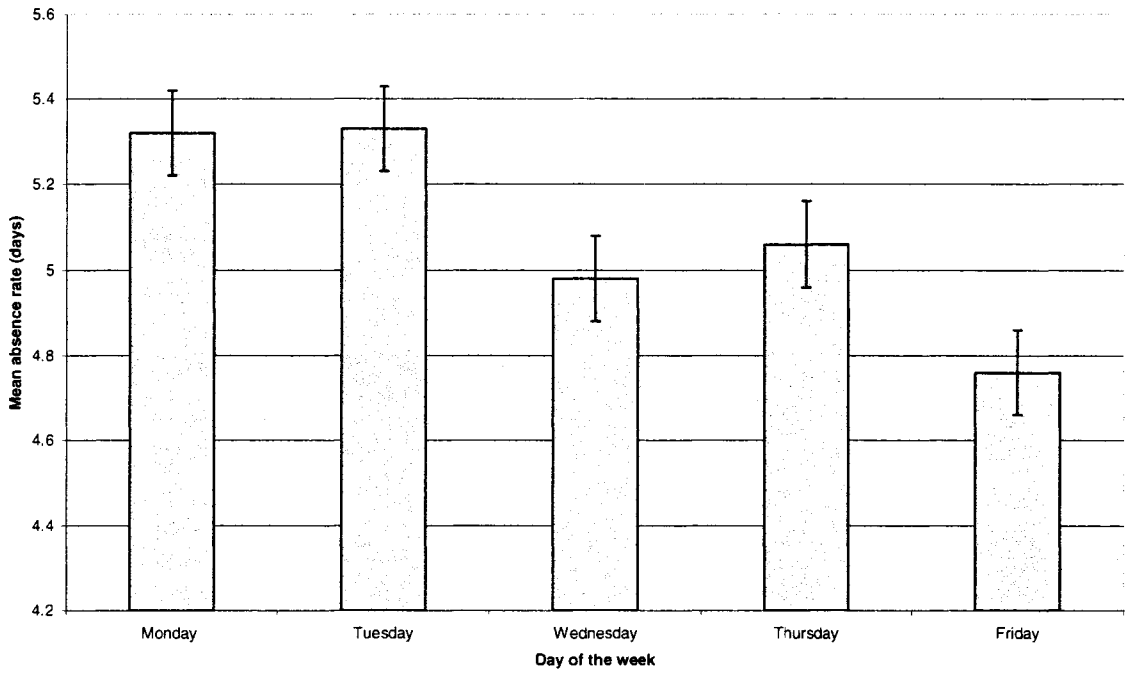

Figure 2 Daily variation in sickness absence, expressed as the mean (days) and standard error in cancer care workers over the six year study period

Predictors of Duration of Employment

Valid data were available for 244 cancer care workers of the NEORCC between January 1st, 1998 and December 31st, 2003. At the end of the study period, 62 (25%) employees had their job separated and 182 (75%) remained employed. The mean follow-up period for workers who remained employed at the NEORCC was 8.98 (SD 5.28), with a minimum follow-up period of 1.06 years and a maximum of 30.13 years.

Employee characteristics by duration of employment (job separation versus currently employed) are presented in Table 9. The gender distribution of employees was predominately female in both the job separated and employed group. The mean age at commencement of employment at the NEORCC was 34.02 (SD 6.93) years (range:

16.73-47.91 years) for employees whose job was separated, and 33.90 (SD 7.41) years (range: 20.77-53.63 years) for workers who remained employed. The majority of workers were permanent employees versus temporary employees, low job level workers versus high job level workers, and clinical workers compared to administrative workers in the respective groups. High sickness absence duration (sickness absence of five days or more), in comparison to low sickness absence duration (less than five days sickness absence), was more common among employees whose job was separated than workers who remained employed. Employees whose job was separated displayed a higher proportion of employees with high sickness absence frequency (three or more absence events per year) versus low sickness absence frequency (less than three absence events per year). For the data presented in Table 9, significant differences in the duration of employment (job separation versus currently employed) were only noted for employment type ($p=0.02$) and job level ($p=0.04$). Temporary employment was significantly higher among workers whose job was separated compared to workers who remained employed at the NEORCC. Low job level workers were significantly greater in the job separated group versus high job level workers. .

Table 9 Duration of employment: employee characteristics (total n=244 cancer care workers of NEORCC)

Group	Job separation (n=62)		Currently employed (n=182)	
	n	%	*n*	%
Male	17	27.4	38	20.9
Female	45	72.6	144	79.1
Mean age (years) at start of employment	34.02 SD 6.93		33.90 SD 7.41	
Range	16.37-47.91		20.77-53.63	
Employment Type *				
Permanent	40	64.5	145	80.1
Temporary	22	35.5	36	19.9
	N=62		*n*=181	
Job Level*				
Low	40	65.6	144	79.6
High	21	34.4	37	20.4
	N=61		*n*=181	
Subprogram				
Clinical	34	54.8	112	61.5
Non-clinical	22	35.5	57	31.3
Administration	6	9.7	13	7.1
Sickness absence duration (absence days per year)				
>5	27	43.5	97	78.2
5+	35	56.5	85	46.7
Sickness absence frequency (absence events per year)				
>3	27	44.3	86	47.3
3+	34	55.7	96	52.7
	n=61		*n*=182	

*Significant results ($p<0.05$). None of the remaining comparisons were significantly different at the 5% level, or better, by the Fisher's exact two-tailed test, Pearson chi-square, or by the *t*-test for testing means.

Proportional hazards model

The ORs for the Cox proportional hazards model are shown in Table 10. Permanent employment (OR=0.21, 95% CI: 0.12-0.38) was associated with a significantly decreased risk of job separation. Low job level was associated with a decreased risk of job separation, however the association was not statistically significant. No interactions were found between any of the variables retained in the final model.

Table 10 Cox proportional hazards model (n=242; 62 uncensored observations)

Variable	OR	(95% CI)
Employment Type		
Permanent	0.21	(0.12-0.38)
Temporary	1	
Job Level		
Low	0.60	(0.35-1.03)
High	1	

Abbreviations: OR = Odds Ratio; 95%CI = 95% confidence interval

Discussion

This study showed that sociodemographic and work-related factors may predict high sickness absence and duration of employment in cancer care workers. Seasonal and daily variation in sickness absence may also indicate patterns of sickness absence.

Age is considered an important determinant and predictor of sickness absence (Labriola et al., 2006; and Pirrainen et al., 2003). The present study demonstrated that younger employees, that is, less than 40 years of age, had an increased risk of high sickness absence than older employees, that is, more than 40 years of age. The association of sickness absence duration and mean duration of sickness absence with age was non-significant. An abundance of literature supports these findings (Labriola et al., 2006; Pirainnen et al., 2003; Ishizaki et al., 2006; Marmot et al., 1995; Sharp et al., 1995; Blank et al., 1995; and Nielsen et al., 2006). However, it has also been shown that short periods of sickness absence are more common among younger workers and long periods among older workers (Marmot et al., 1995; Sharp et al., 1995; Blank et al., 1995, and Nielsen et al., 2006).

Male employees had a decreased risk of high sickness absence and sickness absence duration compared to female employees. Mean duration of sickness absence was not significantly associated with gender. The findings in the present study correspond with earlier research and working hours, family situation, and children are of importance in this context (Voss et al., 2001; Ritchie et al., 1999; Nielsen et al., 2006; Mastekaasa et al., 1998; Ishizaki et al., 2006; Lana et al., 2005; Labriola et al., 2006; Pirrainen et al., 2003; Voss et al., 2001; and Nielson et al., 2006).

Permanent employees had an increased risk of high sickness absence duration, and mean duration compared to temporary employees, however the results were not statistically significant. Earlier research has indicated that permanent employment is a strong predictor of sickness absence (Virtanen et al., 2006; Ritchie et al., 1999; Ferrie et al., 1998; Virtanen et al., 2003; Knutsson and Goine, 1998; and North et al., 1996) and that temporary employees are often at risk of "presenteeism" due to insecurity and instability associated with temporary employment (Virtanen et al., 2006). In a study of 19,093 temporary and 41,530 permanent public sector employees in Finland, temporary employees with high sickness absence were at highest risk of immediate unemployment, and unemployment three years later compared to permanent employees (Virtanen et al., 2006).

The present study demonstrated that low job level workers had an increased risk of high sickness absence, sickness absence duration, and mean duration compared to high job level workers. These findings are in accordance with many other studies addressing sickness absence in health care organizations and in different employment sectors (Ritchie et al., 2006; Ishizaki et al., 2006; Pirrainen et al., 2003; Kivimaki et al., 2001; Vaananen et al., 2004; Melchoir et al., 2005; Allebeck and Mastekaasa, 2004; North et al., 1993; Fuhrer et al., 2002; Pirrainen et al., 2003; and Ishizaki et al., 2006).

This study also showed that clinical workers and non-clinical workers had an increased risk of high mean duration sickness absence compared to administration workers. The highest risk of sickness absence was demonstrated in clinical workers. Clinical workers were shown to have the longest mean duration per absence event, however there appeared to be no difference in high sickness absence or sickness absence

duration measures according to sub-program. In the literature, it is difficult to generalize findings regarding occupation due the variety of occupational groups studied or the specificity of the study group (Matrunola et al., 1996). In a sample of 12,900 health care workers of four National Health Service Trusts in the United Kingdom, the longest mean duration per absence event was experienced by ancillary staff and the shortest by laboratory and estates and pharmacy staff (Ritchie et al., 1999). Medical and dental staff had the lowest rates of sickness absence frequency and duration (Ritchie et al., 1999). Long term absences (over one week) were most frequent among maintenance staff, and least among pharmacy staff (Ritchie et al., 1999). Others studies demonstrated that jobs involving patient care are highly stressful and demanding and increase the risk of sickness absence (Toppinen-Tanner et al., 2005; Borritz et al., 2006; and Grunfeld et al., 2000). There is some evidence in the literature to suggest that there may be under-reporting of sickness absence among medical professionals (Ritchie et al., 1999).

In the present study, long-term employment (five years or more) was associated with an increased risk of high sickness absence, sickness absence duration, and mean duration sickness absence (Vahtera et al., 1999). The literature supporting these findings is sparse. More investigative research is needed to examine the effect of duration of employment on sickness absence rates among health care workers and across different employment sectors.

In the present study, there appeared to be no difference in sickness absence according to employment status, however there is some evidence in the literature that has associated sickness absence with employment status (Ritchie et al., 1999; and Burke and Greenglass, 1999). Ritchie et al. (1999) revealed higher rates of sickness absence among

full-time workers compared to part-time workers (Ritchie et al., 1999). Workers in part-time or temporary contracts have been associated with lower job security when compared to employees with full-time status or permanent employment (Virtanen et al., 2006; Ritchie et al., 1999; Ferrie et al., 1998; Virtanen et al., 2003; Knutsson and Goine, 1998; and North et al., 1996). This implies that part-time or temporary workers are less likely to run the risk being laid off and have stronger incentives for job attendance. There is a dearth of evidence regarding sickness absence according to duration of employment.

The present study identified seasonal variation in sickness absence. The highest rates of sickness absence were observed during the winter months (January to March) and lowest rates of sickness absence during the summer months (July to September). Differences in sickness absence were found between the winter and summer months and between the winter and fall months. These finding are consistent with earlier research (Pocock, 1974; Mitchie et al., 2004; and Eriksen et al. 2006). Respiratory illness has been associated with high sickness absence during the winter months (Eriksen et al., 2006; and Mitchie et al., 2004).

In the present study, there appeared to be no difference in daily variation of sickness absence. However, there has been some evidence in the literature to suggest that employees may lengthen their weekends by voluntary absenteeism (Libet et al., 2001; Chadwick-Jones et al., 1973; and Vahtera et al., 2001). These absences have been considered a phenomenon and referred to as blue Monday absence, recuperation absence, or extended weekend absence (Muchinsky, 1977 and Eisenberger, 1989). A study of 27,541 permanent full-time municipal employees of Finland demonstrated that the mean rate of sickness absence was lowest on Monday, after which it increased during the rest

of the week (Vahtera et al., 2001). The research surrounding these findings is controversial and some studies have accounted the variability in daily absence due to shift work and social contextual influences (e.g., incidence of pay day, weekend social habits, etc.) (Libet et al., 2001).

The present study also demonstrated that temporary employment predicted job separation in cancer care workers. Evidence in the literature corresponds with the present study findings (Virtanen et al., 2006; and Ferrie, 1997). Virtanen et al (2006) showed that temporary employment was a strong predictor of employment duration and was associated with 7.7-fold (95% CI: 7.08-8.33) probability of job separation. Temporary employees were at the highest risk of immediate unemployment and unemployment three years later (Virtanen et al., 2006). Permanent employment was shown to provide secure protection against unemployment, even in the case of high sickness absence (Virtanen et al., 2006).

Study Advantages

The present study used three outcome measures, used in previous research, of high sickness absence which included: sickness absence, sickness absence duration, and mean duration of sickness absence (Bakker et al., 2003). The sickness absence and sickness absence duration measures were preferred as they reflected the average number of sickness absence events (for paid and unpaid sick leave) and average number of days absent from work based on the risk of sickness absence for each employee during the study period. These measures had the advantage of controlling for absences due to all other reasons (e.g. maternity leave, education leave, etc.), drop-outs, and employees lost

to follow-up. The mean duration sickness absence measure was beneficial to determine the average length of sickness absence per absence event and to identify patterns of short and long periods of absence.

Methodological Considerations

Employee attendance records and large human resource databases were used to obtain sickness absence and employment duration data for each study participant. In comparison other data collection methods (i.e., questionnaire, employer registers, etc.), attendance records and large databases were preferred as they allow for longer subject follow-up periods and provide sufficient information on sickness absence and employment duration (e.g., start and end dates) without the bias or recall or self-report in questionnaire data. However, the accuracy of the data in the present study was dependent upon the employer having a reliable registration system. The accuracy of the employee attendance records were of some concern. The inclusion of self-report absences may be reflected in this study. The results of this study may be over-estimated since absences of less than three days did not require medical certification, in accordance with hospital regulations. Incomplete or missing attendance records (n=30) were cross-referenced with human resource databases and personnel files to obtain missing information on start and end dates of sickness absence and reasons for absence. Human error in documenting, maintaining, and retrieving sickness absence records may have also been an issue. All employee attendance records were moved to the Memorial hospital site and had to be photocopied for administrative and research purposes. It is possible that attendance records were lost during integration of the NEORCC, which occurred during the study

period. Other inaccuracies in the data included: unmatched job titles on time sheets and human resource databases. Job titles written on the time sheets were recorded. If employees were employed in more than one position, the most permanent employment was recorded. The study results showed that the maximum follow-up time for employees from start date of employment at the NEORCC was longer than the actual number of years the site was built. This was explained by employee transfers. Employees who had transferred from another cancer centre to the NEORCC were included in the study and their original start date of employment at the previous centre was recorded.

Limitations

The present study had several limitations which may have been reflected in the results. The data was limited to the information available in employee attendance records and large human resource databases. Research has shown that health care providers in rural and remote and northern areas have to deal with additional challenges which may have been reflected in the study findings. These include: geographic remoteness that affects the ability to obtain health services on a timely basis close to home, reduce access to emergency and secondary and tertiary services, low density service areas, demographic changes including an aging population and special needs populations, such as aboriginal communities, shortages of physicians, nurses, and other health care providers, decreased availability of community-based services and non-acute care resources, and fiscal challenges where the options to reduce costs are limited, including the ability to manage patients on an ambulatory basis (Ontario Hospital Association, 2003). No adjustments were made for these factors or the broad range of physical and psychosocial factors

which have been associated with sickness absence (e.g., personality, emotional health, marital status, health status, working conditions, job satisfaction, etc.) (Whitaker, 2001; and Johnson et al., 2003). As a result, the study findings could not explain whether the associations of sickness absence and sociodemographic and work-related factors were over-estimated or under-estimated.

The study findings of sickness absence and duration of employment may have also been affected by adverse organizational changes, unexpected outbreaks, and other work-related factors (e.g., job insecurity, increased job demands, decreased job control, increased job turnover, etc.) during the study period which were not controlled for (Vahtera et al., 2004). Transitional issues related to amalgamation of the cancer centre may have been reflected in the study findings. Between November 1st, 2002 and December 31st, 2004, NEORCC and three local acute care hospitals in Sudbury (i.e., Memorial, Sudbury General, and Laurentian) were integrated to form one new organization, the Sudbury Regional Hospital. The restructuring began in 1997 and continues to evolve. Since the amalgamation, the hospital has faced many transitional issues such as: coping with change, operating deficits and striving to maintain services, and escalating costs in the construction of the Sudbury Regional Hospital (Sudbury Regional Hospital, 2004). Although construction is moving forward, the delays have had an impact on staff, physicians, and community confidence in the organization (Sudbury Regional Hospital, 2004). Another prominent event occurred during the study period; between March 16th, 2003 and July 31st, 2003, an unexpected outbreak of severe acute respiratory disease (SARS) started in Toronto and was transmitted through surrounding communities (Dwosh et al., 2003; and Leslie et al., 2004). The outbreak had a major

psychosocial impact on health care professionals with respect to occupation and personal risk perception, the effect on families and lifestyles, and emotional distress (Nickell et al., 2004). The implementation of hospital-wide infection control procedures across Canada, including Sudbury, and psychosocial effects associated with the outbreak may have been reflected in the study findings.

Examination of sociodemographic and work-related factors of cancer care workers shows that the sample was heterogeneous. The results of this study may reflect the relatively small sample size and specific sample employed, reducing generalization to a larger population. It should also be noted that sociodemographic and work-related characteristics of each employee were recorded at baseline absence (i.e., at the first absence of each employee during the study period). Hence, we cannot rule out the exposure to organizational, socioeconomic, and individual change occurring over the study period.

Furthermore, a healthy worker selection bias, due to the fact that 'unhealthy' workers or individuals with a high frequency of absence could refuse to participate in the study, may have under-estimated the study findings.

Despite these limitations, this study indicates sociodemographic and work-related factors may be associated with an increased risk of sickness absenteeism and job separation in cancer care workers at the NEORCC.

Conclusions

The intention of this study was to identify predictors of workplace absenteeism, duration of workplace absenteeism, and duration of employment in cancer care workers. It also served to highlight the importance of using different measures of sickness absence in order to generate a more informative and comprehensive depiction of sickness absence. As such, this study provided useful information in the understanding of sociodemographic and work-related factors associated with sickness absence and job separation, and the seasonal and daily variability in sickness absence. The results of this study emphasize the need for health care managers to consider the role of work organization, employee retention, management and supervisory support and quality, job security, and decision authority in influencing sickness absence frequency and duration and job separation in the workplace. Research has suggested that in order to create a healthy work environment, a collaborative effort is required by the organization, employees, medical staff, and volunteers of health care settings and organizations (Board of Directors, 2004). Working together to reduce workplace absenteeism and to support retention and recruitment of health care providers is a primary concern of health care organizations and as such, it is important to highlight some of the strategies that target these issues. Improvements in workplace safety, increased health promotion activities, and increased employee assistance programs, aimed to ensure a safe and healthy physical and psychosocial environment, are key strategies to improve workplace absenteeism (Whitaker et al., 2001). Fundamentals to improve recruitment and retention of employees include: improving management and supervisory quality, allowing opportunities for personal growth, open communication, satisfying the needs of

employees, and offering competitive pay. Management practices should include: encouraging workers to participate in decision-making, encouraging workers to voice concern and make suggestions, improving employee trust in the company, and managers' trust of employees, demonstrating fairness in management style and application of policies, training and evaluating supervisors in giving rewards and appreciation appropriately, supporting work, life, and family balance with policies and practices, and measuring employee stressors and satisfaction regularly in combination with appropriate action plans. In the future, researchers should aim to incorporate both quantitative surveys and qualitative questions using focus groups. Future research may wish to consider, to a greater extent, the underlying factors related to sociodemographic and work-related differences in sickness absence and job separation, as well as factors contributing to seasonal and daily variation in sickness absence.

References

Akerlind, I., Alexanderson, K., Hensing, G., Leijon, M., and Bjurnulf, P. (1996). Sex differences in sickness absence in relation to parental status. *Scand J Soc Med, 24 (1), 27-35.*

Ala-Mursula, L., Vahtera, J., Pentti, J., and Kivimaki, M. (2004). Effect of employee worktime control on health: a prospective cohort study. *Occup Environ Med, 61, 254-261.*

Alexanderson, K., & Hensing, G. (2004). More and better research needed on sickness absence. *Scand J Public Health, 32, 321-323.*

Allebeck, P., and Mastekaasa, A. (2004). Risk factors for sick leave-general studies. *Scand J Public Health Suppl, 32, 49-108.*

Andrea, H., Beurskens, AJ., Metsemakers, JF., Van Amelsfoort, LG., Van den Brandt, PA., and Van Schayck, CP. (2003). Health problems and psychosocial work environment as predictors of long term sickness absence in employees who visited the occupational physician and/or general practitioner in relation to work: a prospective study. *Occup Environ Med, 60, 295-300.*

Bakker, A., Demerouti, E., Boer, E., and Schaufeli, W. (2003). Job demands and job resources as predictors of absence duration and frequency. *Journal of Vocational Behavior, 62, 341-356.*

Basant, P. (2002). SPSS In Practice: An Illustrated Guide. (2nd ed.). New York, NY: Oxford University Press.

Benach, J., Benavides, FG., Plaft, S., et al. (2000). The health-damaging potential of new types of flexible employment: A challenge for public health researchers. *Am J Public Health, 90, 1316-1317.*

Benavides, FG. (2006). Ill health, social protection, labour relations, and sickness absence. *Occup Environ Med, 63, 228-229.*

Boedeker, W. (2001). Associations between workload and diseases rarely occurring in sickness absence data. *Occup Environ Med, 43, 1081-1088.*

Bond, FW., and Bunce, D. (2001). Job control mediates change in a work reorganization intervention for stress reduction. *J Occup Health Psychol, 6, 290-302.*

Borritz, M., Rugulies, R., Bjorner, J., Villadsen, E., Mikkelsen, O., and Kristensen, T. (2006). Burnout among employees in human service work: design and baseline findings of the PUMA study. *Scand J Public Health, 34, 49-58.*

Cancer Care Ontario.(2000). Systemic Therapy Task Force Report. Toronto, Ontario.

Chadwick-Jones, JK., Brown, CA., and Nicholson, N. (1973). Absence from work: its meaning, measurement, and control. *Int Rev Appl Psychol, 22, 137-155.*

Christensen, K., Nielsen, M., Rugulies, R., Smith-Hansen, L., and Kristensen, T. (2005). Workplace Levels of Psychosocial Factors as Prospective Predictors of Registered Sickness Absence. *Occup Environ Med, 47, 933-940.*

D'Souza, R., Strazdins, L., Broom, D., Rodgers, B., and Berry, H. (2006). Work demands, job insecurity and sickness absence from work. How productive is the new, flexible labour force? *Aust N Z J Public Health, 30, 205-212.*

Dwosh, H., Hong, H., Austgarden, D., Herman, S., and Schabas, R. (2003). Identification and containment of an outbreak of SARS in a community hospital. *Can Med Assoc J, 168, 1415-1420.*

Eisenberger, R. (1989). Blue Monday: the loss of the work ethic in America. New York: Paragon House.

Eriksen, W., Bruusgaard, D., and Snardahl, S. (2003). Work factors as predictors of sickness absence: A three month prospective study of nurses' aides. *Occup Environ Med, 60, 271-279.*

Eshoj, P., Jepsen, JR., Nielsen, and CV. (2001). Long-term sickness absence—risk indicators among occupationally active residents of a Danish county. *Occup Med, 51, 347-353.*

Ferrie, JE., Shipley, MJ., Marmot, MG., Stansfeld, S., and Smith, GD. (1995). Health effects of anticipation of job change and non-employment: longitudinal data from the Whitehall II study. *Br Med J, 311, 1264-1269.*

Ferrie, JE. (1997). Labour market status, insecurity and health. *J Health Psychol, 2, 373-397.*

Ferrie, JE., Shipley, MJ., Marmot, MG, Stansfeld, S., and Davey Smith, G. (1998). The health effects of major organizational change and job security. *Soc Sci Med, 46, 243-254.*

Goodman, P., and Atkin, R.(1984). New approaches to understanding, measuring, and managing employee absence. Sanfransico, California.: Jossey-Bass Publishers.

Grunfeld, E., Whelan, T., Zitzelsberger, L., Willan, A., Montesanto, B., and Evans, W. (2000). Cancer care workers in Ontario: prevalence of burnout, job stress and job satisfaction. *Can Med Assoc J, 163,166-169.*

Hanebuth, D., Meinel, M., and Fischer, J. (2006). Health-Related Quality of Life, Psychosocial Work Conditions, and Absenteeism in an Industrial Sample of Blue-and White-Collar Employees: A comparison of Potential Predictors. *Occup Environ Med, 48, 28-37.*

Haun, D., Vivero, R., Leach, A., and Liuzza, G. (2002). Working short again? *Med Lab Observer, 34: 28-31.*

Hemingway, H., and Marmot, M. (1999). Psychosocial factors in the aetiology and prognosis of coronary heart disease: systemic review of prospective cohort studies. *Br Med J, 318, 1460-1467.*

Hosmer, D., and Lemeshow, S. (2000). Applied Logistic Regression. (2nd ed.). New York, NY: John Wiley and Sons.

Johnson., C., Croghan, E., and Crawford, J. (2003). The problem and management of sickness absence in the NHS: considerations for nurse managers. *Nurs Manage, 11, 336-342.*

Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., and Amick, B. (1998). The Job Content Questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *Occup Health, 3, 322-355.*

Karasek R., and Theorell T. (1990). Healthy Work: Stress, Productivity and the Reconstruction of Working Life. *Basic Book, New York.*

Kivimaki, M., Elovainio, M., and Vahtera, J. (2000). Workplace bullying and sickness absence in hospital staff. *Occup Environ Med, 57, 656-660.*

Kivimaki, M., Sutinen, R., Elovainio, M., Vahtera, J., Rasanen, K., Toyry, S, Ferrie, J., and Firth-Cozens, J. (2001). Sickness absence in hospital physicians: 2 year follow-up study on determinants. *Occup Environ Med, 58, 361-366.*

Kivimaki, M., Vahtera, J., Pentti, J., and Ferrie, JE. (2000). Factors underlying the effect of organizational downsizing on health of employees: longitudinal cohort study. *Br Med J, 320(7240), 971-975.*

Kivimaki, M., Vahtera, J., Pentti., J., Thomson, L., Griffith, A., and Cox, T. (1997). Psychosocial factors predicting employee sickness absence during economic decline. *J Appl Psychol, 82, 858-872.*

Knutsson, A., and Goine, H. (1998). Occupation and unemployment rates as predictors of long-term sickness absence in two Swedish counties. *Soc Sci Med, 47(1), 25-31.*

Labriola, M., Lund, T., and Burr, H. (2006). Prospective study of physical and psychological risk factors for sickness absence. *Occup Med, 10.1093/occmed/kq1058.*

Libet, J., Frueh, C., Pellegrin, K., Gold, P., Santos, A., and Arana, G. (2001). Absenteeism And Productivity Among Mental Health Employees. *Administration and Policy in Mental Health, 29, 41-50.*

Marmot, M., Feeney, A., Shipley, M., North, F., and Syme, S. (1995). Sickness absence as a measure of health status and functioning from the UK Whitehall II study. *J Epidemiol Community Health, 49, 124-130*

Mastekaasa, A., and Olsen, K.M. (1998). Gender, absenteeism and job characteristics: a fixed effects approach. *Work and Occupations, 25, 195-228.*

Matrunola, P. (1996). Is there a relationship between job satisfaction and absenteeism? *J Adv Nurs, 23, 827-834.*

Maunder, R., Hunter, J., Vincent, L., Bennett, J., Peladeau, N., Leszcz, M., Sadavoy, J., Verhaeghe, L., Steinberg, R., and Mazzulli, T. (2003). The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *Can Med Assoc J, 168, 1245-1251.*

Melchoir, M., Niedhammer, I., Berkman, LF., and Goldberg, M. (2003). Do psychosocial work factors and social relations exert independent effects on sickness absence? A six year prospective study of the GAZEL cohort. *J Epidemiol Community Health, 57, 285-293.*

Michie, S., and Williams, S. (2003). Reducing work related psychological ill health and sickness absence: a systematic literature review. *Occup Environ Med, 60, 3-9.*

Muchinsky PM. (1977). Employee absenteeism: a review of literature. *Journal of Vocational Behaviour, 10, 316-340.*

Nickell, L., Crighton, E., Tracy, CS., Al-Enazy, H., Bolaji, Y., Hanjrah, S., Hussain, A., Makhlouf, S., and Upshur, R. (2004). Psychological effects of SARS on hospital staff:survey of a large tertiary care institution. *Can Med Assoc J, 170(5):793-798.*

Niedhammer, I. (2002). Psychometric properties of the French version of the Karsek Job Content Questionnaire: a study of the scales of decision latitude, psychological demands, social support, and physical demands. *Int Arch Occup Env Health, 75, 129-144.*

Niedhammer, I., Bugel, I., Goldberg, M. et al. (1998). Psychosocial factors at work and sickness absence in the Gazel cohort: a prospective study. *Occup Environ Med, 55, 735-741.*

Niedhammer, I., Goldberg, M., Leclerc, A., Bugel, I., and David, S. (1998). Psychosocial factors at work and subsequent depressive symptoms in the Gazel cohort. *Scand J Work Environ Health, 24, 197-205.*

Nordqvist, C., Holmqvist, C., and Alexanderson, K. (2003). Views of Laypersons on the Role Employers Play in Return to Work When Sick-Listed. *J Occup Rehabil, 13, 11-20.*

North, F., Syme, SL., Feeney, A., Head, J., Shipley, MJ., and Marmot, MG. (1993). Explaining socioeconomic differences in sickness absence: the Whitehall II Study. *Br Med J, 306, 361-366.*

North, F., Syme, SL., Feeney, A., Shipley, MJ., and Marmot, MG. (1996). Psychosocial work environment and sickness absence among British civil servants: the Whitehall II study. *Am J Public Health, 86(3), 332-340.*

Ontario Hospital Association. (2003). Enhancing Access to Health Care Services in Rural Communities. *Rural Health Issues,* Sudbury, Ontario.

O'Rourke, K., Allgood, C., VanDerslice, J., and Hardy, M. (2000). Job satisfaction among Nursing Staff in a Military Health Care Facility. *Mil Med, 165, 757-761.*

Roelen, C., Van der Pol, T., Koopmans, P., and Groothoff, J. (2006). Identifying workers at risk of sickness absence by questionnaire. *Occup Med, 10.1093/occmed/kq1087.*

Sharp, C., and Watt, S. (1995). A study of absence rates in male and female employees working in occupations of equal status. *Occup Med, 45, 131-136.*

Sibbald, B. (2002). Could reduced absenteeism help solve health-worker shortage? *Can Med Assoc J, 166, 365.*

Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. *J Occup Psychol, 1, 27-41.*

Smulders, P., and Nijhuis, F. (1999). The job demands-job control model and absence behaviour: results of a three year longitudinal study. *Work Stress, 13, 115-131.*

Statistics Canada. (2005). Work Absence Rates 2005. Retrieved December 6, 2006, from http://www.statcan.ca/english/freepub/71-211-XIE/0000671-211-XIE.htm.

Sudbury Regional Hospital. (2004). HRSRH Strategic Plan. *Board of Directors*. Sudbury, Ontario. Retrieved March 21, 2007, from http://intranet/portals/0/Corporate%20Corner/Documentss/finalstrategicplan_june2004.pdf

Taunton, R., Perkins S., Oetker-Black, O., and Heaton, R. (1995). Absenteeism in acute care hospitals. *Nurs Manage, 26, 80-82.*

Toppinen-Tanner, S., Ojajarvi, A., Vaananen, A., Kalimo, R., and Jappinen, P. (2005). Burnout as a Predictor of Medically Certified Sick-Leave Absences and Their Diagnosed Causes. *Behav Med, 31, 18-27.*

Vahtera, J., Kivimaki, M., Pentti, J., and Theorell, T. (2000). Effect of change in the psychosocial work environment on sickness absence: a seven year follow up of initially healthy employees. *J Epidemiol Community Health, 54(7), 484-493.*

Vaananen, A., Toppinen-Tanner, S., Kalimo, R., Mutanen, P., Vahtera, J., and Peiro, JM. (2003). Job characteristics, physical and psychological symptoms, and social support as antecedents of sickness absence among men and women in the private industrial sector. *Soc Sci Med, 57, 807-824.*

Vahtera, J., Kivimaki, M., and Pentti, J. (1997). Effect of organizational downsizing on health of employees. *Lancet, 350, 1124-28.*

Vahtera, J., Kivimaki, M., Pentti, J., and Theorell, T. (2000). Effect of change in the psychosocial work environment on sickness absence: A seven year follow up of initially healthy employees. *J Epidemiol Community Health, 54, 484-493.*

Vahtera, J., Virtanen, P., Kivimaki, M., and Pentti, J. (1999). Workplace as an origin of health inequalities. J *Epidemiol Community Health, 53, 399-407.*

Von Thiele, U., Lindfors, P., and Lundberg, U. (2006). Evaluating different measures of sickness absence with respect to work characteristics. *Scand J Public Health, 34, 247-253.*

Virtanen, M., Kivimaki, M., Elovainio, M., Vahtera, J., and Ferrie, JE. (2003). From insecure to secure employment : changes in work, health related behaviours, and sickness absence. *Occup Environ Med, 60, 948-953.*

Voss, M., Floderus, B., and Diderichsen, F. (2001). Physical, psychosocial, and organisational factors relative to sickness absence: a study based on Sweden Post. *Occup Environ Med, 58, 178-184.*

Whitaker, S. (2001). The Management of Sickness Absence. *Occup Environ Med, 58, 420-424.*