2010 CARWH/ACRST

Abstracts

Worker Health in a Changing World of Work

Canadian Association for Research on Work and Health Conference

Toronto, May 28-29, 2010

carwh2010.iwh.on.ca / acrst2010.iwh.on.ca

Hosted by:

Institute for Work & Health | Research Excellence Advancing Employee Health

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Abstracts for presentations

(alphabetical by author)

A

Call centre model improves timelines and outcomes of integrated disability management program

Allan-Reed L, Fraser Health

Objectives: To implement a cost-effective, efficient, effective and comprehensive workplace health call centre for a large, multi-union health-care organization and analyze the results. Overarching goals of the call centre include: improving processing timelines; enhancing quality of data collected; and improve overall disability outcomes in the areas of both workplace incident reporting (Phase I) and occupational health communicable disease management (Phase II).

Methods: Phase I: Incident reporting service launched January 2008 providing paperless reporting of workplace incidents. A live operator receives the detail of each incident, captures the data in the Workplace Health Incident Tracking and Evaluation (WHITETM) database, and generates an e-mail to the manager for completion of accident investigation and corrective action follow up. Information collected in WHITE is used to complete the Employer's Report (Form 7) to WorksafeBC and is submitted electronically. Phase II: Occupational health services launched January 2009 providing baseline health history intake, follow-up of blood/body fluid exposures, and communicable disease outbreak management. Mass immunization clinics replace one-on-one appointments and ensure that staff have appropriate immunity status for vaccine preventable communicable diseases. Data capture methods include: manual tracking of all call details; staff survey administered quarterly to collect satisfaction, awareness and effectiveness of call centre resources; timeline and intervention milestones captured in WHITETM database.

Results: Results to date are impressive. Form 7 submission timeline reduced from an average of 16.9 days to 1.72 days, with a mode of 0.04 days. Claim duration has been reduced from 49.2 days pre-call centre to 36.5 days. Customer satisfaction is high. Percentage of staff are participating in accident investigations with manager increased (86% vs. 56%). Health history completion for new staff has increased to 56% from 30% pre-call centre, taking 6-8 minutes on average. Communicable disease outbreak follow-up timelines have been reduced from days to hours. Personnel required to offer the above services have been reduced.

Conclusions: Successful implementation of the call centre has had a very positive impact on the work undertaken by the workplace health portfolio at Fraser Health and results are impressive. Improvements in accessibility and timeliness of service provision have allowed streamlining of human resources to offer a better program that assists both staff and management in reducing the impact of injuries and illness in the workplace. In an economic time where resources for disability management services are scarce, improving the quality and effectiveness of programs/services, while at the same time decreasing overall resources required to provide such services, is an important imperative.

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Developing leading indicators of organizational performance in Ontario

Amick B, Institute for Work & Health

Objectives: Current occupational health and safety systems use lagging indicators, injuries and illnesses, to manage system performance. Recently, OHSCO tasked a group composed of safety professionals from Ontario Health and Safety Associations (HSAs), the Workplace Safety and Insurance Board (WSIB), the Ministry of Labour (MOL) with the assistance of the Institute for Work & Health (IWH) to develop a safety culture measure. The group was to develop a short, easy-to-use measure that could be used by HSA safety consultants in their meetings with clients that could be linked to injury and illness claim data by IWH. In this presentation, we report on the developed measure and its relationship to injury and illness data.

Methods: The development took place over a one year and resulted in an 8-item measure of organizational indices. Data were then collected from 100 firms in each of 8 HSAs from equal numbers of small (<20 employees) and medium and large (>20 employees) firms, and firms classified by the WSIB as high risk and low risk using the current risk classification scheme. Firms were not sampled; instead HSAs attempted to get 100 firms in a convenience sample. In total, data was collected from 808 firms in 2009. Both classic psychometric (Cronbach alpha and exploratory factor structure) and concurrent validity (using 3-year average injury and illness claim data; 2006-2008) analysis is based on 584 firms, after duplicate firms and respondents with no firm number to link to WSIB data were removed. Validity analyses used a negative binomial regression. All analyses were done using SAS.

Results: The 8-item measure captured 8 questions HSA consultants considered to have face validity and that firm management could accurately report. The items were based on practical experience; items used in other ongoing surveys in HSAs and could be observed. The 8 items measured: formal safety audits at regular intervals are a normal part of our business, everyone at this organization values ongoing safety improvement in this organization, this organization considers safety at least as important as production and quality in the way work is done, workers and supervisors have the information they need to work safely, employees are always involved in decisions affecting their health and safety, those in charge of safety have the authority to make the changes they have identified as necessary, those who act safely receive positive recognition, everyone has the tools and/or equipment they need to complete their work safely. The Cronbach's alpha is 0.88 for the scale and all items load on a single factor. The responses were invariant by firm size and who responded from within the firm. Analyses of the relationship of the 8-item scale to injuries and illness claims in the past three years is in the right direction but it not statistically significant after adjustment for firm size and health and safety association.

Conclusions: The current work shows that work and health researchers can collaborate with key stakeholders to develop a usable psychometrically sound leading indicator metric. While the current metric has not been shown to be associated with historical firm claim experiences – this should not be considered a strong validity test. Furthermore, firm selection may have affected the results. The collaborative activity has led to a large benchmarking initiative in the province base.

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The use of work role functioning in evaluating an ergonomic intervention

Amick B, Institute for Work & Health

Objectives: While work role functioning and other "presenteeism" measures have been widely used in observational studies and in clinical evaluation studies, few studies report the use of "presenteeism" measures in ergonomic interventions. We report the use of work role functioning in a non-randomized field trail of a new ergonomic chair and training. The primary hypothesis is does the ergonomic intervention significantly improve work role functioning?

Methods: Data come from two intervention studies in a public sector and private-sector organization. Data collection occurred two months and one month prior to the intervention and two, six and 12 months post-intervention. During each round, a work environment and health questionnaire was completed via the internet. The intervention was a highly adjustable ergonomic chair and office ergonomics training (Amick 2004). One group received only the training and a control group received the training at the end of the study. Work role functioning (WRF) was measured following Amick (2000). It is a 27-item questionnaire with a Cronbach alpha of .92. WRF varies from 0-100 with 100 functioning well in the job and 0 unable to function in job for a given state of physical and emotional health. All analyses were conducted using multi-level modelling with work role functioning nested within individuals within intervention site.

Results: The overall sample included 414 individuals. Intervention site was non-significant and thus results are reported for both sites combined. Overall, the chair-with-training intervention was marginally non-significant in improving work role functioning ($p=0.06$). However, three of five sub-scales (physical demands, mental demands, social demands) were significantly improved while two were not (scheduling and output demands).

Conclusions: Workers who received a highly adjustable chair and office ergonomics training had improved work role functioning in meeting the physical, mental and social demands of the job. In a knowledge workforce with significant interactions with customers, these demands are critical to being an effective performer. These results show the importance of using a multidimensional scale compared to a shorter scale. Future work should continue to test the usability of this type of measure in ergonomic interventions.

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Training health and safety workers on best practices for return to work – what is the uptake?

Ammendolia C, Institute for Work & Health, Mount Sinai Hospital, University of Toronto

Objectives: In Ontario, the duration of lost-time claims is increasing. Traditionally health and safety association (HSA) field consultants assist workplaces in reducing the incidence of work injury (primary prevention). Recently the Workplace Safety and Insurance Board has expanded its role to include disability prevention and return-to-work (DP/RTW). The objective of this study is to assess knowledge and self-efficacy among HSA field consultants in DP/RTW and to evaluate the integration of DP/RTW services into practice.

Methods: A quasi-experimental method was used comparing outcomes before and after six interactive DP/RTW workshops conducted in four Ontario cities. Evaluations were conducted immediately before, after, six months and one year following the workshops using paper and web-based questionnaires. Main outcomes included self-efficacy, attitudes and knowledge in DP/RTW and the integration of DP/RTW services among HSA field consultants.

Results: Among the 201 HSA consultants attending the workshops, 86%, 69% and 38% responded to the post workshop, six-months and one-year questionnaires respectively. At six months and one year, 89% and 83% of HSA consultants respectively felt confident in acquiring the skills and knowledge to provide education, awareness and resources in DP/RTW for workplaces. At one year, 80% of respondents indicated they were aware of available resources to assist workplaces in DP/RTW. The proportion of respondents who reported they currently provide DP/RTW programs for workplaces increased from 6% at six months to 56% at one year following the workshops.

Conclusions: Although there appeared to be high self-efficacy and knowledge in DP/RTW, only half of HSA field consultants have implemented DP/RTW in practice.

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Extending and improving time to retirement: The older worker leave pilot program

Andrushko K, Red River College

Objectives: "Baby Boomers" are changing the current definitions of work and retirement. Recognizing this, Seven Oaks General Hospital (SOGH) determined that a leave of absence (LOA) may be of benefit to retaining older workers in health care. This LOA was developed in a manner similar to a parental or bereavement leave, with employees earning 55% of their salary for the duration of the leave in exchange for a return to service agreement.

Methods: This program was offered from June 15 to December 31 of 2009. Approximately 20 employees applied for the program; 14 employees from three different hospitals in Winnipeg, Manitoba took part in the Older Worker Leave (OWL) Pilot Program. Employees were given the option of a 12-week leave and one-year return to service agreement or a 24-week leave and two-year return to service agreement. Only two employees opted for the 24-week leave. Employees could spend the leave time in any way they wanted and were only restricted from working during the leave. Participants were asked to participate in a pre- and post-interview regarding the leave.

Results: The pre-interviews were analyzed using content analysis. The analysis for the post-interviews will be completed by February 28, 2010. From the analysis of the pre-OWL interviews, seven themes appeared: 1. Feeling time crunch and job strain; 2. OWL is an opportunity to practise for retirement; 3. We love our jobs, but we don't want to be there all the time! 4. Personal reflection happens when you get to think about things other than work! 5. Taking care of myself; 6. Taking care of others happens on and off the job; 7. Work gets in the way of things I want to do.

Conclusions: Although the analysis is currently incomplete, the results indicate that there may be two distinct benefits of the OWL concerning retirement. First, the OWL may provide participants a better idea of the actual date for their retirement. In essence, the "retirement dry-run" has allowed each participant to determine if s/he is ready for retirement, financially, physically and emotionally. The second indirect benefit may arise due to physical and mental rejuvenation: Taking the time off during the OWL may allow participants to have an especially productive final year as an employee.

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The impact of self-insuring for workers' compensation on workplace fatality rates

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Objectives: A recently published article concluded that workers in firms with a higher degree of experience rating for workers' compensation insurance sustain fewer non-fatal occupational injuries than workers in firms with a lower degree of experience rating. One of the limitations of the published study was that while self-insurance increases the incentive of firms to invest in safety, it also increases their incentive to be involved in excessive claims management practices. To better understand whether these results mostly reflected differential reporting behaviour or were likely due to true investments in worker safety, in the present study we considered fatal occupational injuries that are hard to under-report. In other words, we hypothesized that if self-insurance affects only claims-reporting, we would find no significant association between self-insurance and fatalities.

Methods: Panel data from the Bureau of Labor Statistics and National Academy of Social Insurance between 1998 and 2005 were used. A theoretical framework was developed, and a fixed effects vector decomposition model was estimated.

Results: Self-insuring was positively associated with relatively low worker fatality rates when compared with insuring for workers' compensation (including experience rating and manually rating). After controlling for workforce characteristics, industrial composition, firm size, and state-specific laws, states with an above the median percentage of self-insured firms had fatality rates that were lower than rates in states with a below the median percentage of self-insured firms. We found that a 10 percentage point increase in the share of self-insured firms resulted in a 4.5 percentage point decrease in occupational fatality rate.

Conclusions: Our current results that are based on fatal injuries provide empirical support for the findings we previously published on non-fatal injuries; a higher degree of experience rating seems to better align the economic incentive to invest in prevention and the intended outcome of reducing worker fatality.

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B

Health status of injured workers with permanent impairments: Comparisons by income status

Ballantyne P, Trent University, Institute for Work & Health

Objectives: Recent reports have documented the relationship between income and health inequalities. These suggest that the poor experience a higher rate of adverse health conditions such as disabilities, mental and behavioural disorders, circulatory conditions, and chronic conditions, as well as unequal access to health care. Our objective was to examine injured workers' pre- and post-accident incomes and to compare lower and higher income-earning groups in a sample of injured workers on key health status indicators.

Methods: We used the RAACWI injured worker health and health-care utilization survey to complete the analysis. The study sample was selected with assistance from the WSIB and includes 494 first-time claimants with the WSIB, who have permanent impairments. The survey was conducted by the York University Institute for Social Research via telephone interviewing. All data is self-reported, and includes sample demographics, details on both pre-accident and post-accident physical health, mental health, employment and income. It also includes details on post-accident health-care utilization and health-care deficits. In this presentation we distinguish income groups, comparing lowest- (Q1) and highest-earning (Q5) income quintiles on selected health status indicators.

Results: The average post-accident personal income of Q1 and Q5 was $7,620, and $70,450, representing an average income-change-since-accident of - $19,485 and + $13,181 for each group. On all health indicators examined, Q1 and Q5 differences were consistent with published literature on health and income inequalities: as compared to Q5, Q1 had poorer self-rated health, reported their health to be worse than the day before their accident, were more likely to report post-accident diagnoses (back problems, mobility impairment, RSI, depression, hypertension), and post-accident health problems (sleeplessness, anxiety). We illustrate these findings, and show their relationship to health-care utilization and deficits.

Conclusions: There is a paucity of data showing the health-related trajectories of injured workers as they relate to post-accident (un)employment, income (in)security and earnings recovery. An established literature on the relationship between poverty and/or income inequality and health tells us that spiralling negative health experiences follow poverty (and predict it). Leaders of workers' compensation systems need to be aware of the health risks facing injured workers who are unable to recover their pre-accident earnings and who fall into poverty or near poverty; and to consider appropriate institutional responses to these particular injured workers.

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Trente ans après l'adoption de la Loi québécoise sur la santé et la sécurité du travail: une contribution de la recherche à un bilan et à des perspectives

Baril-Gingras G, Université Laval

Objectives: La loi québécoise sur la santé et la sécurité du travail (LSST) a été adoptée il y a trente ans. Certains des mécanismes prévus ne s'appliquent encore que dans certains secteurs d'activité. Que dit la recherche sur sa portée et ses limites, en particulier face aux changements du travail et de l'emploi? Que dit la recherche sur ces changements? Quelles sont les réponses apportées dans d'autres pays industrialisés? Des chercheur-e-s se sont regroupés pour répondre à ces questions.

Methods: La démarche visait à réunir les connaissances pour répondre à ces questions. Une vingtaine de chercheur-e-s en SST de disciplines variées, surtout de l'Université Laval, ont été invité-e-s à contribuer à la réflexion. La démarche a comporté trois étapes : 1) l'analyse des travaux de recherche des participant-e-s, couvrant notamment: l'intervention en SST et en ergonomie, la santé psychologique au travail, la gestion et la réadaptation ; 2) a) un relevé des études sur les effets de mécanismes de la LSST; b) des revues systématiques (dont celles de l'IWH) sur les mécanismes réglementaires, les systèmes de gestion, la prévention des TMS et en santé psychologique, etc. c) l'évolution du travail, de l'emploi et de la SST, et les problématiques émergentes d) les législations en SST au Canada, en Europe et en Australie. 3) Deux rencontres ont été organisées et des commentaires écrits sur deux versions du document ont été recueillis.

Results: Les mécanismes prévus (programmes de prévention (PP), de santé spécifique à l'établissement (PSSE), comité de SST (CSS), représentant à la prévention (RP)) ont eu des effets positifs sur la prévention et la réduction des lésions. Les principales lacunes : 1) la loi ne couvre pas tous les secteurs de l'économie ; 2) les secteurs à prédominance féminine, les petits établissements et les travailleurs atypiques sont négligés ; 3) l'intégration de la prévention à la conception et aux changements est faible ; 4) les ressources sont insuffisantes pour appuyer la prévention; 5) les TMS et la santé psychologique sont peu traités.

Conclusions: Un mémoire à la CSST propose de : 1) Organiser la prévention de manière systématique : extension, à tous les secteurs, des quatre mécanismes précités, disposition pour mieux couvrir les petits établissements ; 2) Redynamiser la prévention : obligations claires pour la direction; formation ; mandat élargi pour les CSS et RP ; intégration de la prévention à la conception et aux changements ; ressources accrues de contrôle et de soutien. 3) Prendre en compte les changements du travail et de l'emploi : couverture des travailleurs atypiques, réglementation pour prévenir les troubles musculosquelettiques et agir en santé psychologique au travail.

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Musculoskeletal symptoms among mobile hand-held device users and their relationship to device use: A preliminary study in a Canadian university population

Berolo S, University of Waterloo

Objectives: The objectives of this study were to: 1) determine the distribution of seven measures of mobile device use among a population of university students, staff, and faculty; 2) determine the distribution of musculoskeletal symptoms of the upper extremity, upper back and neck among a population of university students, staff, and faculty; and 3) assess the relationship between measures of device use and musculoskeletal symptoms among this population.

Methods: Using cross-sectional design, an internet-based questionnaire was used to collect self-reported measures of daily mobile hand-held device use and self-reported symptoms of pain in the upper extremity, upper back and neck in 140 students, faculty and staff at a Canadian university. A dichotomous exposure variable (low/high) was created for each of the six measures of mobile device use collected in the questionnaire as well as for total device use. Pain data collected in the questionnaire was dichotomized to “no pain” (0 on Likert scale) or “any pain” (1 to 10 Likert scale). By controlling for covariates (daily computer/laptop keyboard and mouse use, daily game controller use, UW status [faculty, staff or student] and gender) multivariate logistic regression was used to examine the relationship between the seven dichotomous mobile device use exposure variables and 24 dichotomous outcomes.

Results: 137 of 140 participants (98%) reported using a mobile device. Most participants (84%) reported pain of any severity in at least one body part. Pain in the right hand was most prevalent at the base of the thumb (17% reporting slight pain, 9% reporting moderate pain, 2% reporting severe pain). Total time spent using a mobile device was significantly associated with any pain reported in the left shoulder (OR = 2.06; 95% CI 1.00 to 4.24), the right shoulder (OR = 2.55; 95% CI 1.25 to 5.21), and the neck (OR = 2.72; 95% CI 1.24 to 5.96).

Conclusions: Although this research is preliminary, the associations observed between measures of mobile device use and musculoskeletal symptoms, in combination with the rising use of mobile hand-held devices, argues for further research in this field including a prospective study with more well-validated exposure measures.

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Developing a survey to assess the health, safety and wellness of truck drivers

Bigelow P, University of Waterloo, Institute for Work & Health

Objectives: Truck drivers experience high rates of injury and illness, and their involvement in motor vehicle collisions can result in injuries to themselves and others sharing public highways. However, in Canada no systematic approach to obtaining information on risk factors in this population is available. The objective of this study is to gain input from drivers and other stakeholders regarding the content as well as the feasibility of a province-wide survey of truck drivers.

Methods: In Phase 1, three truck drivers and nine occupational health and safety (OHS) professionals were interviewed to understand their perceptions of the scope, importance and risk factors related to motor vehicle injuries, non-motor vehicle injuries, occupational diseases, and employee wellness. In Phase 2, this information, along with a comprehensive literature review, informed the development of a draft questionnaire that was a focus of in-person interviews with drivers. The purpose of these interviews was to assess various mechanisms of administration, determine the time required for completion, and whether the questions were relevant to the industry in Ontario or if there were content areas that were missed.

Results: In Phase 1, the responses indicated that both drivers and OHS professionals were aware of the major risks and risk factors for motor vehicle collisions (MVCs), non-MVC injuries, as well as the chronic health issues of drivers. Long hours of work along with associated stress and fatigue were viewed by a majority of respondents as a major problem for drivers and a barrier to adopting a healthy lifestyle. Risk factors associated with these long hours (poor quality sleep, fatigue, stress, inattention, mistakes) were discussed. Overall, these perceptions of the injuries and major risk factors are in concordance with the published literature expect that higher illegal and legal drug use was not reported by respondents. In Phase 2, the questionnaire was modified in response to concerns and opinions of respondents. The logistics of administration (self-administered and in-person interview) of the instrument were documented and benefits, issues and challenges were noted.

Conclusions: The overall consensus was that more information about truck driver safety, health and wellness is needed. The OHS professionals were quite vocal in supporting further studies on drivers' health issues, and drivers themselves were supportive but did mention that they may be reluctant to participate due to time pressures. The revised questionnaire was well received by truck drivers. The study documented facilitators and barriers of implementing a national survey of truck drivers. Further research will include an examination of the measurement characteristics of the instrument. A proposal is under development for a provincial or national survey.

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Pesticides and cancer: New analyses of a multi-centre case control study

Blair A, Occupational Cancer Research Centre

Objectives: Although several pesticides have been linked with cancer in bioassays and human studies, most often the evidence for carcinogenic risk of pesticide exposure in humans is inconclusive. This presentation will provide an overview of the current weight of evidence on the carcinogenicity of several common-use pesticides. Preliminary results from recent analyses of a cross-Canada case-control study on lymphomas and soft-tissues sarcomas that focus on effect modification between (a) multiple-pesticide exposure, and (b) pesticides and immunologic complications will be presented.

Methods: Cases were identified through six provincial cancer registries, based on diagnosis of one of the four cancers of interest: Hodgkin's lymphoma (n= 316), non-Hodgkin’s lymphoma (n=513), multiple myeloma (n=342) and soft tissue sarcoma (n=357). A common set of controls (n=1,506) was identified in several ways including provincial health records, computerized telephone listings and voter lists. Multiple logistic regression analyses were used to estimate the risks associated with self-reported pesticide exposures and these cancers.

Results: Results from analyses conducted in the United States on a similar population suggest that exposure to combinations of pesticides may increase the risk of non-Hodgkin's lymphoma, particularly carbofuran and atrazine, diazinon and atrazine, and alachor and atrazine. In addition, American findings suggest that the risk of non-Hodgkin's lymphoma among asthmatics exposed to pesticides may be higher than in non-asthmatics exposed to pesticides. Preliminary analyses comparing American findings to results from this cross-Canada case-control will be presented.

Conclusions: Since exposure to multiple pesticides is common among applicators and can also occur in the general population, these results underscore the importance of not restricting our assessment of cancer risk to single exposures. Allergies and other immunologic conditions appear to play an important role in the development of lymphatic and hematopoietic cancers as well, and the suggestion of an interaction among these conditions and pesticides may provide new leads regarding the origin of these tumours.

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Designing an occupational disease registry for asbestos workers in Newfoundland

Bornstein S, Memorial University

Objectives: The project team sought to develop a registry for the former employees of a defunct asbestos mine and mill in Baie Verte, Newfoundland that would ethically recruit as many of them as possible, collect and secure their work and exposure history and their health and claim status and use these data for both epidemiological analysis and the provision of improved health services and compensation. The intention was to create a model registry that could be used for similar populations and similar health risks elsewhere.

Methods: The project is unique in that it was sponsored collaboratively by the province's compensation commission, the United Steel Workers and a local community group. The target population was estimated at 2,400 through an analysis of a range of company and administrative documents. Ethics requirements precluded approaching former employees directly so that we were limited to advertising and waiting for them, or their next-of-kin if they were deceased, to make the first contact with us. MS-Access software was used to design the database and data on each individual's employment history, exposure and health were collected from company files (held by the provincial compensation commission), hospital files across the country and in the USA) and questionnaires. A 'job-exposure matrix' was created using all available data to assign an exposure rating to each registrant. A final report on epidemiological findings was produced for the sponsors of the project and the contents of each registrant' s file made available to him/her. The findings will be followed up and extended in subsequent, grant-funded research.

Results: Despite the challenges of recruiting workers from a long-defunct company and under tight ethical restrictions, we succeeded in registering over 900 former employees. The confirmed incidence of asbestos-related diseases was somewhat lower than we had expected as was the rate of formal compensation claims as well as of successful claims. Our methodology can provide a helpful template that can facilitate the development of registries for other occupational diseases.

Conclusions: Despite numerous challenges, it is possible to develop a scientifically reliable health registry for a workplace that has been closed for almost 20 years. Particularly in such a difficult context, the collaborative approach we used involving a consensus-based tripartite working group seems optimal.

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Bridging the safety gap for vulnerable young workers using youth employment centres

Breslin FC, Institute for Work & Health, University of Toronto, Seneca College

Objectives: People aged 16 to 24 years who are out of school are at a particularly elevated risk of work injury. A recent Ontario Ministry of Labour action group made recommendations to improve safety preparation and reduce work injuries in this “high risk” subgroup of young workers. Many of these “high risk” youth use services such as youth employment centres. Our aim was to characterize their occupational injury experience, workplace training, and safety knowledge.

Methods: Participants: Youth recruited through the employment centres met the following criteria: 16 to 24 years of age and have worked at a job at any time in the past 12 months Recruitment: To recruit participants, staff at youth employment centres across Ontario asked young people who were currently using the centre and who met the inclusion criteria whether they would be interested in participating in a 20-minute survey regarding work and safety. For those who expressed interest, the staff provided informed consent, and the participant completed the internet-based survey. Participants were given $10 for their time. Measures: The survey collected information in the following domains: demographics (e.g., age, gender), characteristics of main job in past 12 months (e.g., industry, hours worked), work injury occurrence and nature of injury, unsafe work conditions encountered, nature of safety training and extent of safety knowledge

Results: The key findings were as follows: - 1886 people completed the survey - Among young people aged 16 to 24 years using youth employment centres, the rate of reporting a medically attended work injury is 14.45 per 100 FTEs. - This subgroup of workers is exposed to unsafe work conditions such as dust/particles, trip hazards and heavy lifting. - This subgroup of workers does not always receive workplace-specific training, and when they do, it is often video-based. This subgroup of workers demonstrated knowledge of basic work safety, but had difficulty with more complex safety issues.

Conclusions: Recommendations flowing from these findings are as follows: - Workplace parties should place a priority on reducing unsafe work conditions such as trip/fall hazards, dust/air particles and heavy lifting. Employers should provide orientation and training in ways that maximize information and skill acquisition/retention about health and safety. Options may include closer supervision and one-to-one training on the job. Even though school-based and social marketing efforts have successfully disseminated some basic OHS knowledge to many vulnerable young workers, strengthening workplace-specific training is needed. Additional information on vulnerable young workers is required to tailor interventions appropriate for this group.

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The Somatic Pre-Occupation and Coping (SPOC) questionnaire predicts return to work in tibial fracture patients

Busse JW, Institute for Work & Health, McMaster University

Objectives: To explore the role of patients' beliefs in their likelihood of recovery from severe physical trauma.

Methods: We developed and validated an instrument designed to capture the impact of patients' beliefs on functional recovery from injury, the Somatic Pre-Occupation and Coping (SPOC) questionnaire. At six-weeks post-surgical fixation, we administered the SPOC questionnaire to 359 consecutive patients with operatively managed tibial shaft fractures. We constructed multi-variable regression models to explore the association between SPOC scores and functional outcome at 1-year, as measured by return to work and short form-36 (SF-36) physical component summary (PCS) and mental component summary (MCS) scores.

Results: In our adjusted multivariable regression models that included pre-injury SF-36 scores, SPOC scores at six-weeks post-surgery accounted for 18% of the variation in SF-36 PCS scores and 18% of SF-36 MCS scores at 1-year. SPOC scores at six-weeks post-surgery accounted for 20% of the variation in employment status at one year. In all models, six-week SPOC scores were a far more powerful predictor of functional recovery than age, gender, fracture type, smoking status, or the presence of multi-trauma.

Conclusions: The SPOC questionnaire is a valid measurement of illness beliefs in tibial fracture patients and is highly predictive of their long-term functional recovery. Future research should explore if these results extend to other trauma populations and if modification of unhelpful illness beliefs is feasible and would result in improved functional outcomes.

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C

Marching to a different drummer: The role of the networks in knowledge transfer in the construction sector

Carlan N, University of Waterloo

Objectives: Our research is aimed at reducing musculoskeletal disabilities (MSDs) in the construction sector. We have identified 15 innovations that have the potential to reduce MSDs and we are exploring techniques to transfer knowledge about these tools, processes and messages. Because the construction sector is nonlinear in its structure, it requires creative approaches to knowledge transfer. This component of the research is focused on identifying networks which will be the future audiences for knowledge transfer.

Methods: After receiving ethics approval, we visited worksites to identify innovations, consulted health and safety specialists and scoured trade magazines. We identified 16 companies that used 20 innovations. The innovations were evaluated by measuring work forces, vibration and muscular exertion using electromyography. We determined 15 innovations had the potential to reduce MSDs. Our previous research taught us that there are multiple paths of communication operating in the sector. We conducted semi-structured interviews with 20 managers to determine how they learned about innovations. We used a snowball technique and contacted 10 more people, who could adopt innovations. These interviews were conducted in-person or by phone and lasted between half and one-and-a-half hours. The majority of the interviews were taped and transcribed. When taping was not possible, the interviewers took detailed notes. Members of the research team reviewed all the data and agreed upon themes that addressed the structure of the networks.

Results: We identified a series of complex networks operating in the construction sector. These networks include designers, trade associations, unions, health and safety committees, committees and groups organized by the CSAO, project networks where multiple companies come together, associations of unionized and non-unionized workers, apprenticeship programs, and financial committees which manage pension/benefit trust funds. Each network is structured differently and some have the potential to channel information that can improve health and safety. Four networks have a direct bearing on health and safety: the worksite/project network; the union network; the apprenticeship network; and the Construction Safety Association Ontario network.

Conclusions: Construction is a fluid sector, which includes existing networks as communication paths. These networks, including worksite networks offer top-down and bottom-up knowledge transfer. The union network offers a potential for knowledge transfer, which has to be developed. Finally in the GTA, the government sponsored Construction Safety Association (Ontario) has played an important role as a secretariat providing the resources for labour and management to come together, providing technical training for workers and managers; and providing a forum for problem solving. Successful knowledge transfer will recognize that significant social networks exist and they can facilitate the introduction of innovations.

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Transmission of acceleration from vibrating exercise platforms to the lumbar spine and head

Caryn R, the University of Western Ontario

Objectives: Whole Body Vibration platforms have become a popular modality in the fitness and rehabilitation industry. Whole body vibration has also been identified as a cause of injury in occupational settings. The goal of this study was to quantify the accelerations experienced at the axial skeleton during standing vibration. This study investigated which knee angles effectively dampened vibration to the upper body.

Methods: Healthy male and female subjects completed whole body vibration trials on a vibrating platform (WAVE) that generated vertical vibrations at 2 and 4 mm amplitudes between frequency ranges of 20 to 50Hz. A twin axis electrogoniometer (Biometrics SG 150) was used to monitor knee flexion during static squat and dynamic squat trials. A reference measurement made at the platform was compared to accelerations measured at the greater trochanter, 5th lumbar vertebrae, and skull. All accelerations were measured with triaxial accelerometers (Biometrics ACL 300/PCB Piezotronics). A published transfer function was used to calculate accelerations at the bone from the accelerations recorded at the skin. A transfer function was used to determine changes in both magnitude and phase of the input mechanical signal at each measurement point.

Results: Peak vertical accelerations of the platform ranged from 1 to 6.50 g. RMS accelerations experienced at the spine (0.445 g) and head (1.01 g) were greatest when the knees were close to full extension, resulting in the greatest transmission of mechanical energy.

Conclusions: The recorded accelerations illustrate that the body is a nonlinear system. Large amounts of mechanical energy can be passed through the axial skeleton during whole body vibration; keeping the legs near full extension should be avoided. More research is needed to explore the long-term health effects that may be caused by whole body vibration through the feet.

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OHS policy, politics and structures in Québec: Effects on interventions in small workplaces

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Objectives: Fight invisibility of small businesses (SBs) in Québec OHS institutions, as there are no OHS statistics according to workplace size. Complement recent Québec research results where OHS practitioners reveal high level of risk in SBs, ineffectiveness of prevention approaches, and absence of formal recognition by institutions. Interview various stakeholders to link SB situation with broader issues about OHS policies, structures, resources and interventions.

Methods: Secondary analysis of inquiries made by the compensation board into serious and fatal accidents was used to produce an original portrait of risk in small workplaces. Data obtained via 18 semi-directed individual interviews with policy-makers, senior management of OHS institutions, employers' associations and unions, public service organizations and researchers was subjected to qualitative analysis. Official documentation, annual reports, interviews, publications were also used.

Results: Differences between the social and economic context at the time of policy implementation and now are perceptible in the change in public discourse and in the broad orientations of the OHS system. Legislation, enacted without the participation of SB representatives, is geared to large businesses' capacities and resources. The system has slowly shifted from a human rights approach to an auto-regulation and insurance approach.The bipartite structure has been paralyzed by permanent political conflict which is proving especially detrimental to adaptation of prevention and intervention approaches and resources to the new work environment and to SB needs in particular. In-depth inquiries point to over-representation of small workplaces employees among serious and fatal accidents.

Conclusions: SBs are disadvantaged within the Quebec OHS system because of their invisibility and because legislation and intervention are geared to large businesses. Results reveal crisis within the whole OHS system in Québec. The situation affects SBs in a particular way, as they receive a smaller share of OHS services, even though results on risk level concord with the opinions of safety practitioners and with international literature. The SB situation stresses the need for broad debate about government's role and the implementation of legislation and institutional orientations.

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Factors predicting recovery patterns of back pain among workers with compensated occupational back injuries

Chen C, Institute For Work & Health

Objectives: Previous research in Ontario has documented four recovery patterns of back pain among injured workers during the 12 months following a claim: Continuous high levels of pain (43%), Fluctuating pain (33%), Moderate reductions in pain (12%), and Large reductions in pain (12%). The objective of the current analysis is to investigate the baseline factors associated with higher probability of membership in each of these back pain groups.

Methods: Information was collected from a cohort of workers off work because of "new" back injuries via structured telephone interviews. A subset of respondents (n=479) were identified with one of the above four recovery patterns based on the intensity of their back pain. Potential prognostic variables were divided into the following groups: respondents' demographics, clinical variables of back pain (e.g. Roland-Morris disability scores, physical function, mental health, nature of pain), job-related factors (e.g. physical demand of the job, firm size, industry group), respondents' expectations of recovery and workers' perception of their workplaces (e.g. offer of return to work from employer, perception of re-injury on return to regular job). An initial series of prognostic models of recovery patterns were examined with each group of predictors individually. A final model of the most significant prognostic factors from these five groups was fit to identify the most relevant predictors.

Results: Older workers, or those with other health conditions, high level of disability from the injury, or those with the perception of re-injury upon return to regular job, when interviewed at baseline, had increased risk of experiencing stalled recovery represented by continuous high pain in 12 months post-injury. Those workers free of other health conditions, numbness, tingling or a cramping feeling of the back pain, or those with less severe disability were more likely to have fluctuating pain over the follow-up. Young workers were more likely to have moderate reductions in pain during the 12 months after injury.

Conclusions: Factors in clinical diagnosis of back injuries, such as age, status of disability, nature of pain and other ongoing health conditions, were predictive of the recovery patterns from back pain that injured workers would experience. In particular, workers' perception of high risk of re-injury at the workplace was associated with prolonged recovery. When evaluating recovery of compensated back injuries, these combined measures will be useful for health practitioners and workers' compensation boards.

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New onset mental illness: Analysis by occupation and health costs

Cherry N, University of Alberta

Objectives: To identify occupations and industry groups in Alberta with higher than expected incidence of physician-diagnosed affective disorder (anxiety/depression) substance abuse (alcohol/drugs) or psychosis. The pattern of health-care costs associated with such mental disorders and their relation to WCB claims are also examined.

Methods: An approach previously used in the study of new onset adult asthma has been adopted. Mental illness data and cost data were obtained from administrative health records and linked by personal health number (PHN) to a databank of more than 1,000,000 WCB claims (for all causes) in Alberta from 1996-2005. Subjects whose PHN was missing or invalid in the WCB record were excluded, as were those not resident in the 5 fiscal years prior to the claim. Diagnoses of mental ill health in the 12 months prior to the WCB claim were examined. Only those with no record of illness (for each condition) in the 3 years prior to the 12-month "lead in" were included in the analysis of "new onset" disease. Costs of health care in each of the 3 years prior to and following the "new onset" health claim were computed.

Results: Some 600,000 subjects (varying slightly between diagnoses) were available for these analyses, with an incidence for affective disorders of 7.8% (male 6.5%; female 13.1%), substance abuse 1.5% (male 1.5%; female 1.2%) and psychosis 0.7% (male 0.6%; female 0.9%). Analysis by occupation indicated that 17 occupations (coded to 4 digits) were at increased risk of new onset affective disorders, 11 of new onset substance abuse and 6 of new onset psychosis. Of concern was the presence of increased risks of new onset affective disorders and psychoses among community welfare workers and of substance abuse amongst locomotive drivers, although these may in part reflect selective employment and testing schedules. Non-mental health costs increased importantly in the year before the incident mental health diagnoses and continued to be raised for the following 12 months. Among those with WCB claims, the peak in costs prior to diagnosis was higher and, for women, continued to climb.

Conclusions: The method previously applied to new onset asthma has allowed analysis of the distribution of new onset physician-diagnosed mental illness among occupations, although job changes and unemployment following diagnosis of disabling disease complicates interpretation of some results. The interaction between mental illness and WCB claims on heath-care costs in women deserves further analysis.

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L'évaluation de la formation à l'harmonisation travail-vie personnelle : un domaine de recherche en émergence

Chrétien L, Université Laval

Objectives: Depuis plusieurs décennies, les praticiens encouragent vivement la formation à l'harmonisation travail-vie personnelle (HTVP) comme moyen de promouvoir la santé publique et organisationnelle, de même que la performance des entreprises. Mais que sait-on vraiment de la formation à l'HTVP et de l'évaluation de son efficacité ? Comment se structure ce champ de recherche en plein émergence ? Quels sont les résultats les plus prometteurs pour la pratique et les voies de recherche inexplorées jusqu'à présent ?

Methods: À cette fin, une recension des études a été réalisée dans 34 bases de données (31 anglophones et 3 francophones) en management, gestion des ressources humaines, relations industrielles, psychologie, sciences sociales et éducation. La combinaison de 26 mots-clés (tels que « conciliation travail-famille », « harmonisation travail-vie personnelle », « work-family balance », « work-life balance », « formation », « training », « intervention », « évaluation », etc.), a permis d'identifier 2 thèses de doctorat et 8 articles académiques pertinents (Bedell, 2008; Friede, 2009; Fusch, 2002; Green et Skinner, 2005; Kossek et Hammer, 2008; Liossis et al., 2009; Petridou et Glaveli, 2008; Tennant et Sperry, 2003; van Steenbergen et al., 2008; Wilson et al., 2006). De ceux-ci, 12 études distinctes ont été dénombrées. Le contenu de ces études fut analysé en fonction de caractéristiques méthodologiques, du type des formations testées et des résultats de l'évaluation des formations testées.

Results: L'analyse du contenu en fonction des caractéristiques méthodologiques montre, entre autres, que les études sont particulièrement récentes (depuis 2002), que la majorité d'entre-elles sont américaines (aucune étude canadienne n'a été recensée), longitudinales et quasi-expérimentales ou expérimentales. Les échantillons comptent rarement plus de 100 participants et sont principalement composés d'employés dont ont a évalué les perceptions grâce à des questionnaires d'enquête. Les formations testées prennent généralement la forme d'un cours donné aux employés par un formateur externe. Les résultats des évaluations des formations sont positifs : on note une amélioration significative de la capacité d'HTVP et de la santé des participants.

Conclusions: Ce nouveau champ de recherche, l'évaluation de la formation à l'HTVP, se structure autour de projets-pilote ayant montré l'impact positif sur la capacité d'HTVP et la santé des employés. Les formations offertes par un formateur externe se présentent comme les plus prometteuses pour la pratique de l'HTVP. Plusieurs autres types de formation (auto-formation, communauté d'apprentissage virtuelle, coaching, etc., de même que des formations pour les employeurs, les représentants syndicaux et les familles) mériteraient d'être évalués. De plus, l'évaluation des formations pourrait non seulement porter sur les perceptions des participants, mais surtout sur leurs comportements au travail et à la maison.

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Health screening in the workplace – Preliminary results from the WorkHealth Program in Victoria, Australia

Collie A, Monash University, Australia

Objectives: The workplace is becoming an increasingly important setting for establishing health promotion and screening programs aimed at reducing the burden of chronic diseases, such as cardiovascular disease (CVD), diabetes and cancer. This paper seeks to describe the rates of CVD and diabetes risk factors among workers in the state of Victoria, Australia.

Methods: The WorkHealth program was introduced in the state of Victoria, Australia in 2008 by WorkSafe Victoria, the government body responsible for workers' health, safety and compensation in that state. The aims of the WorkHealth program are to reduce the burden of chronic disease in the community and to increase health and well-being in the workforce. A major component of WorkHealth is the availability of free health checks to screen workers for cardiovascular disease (CVD) and diabetes. The health checks involve completing a lifestyle questionnaire, measurement of blood pressure, waist circumference, cholesterol and random blood glucose levels. The lifestyle questionnaire includes gender, age, ethnicity, modifiable lifestyle behaviours (such as tobacco smoking and alcohol consumption) and relevant personal and family medical history. By November 2009, 40,000 health checks had been completed.

Results: There were significantly higher rates of risk factors among males, with 63.0% referred to their general practitioner due to the presence of one or more measured risk factors, compared to 41.5% of women. Rates of diabetes and hypertension also varied by occupation, with those employed in professional services, technicians and tradespeople, and managers more likely to display one or more risk factors for CVD or diabetes. Sales workers, service workers and those in community and personal services were least likely to display risk factors.

Conclusions: Mass health screening in the workplace is feasible. Male workers are more likely to display CVD and diabetes risk factors than women, and certain occupational groups are at higher risk for CVD and diabetes than others.

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Cultural issues in disability prevention, rehabilitation and return-to-work process

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Objectives: To describe the growing evidence in the cultural issue in rehabilitation and return-to-work process, and to discuss different ways to carry out more culturally sensitive approaches to prevent long-term disability and/or to facilitate return to work among workers from different ethnocultural backgrounds.

Methods: A survey was conducted using English- and French-language literature from the early 90s. The databases PUBMED, CINHAL and SocINDEX were consulted using specific keywords such as rehabilitation, therapy, treatment AND cross-cultural communication, cross-cultural comparison, cross-cultural differences, cultural characteristics, cultural competency, transcultural nursing, cultural diversity, cultural factors, culture, ethnic groups, ethnic minority, Work, etc. Fifty-six articles or documents were retained. Content analysis and critical commentary were recorded for each document.

Results: Cultural issues in disability and return-to-work process are still given less attention, and they are often reduced to ethnic or racial confounding variables. Nevertheless, there are growing evidences showing that cultural issues may be determining factors in enhancing health communications, behaviour changes, interpersonal relationships, empathy, trust and confidence. Clinicians' cultural competence appears as one of the most promising issue in rehabilitation programs effectiveness and disability management practices.

Conclusions: This literature review explores cultural issues in disability management, rehabilitation and return-to-work process. The major emerging themes are the development of clinicians' cultural competency (including building mutual trust and empathy), health and cross-personal communication, and pain or illness representations. All of these themes may have a strong impact on the recovery and return-to-work process.

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D

A collaborative early intervention model supporting return to work for health-care workers

Dawson K, Fraser Health Authority

Objectives: This study investigated two different models focusing on early access to physiotherapy services. Return-to-work outcomes were improved by; (1) decreasing duration of time loss acute MSIs by returning injured employees to their regular duties earlier; (2) decreasing costs associated with lengthy absences from work and; (3) assisting in the promotion of a culture that supports connection to the workplace while recovering from injury through the use of early intervention services.

Methods: This quasi-experimental study compared RTW outcomes associated with duration, costs and durability for each of the three treatment groups. Means for duration and costs were analyzed using Analysis of Variance (ANOVAs) and durability was measured using the Chi-Square test of associations. It was hypothesized that the PEARS Plus model would perform better than the PEARS model and the PEARS model would perform better than the non-intervention group (Stream 1 Physiotherapy) on all accounts. There were a total of 289 participants, who met the study criteria and chose to participate. Of those participants, 244 claims had STD duration and STD claims cost. All participants were employees of Fraser Health Authority and actively working within the hospital or community delivering health-care services. All data was collected over a one-year period from May 1, 2007 to April 30, 2008 and data was given an additional six-month maturation period prior to analyzing.

Results: It was demonstrated that the duration of a PEARS Plus (RG 1) claim was statistically lower, M = 40.84 when compared to PEARS (RG2), M =67.60 and Stream 1 Physiotherapy (RG3), M =74.29. There was statistical difference in claims costs for PEARS Plus (RG1), M = $ 4081 when compared to PEARS (RG2), M = $8223 and Stream 1 Physiotherapy (RG3), M = $8307. Both outcomes support the hypotheses that duration and claims costs would be lower in PEARS Plus (RG1) when compared to the other two treatment groups. There were insufficient claims to reliably assess durability.

Conclusions: This pilot study investigated if the use of an off-site model, that was closely connected to the workplace and WorkSafeBC (the insurer), would be a viable option when compared against its on-site predecessor, PEARS. This research has demonstrated that access to supportive resources such as physiotherapy in conjunction with modified work or transitional duties programs have shown to be effective in facilitating return to work for temporarily and permanently disabled workers. The PEARS Plus (RG1) model demonstrated that it was an effective and sustainable way of delivering early intervention services and in the end performed statistically better than its predecessor.

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Taking care of those who care: A stress management intervention for anti-violence workers

Dechief L, Equality Research & Consulting

Objectives: Working with victims of violence is one of the most demanding professional experiences. Anti-violence workers are exposed, on a regular basis, to the difficult stories and excruciating pain of victims/survivors. Mindfulness-Based Stress Reduction (MBSR) has been found to be a successful intervention that helps individuals be less reactive to stress-related events. The objective of this research is to conduct, assess the impact of a MBSR management intervention on stress, depression and burnout for anti-violence workers.

Methods: The five residential and 10 non-residential programs of Atira Women's Resource Society form the site of this research. The study uses a quasi-experimental design that implements a 2 (experimental vs. control group) by 2 (baseline, post-treatment) study design, yielding a between-groups comparison condition. Participants are assigned to receive an 8-week MBSR intervention or to a wait-list control group. Validated tools are being used pre- and post-intervention to measure the degree of burnout, stress and depression. Records kept at Atira allow us to look at absenteeism rates (sick leave). Potential moderators of the effectiveness of intervention are also investigated, such as experiences of violence, job characteristics (emotional demands, role expectations, control, social support, job insecurity, and work-life balance), and personality traits (Big Five, self-esteem).

Results: We have conducted the baseline assessment among both the intervention and control groups. Participants of the intervention group are undergoing training, scheduled to finish in February 2010. Data will be analyzed using ANOVA, ANCOVA and repeated measures study design. We will report on the impact of the 8-week stress management intervention on anti-violence workers' stress, depression and burnout. We will also examine under which conditions the intervention is most likely to be effective.

Conclusions: "Mindfulness-Based Stress Reduction" (MBSR), which includes yoga, meditation and other "mindfulness-based" practices, has been found to be beneficial for a variety of health conditions and has the potential to "transform those who work with clients with painful or traumatic experiences…including becoming less reactive to stress-related or anxiety-provoking events." Studies with medical students and health professionals who engaged in MBSR found statistically significant decreases in levels of psychological distress, including depression and anxiety, and a greater sense of control and adaptability skills as well as empathy. This study reports on the impact of MBSR on the health of anti-violence workers.

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Occupational carcinogens: Current knowledge, gaps, and stakeholder perspectives

Demers P, Occupational Cancer Research Centre

Objectives: The research effort on occupational cancer has been diminishing for several decades. The Occupational Cancer Research Centre (OCRC) was launched to revitalize this research area in Ontario. To help develop Centre research priorities, we have reviewed the literature for gaps, and surveyed stakeholders in the occupational cancer community to understand their concerns regarding occupational exposures. This presentation will describe our current understanding of workplace carcinogens, identify knowledge gaps, and characterize the needs of the stakeholder community.

Methods: Contents of the IARC Monographs on the Evaluation of Carcinogenic Risks to Humans were reviewed and summarized to describe our understanding of occupational exposures as possible carcinogens, and to identify gaps in our understanding. Special attention was paid to the depth and breadth of studies on women and minorities. Stakeholder views were sought through a web-based survey administered by OCRC between June and July, 2009.

Results: According to IARC Monograph evaluations, occupational exposures represent between one-third and one-half of all exposures classified as sufficient, probable and possible human carcinogens. Many occupational carcinogens have been identified, but a far larger number need further evaluation. In addition, much of the literature examined focused on white men, pointing to a deficiency in the amount of research including women and minority populations. OCRC received 177 completed surveys from the stakeholder community. Nearly 100 workplace exposures were identified as concerns for occupational cancer research. Although numbers were small, there was some suggestion that priority exposures differ somewhat by respondents' occupational role.

Conclusions: Both the number of occupational exposures established as carcinogenic to humans and the number of suspected exposures in need of further investigation underscore the importance of increasing capacity for research in occupational cancer. Deficits in research looking at women and minority populations also highlight the need to diversify efforts put forth in this field. The Occupational Cancer Research Centre hopes to contribute by developing and carrying out a research program that addresses knowledge gaps found in the literature, while attempting to address concerns identified by the stakeholder community.

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Time trends for asbestosis, silicosis, and coal workers' pneumoconiosis in British Columbia

Demers P, University of British Columbia

Objectives: Pneumoconioses are fibrotic lung diseases typically associated with high levels of respirable dust exposure. Fibrogenic dust exposure levels have been decreasing since the 1970s driven by recognition of the hazards and lowering of workplace exposure limits. Surveillance efforts for pneumoconiosis have traditionally relied on death certificates or workers' compensation data, which have significant limitations. We used outpatient and hospital, as well as compensation data, to examine whether the incidence of the pneumoconioses is decreasing.

Methods: Data on all outpatient and hospital visits between 1991 and 2007 for asbestosis, silicosis, and coal workers' pneumoconiosis (CWP) were obtained from the BC Ministry of Health. Data on accepted claims was obtained from WorkSafeBC. Data sets were linked by PopData BC and a case was defined as a person with an accepted compensation claim (WCC), any diagnosis in hospital discharge records (HDR), or at least two visits in the outpatient records (OPR). Trends were assessed for men and women between 1992 and 2006. Pneumoconioses are progressive and, except in the case of exceptionally high exposures, take decades to develop. To assess whether exposure levels are decreasing we examined trends in data collected by the Workers' Compensation Board of British Columbia and Ontario's Ministry of Labour. We also examined trends in occupational exposure limits, Stats Canada employment data, and Natural Resources Canada production data.

Results: 1561 cases of asbestosis were identified (702 OPR/461 HDR/11 WCC/287 combination; 97% male). 388 cases of silicosis were identified (52 OPR/268 HDR/21 WCC/22 combination; 86% male). 388 cases of CWP were identified (71 OPR/303 HDR/5 WCC/1 combination; 72% male). Among men, 1992 to 2006 asbestosis incidence increased from 5.5 to 6.2/100000, silicosis and CWP decreased from 2.3 to 0.3/100000 and 2 to 0.4/100000, respectively. Similar trends were observed among women, based on small numbers. Since the 1970s exposure to asbestos, silica, and coal dust appear to have decreased, although there is still the potential for high exposures to smaller groups.

Conclusions: The decreasing rates of silicosis and CWP are consistent with the decreasing prevalence of high exposures over time. This could be due to a difference in the latency/induction periods or a lower threshold for reporting in the datasets. The latter is compatible with the different pattern of case ascertainment. Increasing asbestosis rates are compatible with mesothelioma rates, but asbestosis is thought to have a different dose-response relationship with asbestos. These results are based on administrative databases and the numbers may not be precise. However, using data from this combination of sources is useful for surveillance of these serious work-related diseases.

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"What benefit are we getting out of this?": Investigating sustainability in two occupational health programs

Dixon SM, University of Waterloo

Objectives: Many occupational health and safety (OHS) programs are intended to endure for an extended period of time. However, evidence exists that OHS programs may not be sustained long enough that their anticipated benefits for workers and companies are realized. In this presentation, sustainability is examined in the context of participatory ergonomics. Participatory ergonomics draws on the input of labour and management representatives to address exposure to hazards that may lead to work-related MSDs. This presentation investigates how access to resources and management's support influenced the continuation of occupational health programs in two settings.

Methods: The analysis is based on field notes and interview data gathered in two workplaces: a furniture manufacturing company that produces components for office equipment and a courier company. Field notes were recorded for 30 months in the courier depot and for 48 months in the furniture plant. In each site, interviews were conducted with approximately 25 individuals, including representatives of labour and management. Interviews were audio recorded and transcribed verbatim. Transcribed interviews and field notes were imported into a qualitative software program and then analyzed.

Results: Participatory ergonomic (PE) programs were established in a courier depot and a manufacturing plant. Ergonomic change teams that consisted of labour and management representatives were formed. The outcomes differed in the two sites. In the courier company, the ECT made several changes to reduce MSDs; however, the PE program was not accepted by management as a worthwhile way to address OHS concerns. Support for the program's maintenance, strong in the beginning, receded over time and management was unprepared to provide for its continuance. Conversely, in the furniture company, support grew over time and management accepted the PE program as an important means of addressing high OHS costs. The findings demonstrate how the programs' sustainability differed and how these variations were related to (a) the ECTs' capacity to make a case for PE program continuation and (b) the organizational context in which the programs were embedded.

Conclusions: Two main factors influenced PE program continuation. The first was the ability of program supporters to demonstrate an impact on OHS costs. While in the furniture plant, supporters successfully made the case that the programs contributed to reducing OHS costs. In the courier depot, management viewed the programs to have no measurable effect on these costs. The second factor was the ability of program supporters in the furniture plant to integrate the programs into the company's OHS system. They did this in three ways: they promoted the PE program among key audiences such as plant managers, they formalized the program by codifying its procedures, goals, and identifying personnel responsible for its activities, and they established PE as complementary to the plant's OHS programs, and specifically its return-to-work program. In contrast, in the courier company, the PE program was never fully integrated into facility activities and, in the absence of evidence that it decreased OHS costs management support eventually was withdrawn.

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Radiation and cancer: Long-term risks in Ontario uranium miners

Do MT, Centre for Research in Environmental Epidemiology (CREAL); Cancer Care Ontario

Objectives: Excess lung cancer risk associated with exposure to inhaled radon decay products among uranium miners is well established. Although ingestion is also a potentially important route of exposure, risk associated with non-lung cancer sites has not been well examined. The objective of this presentation is to examine the relationship between exposure to radon decay products and the incidence and mortality of cancers other than lung among the Ontario cohort of uranium miners.

Methods: A cohort of miners who had ever worked in an Ontario uranium mine between 1954 and 1996 was created using the Work History File and the National Dose Registry. Cumulative radon exposures measured in Working Level Months (WLM) were estimated by year and mine for each miner. Cancer diagnoses (1964-2004) and cancer deaths (1954-2004) occurring in Ontario were determined by probabilistic record linkage with the Ontario Cancer Registry. Non-cancer deaths were also ascertained from the Ontario mortality file, 1954-2004, to calculate person years at risk. Poisson regression methods for grouped data were used to estimate the relative risks (RR) and 95% confidence intervals (CI) by exposure level.

Results: The final cohort consisted of 28,273 Ontario uranium miners. By the end of 2004, 2,926 miners had been diagnosed with cancer and 1,640 died from cancer (all sites). Excesses in lung cancer mortality were confirmed. When comparing the highest cumulative exposure category (>40 WLM) to the referent group (0 WLM), significant increases in both stomach (RRIncidence= 2.30, 95% CI =1.02-5.17 and RRMortality=2.90, 95% CI=1.11-7.63) and colorectal cancers (RRIncidence =1.56, 95% CI=1.07-2.27 and RRMortality =1.74, 95% CI=1.01-2.99) after adjusting for age at risk and period effects. No excess risks were observed for other cancer sites including brain, bladder and kidney.

Conclusions: In addition to lung cancer risk, analyses from this study suggest that occupational exposure to radon decay products among Ontario uranium miners increases the risk of diagnosis and death from stomach and colorectal cancers.

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The effect of experience on caregiver low-back loads resulting from overhead and floor lift devices

Dutta T, University of Toronto

Objectives: To determine the effect of caregiver experience on the loads generated at the low back of caregivers during lift use.

Methods: Twenty-one caregivers were asked to perform five activities designed to simulate the activity of moving a patient from a bed to a wheelchair and back to the bed. Each caregiver was instrumented with ForceShoes as well as a set of reflective markers used to determine body posture. The caregiver was asked to perform each task alone as well as with the help of a second non-instrumented caregiver. Caregivers were asked to repeat the five activities in a total of three different conditions with each lift: 1) Solo - the instrumented caregiver works alone, 2) Primary - the instrumented caregiver who takes control of the lift device while working in a pair, 3) Secondary - the instrumented caregiver who supports the patient while working in a pair

Results: When the 21 caregivers were divided into two groups based on their amount of lifting experience, we found inexperienced caregivers (n=11, mean experience = 2.6±1.6 years) generated significantly higher loads than experienced caregivers (n=10, mean experience = 15.4±10.2 years).

Conclusions: Experienced caregivers generate lower loads on their bodies compared to inexperienced caregivers when operating both floor or overhead lifts with one or two caregivers.

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E

From research to action: An academic researcher's perspective

Eakin JM, University of Toronto

Objectives: From the standpoint of an academic researcher, to reflect on the stigma reduction collaboration between RAACWI, a SSHRC-funded "CURA" (Community University Research Alliance) and Ontario's WSIB. The presentation focuses on the role of research and the researcher on the knowledge exchange and research-action process.

Methods: Auto-analysis of the presenter's own experience as an academic researcher participating in the RAACWI-WSIB stigma reduction project, and in other research collaborations with the WSIB.

Results: Academic researchers' engagement in bringing research to action depends on their willingness and capacity to: 1) regard the process more as knowledge exchange than as knowledge transfer; 2) accept the transformation and evolution of intellectual capital and share ownership of emergent ideas and action; 3) get in the shoes of those using research knowledge and understand the institutional forces, organizational imperatives and power dynamics that govern "inside" knowledge and practices and responses to and uptake of "outside" knowledge; 4) step outside officially sanctioned and rewarded university roles, recognizing attendant risks and returns; 5) appreciate the length of time, particular context/circumstances, positioning, and interpersonal skills required to generate the level of trust and mutual respect required for successful collaborations.

Conclusions: The participation of academic researchers in successful initiatives like the RAACWI–WSIB project may depend on the confluence of a unique set of circumstances. Profound changes in the university may not work in favour of such collaborations in the future.

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The stigmatization of injured workers: The construction of "unworthiness" in the compensation process

Eakin JM, University of Toronto

Objectives: Injured workers claiming compensation can experience considerable social "stigma" – disapproval and negative stereotyping - that can be deeply morally discrediting and increase suffering and impede rehabilitation. Our previous research identified a "discourse of abuse" (presumptions of worker bad faith and misuse of the system) surrounding work-related injury, compensation claiming, and return to work, and documented its stigmatizing and disabling consequences for injured workers. This study and others suggest that such a discourse is produced and sustained through societal, legal, and administrative policies, structures and practices. The purpose of this paper is to extend this line of inquiry by reflecting on the stigmatization of injured workers in the light of findings from our subsequent study of front-line service work in a compensation agency.

Methods: This project investigated, from a sociological perspective, the nature of front-line service work with clients in Ontario's Workplace Safety and Insurance Board (WSIB). A variety of interpretive qualitative strategies (e.g. discourse analysis, structural-interactionist induction) were employed to collect and analyze data from individual interviews with front-line staff (adjudicators, nurse case managers, employer account administrators, team managers), "go-along" ethnographic observations of daily work practices, and institutional texts (e.g. policies, performance guidelines).

Results: Work at the front lines is characterized as a "professional assembly line" on which staff mediate the competing accountabilities of the WSIB as an institution (e.g. serving conflicting stakeholder interests) and navigate the difficulties and uncertainties associated with human service work. To accomplish their work in this context, front-line staff engage in strategic "discretionary" and "discursive" practices, some involving the construction of worker "unworthiness". Such constructions are tied to the perceived failure of workers to play the role expected of them, the moral illegitimacy of economic motivation for workers, and the functional administrative uses of unworthiness as a basis for keeping the work process moving and evaluating claims. These and other aspects of the WSIB-client encounter (e.g. telephone based interaction, exclusion of the social and non work-related dimensions of injury) create conditions that can undermine and fracture injured workers' identity and sense of being understood, and perversely and unintentionally stigmatize them.

Conclusions: The sources and sites of stigmatization are subtle and deeply embedded in institutional structures and process, and cannot be redressed without systemic change in the occupational health and safety system and in society more generally. Ontario's WSIB has recently been engaged in serious self-inspection and reform in a promising effort to reduce its own contribution to the problem.

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Safer workplace through authentic training

Emad G-R, University of Victoria

Objectives: Each year many workers are injured, disabled or lose their lives in Canada. Accidents and incidents at work are the biggest challenges in the world of work. Investigations into industrial incidents have shown that the human errors due to the lack of competency are the main contributory factors. The purpose of this study is to investigate the processes that the workers develop their skills and associated transfer of knowledge and expertise to their workplace.

Methods: This research is based on an ethnographic case study conducted in the maritime settings-domain in Canada. The study is part of a larger research program designed to better understand the apparent contradictions in the maritime education and training system specifically designed to increase the competencies of practitioners. I attended and videotaped the classes and did interviews with students and the course designers and lecturers. My data sources comprise field notes, videotaped sessions in the classroom, and interviews. The data sources also included documents such as lecture notes, syllabi, handouts, Transport Canada's rules and regulations.

Results: In recent decades, the majority of training of newcomers has shifted from workplace to the training institutes, which separates the learning from practice. Mariners like any other workers attend training programs in anticipation of gaining proper skills and knowledge that they need in practice to work safely and efficiently on-board ships. Yet, throughout our research we found out that there is a gap between what mariners learn in their college-based training program and what they are supposed to do in the workplace. This gap is a source of risks to occupational health and safety on board of ships.

Conclusions: There is a critical need for the comprehensive revision of vocational training system in Canada. The vocational pedagogy has to re-contextualize the field of practice itself and translate this field into curriculum. Apart from use of sophisticated technologies and the tasks, which needs higher order cognitive knowledge, most features of traditional practice in workplaces have properties that depend on particular contexts. The vocational pedagogy also has to consider the situated knowledge that is usually closely associated with those job tasks. Vocational pedagogy thus needs to consider both aspects: the occupationally re-contextualized disciplinary knowledge and the component of practice to be realized at workplace.

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Relative and absolute inequalities in cause-specific mortality among Canadian adults by socioeconomic indicator

Etches J, Institute for Work & Health

Objectives: To describe the extent of social inequalities in mortality among adults in Canada by age, sex, cause of death, and socioeconomic status (SES) indicator, and to explore various relative and absolute methods of summarizing this inequality.

Methods: Ten-year mortality for a 15% sample of the adult population of Canada was collected by linking the 1991 Census long-form questionnaire to death certificates. Cox models were used to estimate the hazard of death by cause of death, sex, age and SES indicator for adults aged 30 to 69 in 1991. SES indicators include one measure of education, two measures of income and four measures of occupational rank. Causes of death were aggregated by chapter of the International Classification of Diseases, and also by two measures of medically amenable diseases, a measure of diseases due to alcohol and a measure of diseases due to tobacco. Summary measures include the Relative Index of Inequality (RII), the Population Attributable Risk %, the excess rate, excess death, and Potential Years of Life Lost (PYLL).

Results: The RII is two to three for most causes of death and SES indicators. Relative inequality was slightly greater for men, and decreased with age for most causes of death. Relative inequality varied by cause of death but rarely by socioeconomic indicator. Excess rates are high for common causes of death, men, and at older ages, and are mostly consistent across socioeconomic indicators. Excess deaths are greater at ages 50-59 than 60-69 due to the greater population at risk. PYLL are greater for men, and show cause-of-death-specific age patterns.

Conclusions: There are large socioeconomic inequalities in mortality among Canadian adults. Instances in which the extent of inequality varies importantly by socioeconomic indicator are rare. Men experience more inequality than women according to relative, and especially absolute measures. Magnitudes of inequality differ by cause of death and age, but the pattern depends importantly on the summary measure used, even among absolute measures. The appropriate measure depends on the purpose of the analysis, the audience, and on value-judgements regarding what constitutes inequality.

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F

Understanding work disability among rural health-care workers – A literature review and environmental scan

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Objectives: Approximately 20% of Canadian health-care workers work rurally (CIHI, 2007), yet disability management programs are developed in urban areas without attention to how they apply to rural workers. Work disability prevention research and rural health have remained studied in a compartmentalized fashion. We conducted a comprehensive literature review and an environmental scan to connect these fields and understand rural workers' vulnerability to workplace injury and prolonged work absence, focusing on health-care workers.

Methods: Three databases - Medline, CINAHL and EMBASE - and relevant research centres and government agencies were searched to identify all relevant studies, in English, published between Jan 1, 2000 and Oct 6, 2009. Papers were included if they discussed occupational injury, work absence duration, disability management, or risk factors for disability prevention outcomes, among rural workers or if they compared rural and urban workers. Risk factors for workplace injury and prolonged work absence were identified based on expert knowledge in the field of work disability at large. This allowed inclusion of articles discussing known risk factors within the context of rural and urban differences, and not necessarily in relation to work disability outcomes. Between July and Nov 2009, we conducted an environmental scan with stakeholders and researchers identified through snowballing. Using semi-structured interviews, participants discussed workplace injury and/or work disability management among rural workers, depending on their area of expertise.

Results: We identified 814 references – 9 discussing disability prevention outcomes, and 25 discussing risk factors. This limited and primarily non-Canadian evidence suggests high rates of injury among rural workers, which, together with work absence duration, may vary by occupation along a rural-urban continuum. We identified risk factors at the environmental-, worker-, job-, organizational-, worker compensation system, health-care access, and disability management process levels. Important methodological limitations were noted. Fifteen experts participated in the environmental scan, identifying health-care access issues, reduced availability of modified work, and distance management and policy-making structures as important challenges for disability prevention among rural workers.

Conclusions: This review points to a glaring paucity of evidence, particularly from a Canadian context, on work disability prevention issues for workers in rural areas including in the health-care sector. Workplace violence, high workloads, lack of replacement staff, and challenges unique to rural contexts, such as distance and isolation were identified as key risk factors for poor disability outcomes in rural health-care workers. Further Canadian research, addressing methodological limitations of previous studies, is needed to document the disparities in work disability outcomes between rural and urban workers, as well as to understand the source and risk factors associated with these disparities.

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G

From research to action: A policy-maker's perspective

Geary J, Workplace Safety and Insurance Board

Objectives: To describe: the awakening of awareness within the WSIB of the ways in which injured workers are stigmatized; our perspectives on the WSIB/RAACWI collaboration; and the action WSIB is taking to eliminate injured worker stigma within the WSIB.

Methods: Participants will follow the development of RAACWI's first “Blue Sky Discussion” with WSIB management staff. We will explore: some research results describing the effects of stigma on injured workers; the importance of building trust and common ground in initial stages and some of the tools used to facilitate that process; the role of research and researchers; the dynamics of evolving relationships; the importance of having differing view points involved in the process; and how this initiative has changed the individuals involved.

Results: Some of the results achieved in partnership with the Research Action Alliance on the Consequences of Work Injury (RAACWI), the Ontario Workplace Safety and Insurance Board (WSIB) set out to define injured worker stigma, recognize it in language, behaviour and attitudes, and find ways to eliminate it. Using staff training opportunities, partnering with other internal outreach initiatives, examining the values we look for when hiring new staff, and beginning a dialogue with senior management and front-line staff, the WSIB is working to reveal the “inconvenient truth” about injured worker stigma.

Conclusions: We have experienced a collaborative and action-oriented process of knowledge transfer that operates in two directions: researcher to practitioner/policy-maker and policy-maker/practitioner to researcher. The perspective of each of these parties was crucial to addressing the issue. While it is premature to evaluate the effectiveness of the actions taken, we have gained a deeper understanding of the issue of stigma and of the complexity and possibilities of eliminating it. We've been heartened by the finding of common cause, and gained confidence in our ability to interact with researchers and advocates to create change.

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Using research to improve work reintegration outcomes

Geary J, Workplace Safety and Insurance Board

Objectives: To describe how the Workplace Safety and Insurance Board (WSIB) is using research in policy and program design to improve work reintegration outcomes. To describe the benefits and challenges of incorporating evidence into policy and program design.

Methods: WSIB has been using work reintegration research to inform policy, program design and service delivery interventions for several years. A set of evidence-based RTW policies was created in 2006, a new service delivery model was introduced in 2008-09 that incorporated research into several processes, and a new work reintegration model/strategy is being developed based on leading global practices and intervention research.

Results: The session is not about the research itself, but about the ways in which WSIB has used it, the benefits and challenges of incorporating research into policy, program design and practice. WSIB has collaborated with researchers to understand work reintegration performance drivers and duration, in the design of processes and tools for front-line service delivery, and in creating a new work reintegration model. Benefits include increased confidence in and credibility of the design, greater awareness of where evidence is lacking, and encouragement of relevant research. Challenges include knowing what evidence is strong, how to translate knowledge into a practical tool, and how to assess why it may not be working, as well as just getting comfortable working with researchers in this way.

Conclusions: There are rewards in using research to build strategy, policy, programs and interventions. It is not a simple process, however. The WSIB experience will provide insight to both researchers and policy-makers on what works well and what challenges may be encountered.

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Performance de Medline pour l'identification des articles de qualité en santé au travail

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Objectives: Medline est la principale base de donnée bibliographique dans le domaine biomedical. Elle est toutefois non exhaustive, notamment dans le domaine de la santé au travail. L'objectif de cette étude était d'évaluer l'exhaustivité de cette base pour les seules études de bonne qualité, utilisables dans la pratique quotidienne du médecin ou du professionnel de santé au travail.

Methods: Nous avons construit une base de référence comprenant tous les articles retenus par les revues systématique de littérature de santé au travail, publiées sur le site du Cochrane Occupational Health Field (http://www.ttl.fi/internet/partner/cochrane). Chacune de ces revues systématiques reposait sur l'utilisation des plusieurs bases de données, sans restriction de langage ni de source de publication.

Results: Au total, la base de référence a inclus 441 articles, issus de l'ensemble des 34 revues systématique de littérature indexés dans la Cochrane Occupational Health Database. Parmi ces articles, 394 (89,3%) ont pu être identifiés dans Medline, parfois dificillement, et 50 (11,6%) n'étaient pas indexés dans cette base de donnée.

Conclusions: Le taux de couverture de Medline dans le domaine des seuls articles de qualité en santé au travail est très supérieur à son taux de couverture moyen dans ce domaine. Bien que Medline ne soit pas exhaustif, son utilisation exclusive permet d'obtenir une très bonne couverture des articles rapportant des études de bonne qualité méthodologique, et l'utilisation d'autres bases de données (Embase, PEDRo, PsycINFO, CINAHL, Cochrane Central Register of Controlled Trials) n'apporte qu'un bénéfice marginal et ne présente pas un rapport coût-bénéfice favorable pour le professionnel de santé au travail.

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An asbestos exposure database for asbestos mine/mill workers (1977-1994)

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Objectives: As part of the creation of the Baie Verte, Newfoundland Asbestos Miners Registry, the results from over 7,000 asbestos personal and area air samples collected at the Baie Verte open pit asbestos mine and mill between years of 1976 and 1994 are described. Patterns of variance are explored within- and between-sampling units (persons, shifts, jobs within departments).

Methods: Over 6,000 personal and area sampling data were extracted from monthly lists of routine air sampling results for asbestos taken at the asbestos mine and mill near Baie Verte in Newfoundland between the years of 1976 to 1994. For the years 1991 to 1994, actual individual sampling results including raw fibre counts were available for over 250 of these personal samples. In addition, data for just under 1,000 personal samples were extracted from an intensive four-month government study carried out in 1981. The data were evaluated for log-normal distribution fit and descriptive statistics. For the data from the years 1991-1994, a mixed model analysis was performed to determine the between- and within-worker proportion of the total variance. The data from the intensive 1981 sampling campaign was used to ascertain the within- and between-shift variance.

Results: The distribution for most job categories could adequately be described as fitting a log-normal distribution. For almost 100 different job codes, mean exposures ranged from 0.1–5 f/mL (averaging around 0.5 f/mL). Variability with job categories was quite significant often exceeding a geometric standard deviation of 2.5. The between worker portion of the total variance was usually negligible. Within-shift variation accounted for more than 75% of the total variation in fibre counts. A slight downward trend over time could be detected in most groupings however, a slight increase was observed in the last few years before the mine shut down.

Conclusions: Personal exposures to asbestos fibres in the Baie Verte asbestos mine and mill were generally below 2 f/mL but greater than 0.1 f/mL. Exposures were greater in the mill than in the mine. Most of the variation in the personal air sampling results could be attributed to the within-worker/shift component, however, some of this may be due to the significant variation in asbestos fibre counting techniques. The exposure database represents a comprehensive picture of worker exposures in the Baie Verte asbestos mine and mill for the years from 1976-1994.

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Approche organisationnelle du déchargement de containers: analyse des effets en termes de santé et sécurité

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Objectives: Compte tenu du contexte économique actuel, on constate que le recours à des fournisseurs localisés dans les pays en voie de développement augmente. Dans cette logique, le transport est réalisé par containers dans lesquels la marchandise occupe l'ensemble de l'espace (du sol au plafond). Ce type de transport impose un déchargement manuel de la marchandise. Notre travail s'intéresse à cette activité pour prévenir les accidents du travail et les maladies professionnelles des salariés.

Methods: L'analyse a consisté à observer (enregistrements vidéo) 5 équipes de 3 opérateurs réalisant le déchargement d'une trentaine de containers composés de différents types de marchandises (électroménager, textile, chaussures …). Les containers comprenaient entre 4 et 20 références de produits à trier. Une catégorisation des opérations et des postures est effectuée. Elle recouvre des dimensions telles que la prise et le lancé de colis, les postures adoptées par les opérateurs, le poids soulevé par opérateurs et par heure, ou encore la coordination et la répartition des tâches à l'intérieur des équipes. Des mesures de fréquence cardiaque sont réalisées comme indicateurs de l'effort produit. Des entretiens complètent ces observations.

Results: Les résultats montrent que : Le tri et le déchargement sont dépendants de la manière dont la marchandise a été chargée; La présence d'un expert influence les stratégies déployées par les opérateurs pour trier et décharger. Ces stratégies n'imposent pas les mêmes contraintes en terme d'efforts physiques; Les stratégies d'organisation peuvent évoluer durant le déchargement d'un même container; Des variations sont constatées dans la répartition des charges soulevées par les opérateurs d'une même équipe.

Conclusions: Le recours à des solutions techniques pour soulager les opérateurs dans les opérations de manutention (plate-forme de tri, bras de levage…) est envisageable dans certaines situations (espace de quai disponible important, nombre restreints de référence de colis…). Cependant, ces situations sont peu fréquentes. Il s'agit alors de développer des solutions organisationnelles et de formaliser les stratégies efficaces sous peine d'accroitre les efforts de manutention et/ou de diminuer l'efficacité des opérations de tri. Cette approche organisationnelle est d'autant plus cruciale que la saisonnalité du déchargement de container conduit les entreprises à recourir à du personnel temporaire pour assurer ces opérations.

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Occupational health and safety measures in small businesses employing immigrant workers in Montreal

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Objectives: This study seeks to understand the difficulties involved in appropriating workplace-safety measures in small businesses (SBs) with a high proportion (≥25%) of immigrant workers. The following research questions are: Which are the strategies and arguments conducive to management's adoption of OHS measures in a context of market globalization that threatens profitability in SBs? How can the adoption of safety management be sustained to create a culture of workplace safety in such small businesses?

Methods: It's a descriptive design with a comparative group. The study population is composed of unionized and non-unionized private-sector SBs with fewer than 50 workers, of which at least 25% are immigrants (that is, born outside Canada) (n=20). Neither immigration status (citizen, landed immigrant, refugee, or awaiting status) nor length of stay in Canada is considered. One or more professionals, from any discipline, working in the Health and Social Services Center Montagne's OHS team has conducted an intervention since June 2008 in the 20 SBs under study. The control group is composed of 10 SBs that fulfil the same criteria but do not employ as many immigrants. The enterprises in the control group thus employ fewer than 50 workers, of which 75% of are Canadian born. A mixed methodology is used, including questionnaires, structured interviews and analysis of technical health management data regularly entered on each SB by professionals.

Results: The preliminary results indicate that managers hold a good number of arguments in favour of OHS. Obviously, production costs are of primary consideration: SBs must continually balance investment in production against immediate returns. However, the workers and employers have problems understanding OHS regulations. Half the respondents duly recognized that their knowledge of some of these issues was average and, in some cases, limited. Communication problems with allophone personnel in the studied companies arise during safety training. The barriers to comprehension are not solely linguistic; the actors also have difficulty grasping the OHS culture, particularly the basic principle of worker-employer parity.

Conclusions: The employment of immigrants is a solution to the problems of labour-force renewal in many countries. However, such workers are concentrated in very high-risk industries and they know little or nothing about their rights and duties about the available prevention methods. In order to develop culturally-appropriate health and safety activities, an essential basis is missing: a mutual and democratic commitment by both employers and employees to act upon preventive health and safety work. However, actors' recognition that their understanding of health and safety laws and regulations is at best partial can lead them to seek support for their efforts.

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Sous-traitance et accidents. Exploitation de la base de données EPICEA de l'INRS

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Objectives: La sous-traitance constitue une pratique économique ancienne, qui a connu un développement important. Pourtant, son ampleur et ses conséquences en termes de santé et sécurité restent difficiles à estimer. Cette étude visait, grâce à l'exploitation d'une base de données d'accidents du travail (EPICEA), à identifier les accidents liés à la sous-traitance et à les caractériser. Ces analyses, qui s'inscrivent dans une réflexion plus large de l'INRS sur le sujet, feront l'objet de cette communication.

Methods: De première analyses visaient à identifier et caractériser les accidents liés à la sous-traitance dans la base (EPICEA est une base de données française d'accidents du travail, constituée grâce au travail d'enquête après accident par les CRAM) : présélection des dossiers d'accident sur la base de mots-clés ; examen des dossiers selon des règles d'identification de ces accidents ; caractérisation des accidents retenus sur différentes dimensions (type de sous-traitance, victime…). Des analyses plus cliniques avaient pour objectif d'identifier des "types" d'accidents liés à la sous-traitance, en fonction des facteurs ayant contribué à leur survenue. Les dossiers retenus ont fait l'objet d'une catégorisation centrée, non pas sur l'ensemble des facteurs ayant contribué au processus accidentel, mais sur ceux relevant de l'organisation des interactions entre entreprises utilisatrice et extérieure. Tous les dossiers répertoriés pour l'année 2002 ont été considérés, quel que soit le secteur d'activité ou la gravité des accidents.

Results: 79 accidents (11,7% des 676 dossiers) ont été considérés liés à la sous-traitance. Les sous-traitants sont les principales victimes des accidents. Toutefois, les personnels de l'entreprise utilisatrice constituent les victimes de près d'un accident sur six. Trois types d'accidents ont été identifiés, selon que les fragilités du système entreprises utilisatrice/extérieure relèvent de : l'organisation de la sécurité relative à la prestation ou de l'opération elle-même ; l'organisation des relations d'interdépendance entre les activités successives des personnels des deux entreprises ; l'organisation de la concomitance des activités des uns et des autres (communauté de temps et lieu).

Conclusions: Ces résultats tendent à confirmer la criticité des situations de sous-traitance évoquée dans la littérature. Ils soulignent que la problématique "sécurité et sous-traitance" ne se limite pas à la question de la sécurité des personnels extérieurs lors d'interventions dans l'établissement de l'entreprise utilisatrice. La sécurité des personnels de l'entreprise utilisatrice sur leur propre site et celle des personnels sous-traitants en dehors de l'établissement de l'entreprise utilisatrice sont également concernées. C'est ainsi la question de l'organisation des interactions entre ces entreprises, ou celle des "entreprises en réseau", et de leurs relations avec la sécurité que cette problématique soulève.

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H

A survey of exposure data availability in Canada

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Objectives: CAREX Canada is a national carcinogen exposure surveillance project based at the University of British Columbia. An integral part of this project is the Canadian Workplace Exposure Database (CWED) which will house measured Canadian workplace exposure data and allow the characterization of exposure levels and trends by occupation and industry. In 2009 we surveyed Canadian regulatory agencies (provincial, territorial and national) to obtain a clearer picture of the quantity and quality of exposure data available.

Methods: CAREX Canada has already acquired large volumes of exposure data held by five Canadian public agencies, including WorksafeBC, the Ontario Ministry of Labour and the National Radiation Dose Registry. In March of 2009, the 11 remaining national, provincial and territorial workplace regulatory agencies were contacted by a CAREX Canada hygienist and asked about current and historical collection practices, estimated volume of data holdings, data storage format (hard copy vs. electronic database), and data retention policies.

Results: Out of the 11 regulatory agencies contacted, three hold essentially no exposure data, due to short retention policies combined with scant present-day workplace sampling. Of the eight remaining agencies confirmed to possess data, seven indicated that the majority of their exposure data holdings are stored in unwieldy formats (i.e. hard copy or individual electronic files). Quebec and Human Resources Services Development Canada are the only regions currently collecting significant amounts of exposure data; most other provincial and territorial agencies collect anywhere from zero to 200-300 measurements annually. Retention policies for archived data vary across agencies and occasionally by substance.

Conclusions: There is a wide range in the accessibility of workplace exposure data across regulatory agencies in Canada, due to variation in database formats, differing data retention policies, and a significant decrease in workplace exposure sampling performed by regulatory bodies since the 1990s. This has made exposure data relatively inaccessible from a research point of view. Although limited in scope, the results of this survey show downward trends in the availability of historical and prospective workplace exposure data in Canada. This does not bode well for effective exposure surveillance to inform research and evidence-based policy development for regulation and primary prevention.

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Occupational asbestos exposure in the news: An historical content analysis of French- and English-language newspapers

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Objectives: This study examines French and English language print media coverage of health effects of occupational asbestos exposure during the period 1975-1985 and compares the coverage to a timeline of the epidemiological research and regulations on asbestos during the same period. This study also explores how the news coverage, and particularly the health implications varied by geographical region.

Methods: A content analysis of newspaper articles about the health effects of occupational asbestos exposure was conducted. A random sample of 250 articles was retrieved from two English-language and three French-language newspapers during an 11-year period (Jan 1975-Dec 1985). News articles, opinion pieces and letters to the editor were included. Articles were coded for prominence (placement, story length), type of article, health effects reported, news trigger, and key message(s). Frame analysis was used to examine how the various newspapers portrayed asbestos exposure as a public policy issue. A timeline of important events in the history of Canadian asbestos production and regulation between 1880 and 2009 was constructed through searches of journal articles, legislation, government reports, books and other sources. The selected news stories were compared to the timeline to examine how the story about the health effects of asbestos unfolded for the public versus how it emerged in scientific and regulatory realms.

Results: The timeline of important Canadian events showed that the majority of seminal events pertaining to asbestos legislation occurred during the study period. (A visual representation of the timeline will be shown). Coverage differed between the regional papers based in Quebec (where asbestos mining was occurring) and the Canadian and US national papers. The regional newspapers were less likely to report on international events or scientific research. Regional papers also presented asbestos in a more positive frame than the national papers.

Conclusions: The differences in framing of the stories between regional and national papers may be reflect the “reassurance” function of local media, whereby local media function to reassure readers to avoid contributing to anxiety and negative impacts on local businesses (Nicol 2008; Ungar 1998). Sovereignty issues between Quebec (where the regional coverage was concentrated) and the rest of Canada that occurred during the study period may also have contribute to this phenomena. The timeline comparison determined that the national papers covered major events with a very short time lag whereas the regional papers where less timely and less likely to consistently cover major events.

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Evaluation of the Ontario High Risk Firm Initiative

Hogg-Johnson S, Institute for Work & Health

Objectives: The Ontario Ministry of Labour (MoL) ran the High Risk Firm Initiative (HRFI) from 2004 to 2008 – a targeted inspection and consultation program aimed at reducing work-related injuries. Targeting was based on recent work injury statistics. In 2006, two health & safety associations randomized their lists of firms into three study arms. Our objectives were to evaluate the 2006 HRFI program year in the manufacturing and service sectors by examining trends in work injury statistics.

Methods: The study population includes all firms in manufacturing or service sectors registered with the Ontario Workplace Safety and Insurance Board (WSIB) and in business in 2005. The study sample consists of those firms ranked by the HRFI algorithm to be in the worst performing 2% (high risk firms) and the next worst performing 8% (last-chance firms) for HRFI program year 2006. The last-chance firms were randomized to one of the three study groups (HSA consultation, priority inspection, referent). Information was extracted from the Ontario WSIB on characteristics of the firms (size, age, region, sector, closed for business) and their claims experience (counts of claims and disability days) from 2002 to 2008 inclusive. Trends by study arm and year were examined graphically. Negative binomial generalized estimating equation models were used to model claim counts and disability day counts by study arm and year, while controlling for firm attributes.

Results: There were 6,814 firms in the study sample: (3,616 in manufacturing and 3,198 in service). Among the randomized study arms within each sector, firms were very similar with respect to age, size, region and prior counts of claims and disability days, but the 2% high risk firms showed differences in these attributes. When trends were examined from 2002 to 2008, there were significant differences in claims and disability days counts over time, but these trends were similar across the three randomized study arms. The 2% high risk firms showed higher claims and disability rates than last-chance firms prior to intervention, but very similar rates after intervention.

Conclusions: The targeted consultation and reduced inspection schedule had little impact on the immediate post-intervention years relative to the referent group of firms. It is more difficult to draw conclusions about intensive inspection given the lack of comparability of this group of firms with the last-chance firms. Changes in the high risk firms could be due to the intensive inspection or due to other sources of variation over time, such as regression to the mean.

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Long-duration claims – what is driving increases in duration and locked-in claims in Ontario?

Hogg-Johnson S, Institute for Work & Health

Objectives: Over the last decade in Ontario, there has been a dramatic increase in the number of total compensated days per lost time Workplace Safety & Insurance Board (WSIB) claim. Our objective is to determine whether these increases are concurrent with the policy changes of January 1998 under Bill 99 or whether changes in worker demographics, injury characteristics and workplace characteristics account for the observed changes in claim duration over time.

Methods: Claimants to the Ontario WSIB with an allowed lost-time work-injury claim with date of accident between January 1, 1990 and December 31, 2001 were eligible for inclusion. Fatalities, serious injuries and occupational diseases were excluded. Inclusion ended at 2001 to allow complete follow-up for locked-in status for all claims. A stratified random sample of 10% of claims from each accident year was drawn and used for analysis. Two outcome measures were considered: total compensated days on 100% benefits and whether the claimant is “locked in” to receive benefits until age 65 years. Baseline covariates included: year of accident, age, sex, occupation, pre-injury wage, region, previous claim, part of body injured, nature of injury, firm size, industrial sector. Descriptive statistics of all variables under study were examined by year of accident. Logistic regression (locked in status) and log-normal models (cumulative duration) were used to analyse the relationship between covariates and outcomes.

Results: There were 126,709 claims in our sample. The percentage of claims locking in was 3.7% for 1990 claims, gradually reducing to 1.5% for 1997, and increasing to 3.0% for 2001. Locking in was more likely for older workers, females, concussions, inflammations and herniated discs, backs and necks and for workers from smaller firms. There were similar covariate findings for cumulative duration. Adjusting for covariates did not alter odds ratios for locking in or rate ratios for cumulative duration e.g., OR of locking in for 2001 compared to 1997 is 2.06 (1.66, 2.54) without adjustment and 1.98 (1.58, 2.48) with adjustment.

Conclusions: We see changes in claims outcomes coincidental with introduction of Bill 99. Reaching locked-in status for 2001 claimants was approximately twice as likely as for 1997 claims and this could not be explained by changes in worker age, injury type or workplace characteristics. Trends for duration were similar. These findings point to changes in claims management arising out of the policy change. Continuing work will examine claims management milestones (timeliness of adjudicative decisions, use of WSIB funded services, Second Injury Enhancement Fund) as possible explanations for increasing durations.

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Physician practice patterns and barriers to practice with a focus on occupational diseases

Holness DL, University of Toronto, St Michael's Hospital, Centre for Research Expertise in Occupational Disease

Objectives: Occupational diseases are often under-recognized and under-reported. While there is continuing evidence that supports poor occupational history taking by physicians, there is less information about practice related to specific occupational diseases and barriers to recognition and reporting of occupational disease. The purpose of two recent studies was to explore physician practice patterns and barriers to practice with respect to three occupational diseases: occupational asthma, occupational contact dermatitis and occupationally related lung cancer.

Methods: Two studies were conducted. The first was a survey of respirologists, dermatologists and family physicians in Ontario that collected information related to their practice, in particular that of occupationally related problems, and the barriers and facilitators to recognizing and reporting occupationally related disease. The second study was a feasibility study focused on occupationally related lung cancer that involved interviews with health-care practitioners in lung cancer clinics regarding occupational history taking and barriers to recognition and reporting.

Results: Survey results found time constraints and lack of knowledge as barriers to taking an occupational history. Reasons for referral to specialists include lack of expertise, testing facilities and knowledge about WSIB, time constraints and inadequate re-imbursement, while lack of access to specialists is a barrier for referral. The lung cancer clinic interviews identified time constraints, lack of knowledge, complexity of the WSIB system and lack of easy referral routes to occupational medicine resources as barriers to recognition and reporting while they noted patient completed exposure questionnaire, clear and simple referral criteria and availability of occupational medicine resources as possible facilitators.

Conclusions: Both studies identify key barriers to physician recognition and reporting of occupational disease. Methods to address address the barriers need to be developed and tested to improve the recognition and reporting of occupational disease.

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Return-to-work program for workers with contact dermatitis – initial results

Holness DL, University of Toronto, St Michael's Hospital, Centre for Research Expertise in Occupational Disease

Objectives: There has been little research concerning return to work (RTW) in workers with contact dermatitis. The objective of this study is to describe the results of a RTW program for workers with contact dermatitis attending the Occupational Disease Specialty Program. The RTW program is led by a RTW co-ordinator and includes a multidisciplinary clinical team of dermatologists, an occupational medicine physician, an occupational hygienist, a nurse, a patch test technician and administrative support.

Methods: A retrospective chart review was carried out of workers attending the Occupational Disease Specialty Program at St Michael's Hospital for assessment and management of work-related contact dermatitis who utilized the services of the RTW program from August 2006 to June 2008. Basic demographic information, return-to-work interventions and barriers and facilitators of RTW were abstracted and a basic descriptive analysis was performed.

Results: Eighty-one workers participated in the RTW program. In total, 59% were male and the mean age was 48. 59% had a diagnosis of allergic contact dermatitis and 64% had irritant contact dermatitis. At entry to the program the mean time off work was 180 days with a range from 4 days to 2.6 years. Initially 40% were off work because of their dermatitis, at discharge and follow-up only 15% were not working because of their dermatitis. Particular components of the RTW intervention included avoidance of exposure, RTW trial and graduated RTW, a personal protective equipment prescription and skin status monitoring.

Conclusions: There is little information in the literature regarding RTW in workers with contact dermatitis. The use of a multidisciplinary RTW program assisted with RTW for these workers. In addition to usual RTW practices and barriers and facilitators, those specific to contact dermatitis were identified.

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Physical demands and air management during simulated firefighting tasks

Hughson R, University of Waterloo

Objectives: Toronto firefighters are confronted by the second greatest volume of high-rise buildings, subway systems and large box stores in North America. During emergency operations, the lives of the firefighters depend on the finite volume of air carried in the self-contained breathing apparatus (SCBA). We measured energy expenditures and the rates of air consumption of firefighters performing typical work tasks while wearing full turnout gear and breathing from the SCBA.

Methods: Thirty-three Toronto firefighters (three women) volunteered to participate in this study. The SCBA mask was integrated with a Cosmed K4b2 portable gas analysis system fitted to the expired port and not affecting in any way the normal performance of the device. This enabled measurement of breath-by-breath air consumption along with oxygen uptake (VO2) and carbon dioxide output (VCO2). Three different scenarios were investigated: a maximal stair climb to consumption of 55% of the nominal “30-minute” cylinder; a fifth floor search and rescue; and a subway search and rescue scenario. Firefighters were instructed to work at their normal pace; in the subway they worked in teams of two.

Results: The two scenarios involving stair climbing evoked the greatest increases in energy requirements to 70 ± 10% and 65 ± 10% of maximum VO2. The subway scenario required 49 ± 8% peak. Heart rate increased to 88 ± 4%, 88 ± 6%, and 76 ± 7% of maximum. The ratio of VCO2 to VO2 was consistently greater than 1.0 in both stair climbing scenarios reflecting excessive production of lactic acid. Air consumption during the stair climbing and fifth floor scenarios ranged from about 60 to >125 L/min, and from 40 to 80 L/min during the subway scenario.

Conclusions: The high rate of air consumption resulted in sounding of low air alarm indicating 25% air remaining as early as 8 min in the stair climb, and it would have sounded by approximately 9 and 11 min in the fifth floor and subway scenarios. These results give evidence for reduced durations of work shifts to avoid placing firefighters in dangerous situations where they could deplete their air supply. The data provide evidence of lactic acid production markedly above what would be anticipated at the same percentage of maximum VO2 in activities other than firefighting.

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J

Accidents ashore: Occupational safety challenges on wharves in Newfoundland and Labrador

Jackson B, SafetyNet Centre for Occupational Health and Safety Research

Objectives: To identify the safety issues associated with fishing and recreational wharves in rural Newfoundland. To identify the activities and groups associated with these wharves and their attendant risks. To identify the components that make up the regulatory framework for wharf safety and to examine how these regulatory elements interact in the field. To document some of the factors that contribute to the risk of accident and the prevention challenges specific to this context.

Methods: Pilot, multi-methods study, the design of which was worked out in collaboration with a steering committee of stakeholder groups. Methods included: a detailed and systematic review of the literature on wharf safety; semi-structured interviews in 18 communities with 41 local wharf users; key informant interviews with representatives of agencies concerned about and/or with a mandate to address wharf safety; a review of documents explaining governance rules and practices on wharves; a telephone survey with a random sample of harbour authority representatives and dockside monitors.

Results: Safety on wharves is seriously under-researched globally. NL wharves and harbours are important industrial, recreational and semi-public spaces located primarily in rural and remote environments where access to OHS expertise and monitoring are very limited. They are associated with very diverse and often risky activities in high risk environments (proximity to water, limited space to operate, challenging weather conditions) and associated substantial risk of injury or death. Reported hazards and risk factors include: time pressure/rush periods of intensive activity; bad weather (wind, ice, snow); congestion; parked vehicles; debris on the wharf; and, public access. Slips/trips/falls and Struck by falling/flying object are prominent among injuries identified in interviews. Perceptions of risk appear to vary among user groups. Wharves are multi-employer worksites where the employer who creates the risk might be different from the employer who exposes his or her workers, and different again from the employer who controls the worksite at any one point in time. It is not always clear what employer is responsible for addressing specific safety issues in this shared work environment. More generally, jurisdictional responsibility for ensuring and promoting safety on wharves is complex, ambiguous and evolving. Lack of clarity at all levels regarding safety responsibility may have contributed to the invisibility of risk on wharves and to prevention challenges over past decades.

Conclusions: The use of wharves as a worksite by multiple and diverse groups of workers associated with multiple employers, combined with the high risk environments and activities associated with wharves, extremely limited local OHS expertise and jurisdictional ambiguities appear to have contributed to the lack of research on safety on wharves in NL and elsewhere, to the invisibility of substantial risk in official statistics, and to major prevention challenges for these critical worksites.

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K

Assessments in computer workers: A comparison of methods

King T, Institute for Work & Health

Objectives: Our objective was to compare two non-intrusive and relatively inexpensive methods of computer exposure assessment: self-report (SR) and electronic monitoring (EM). EM software is widely used; however it results in (systematic) underestimation in exposure time when compared to self-report. Our intention was to examine these relationships at a closer level. A better understanding of these exposure measures will assist practitioners and decision-makers trying to assess and solve the source of computer worker pain/discomfort.

Methods: SR data was collected using web-based questionnaires for 15 consecutive days; workers were asked to report daily use of mouse, keyboard, and computer. EM software recorded computer, keyboard, and mouse use. A commercially available mouse with a built-in transducer (www.hoverstop.com) recorded the time the hand was on or directly over the mouse. Continuous monitoring of the position of the computer user's hand, relative to the mouse, gives a more accurate estimate of the time the user's hand is on the mouse in a potential straining or static posture. Pearson correlations were used to compare exposure durations for computer, keyboarding and mouse tasks. Study approval was obtained from the Research Ethics Board of the University of Toronto.

Results: Twenty-six participants completed both SR and EM. SR and EM data were missing if subjects were absent from the office. SR data were also missing if subjects did not complete questionnaires. EM data were missing due to computer software conflicts. The Pearson correlation between SR and EM for computer use was r= 0.68, for keyboarding r=0.38, and mouse use r=0.54. The Pearson correlation between SR mouse and computer use was r=0.74, SR keyboard and computer use r=0.80, and SR mouse and keyboard use r=0.73. The Pearson correlation between EM mouse and computer use was r=0.95, EM keyboard and computer use r=0.66, and EM mouse and keyboard use r=0.40.

Conclusions: There are moderate correlations between SR and EM methods for mouse use and computer use, and a lower correlation for keyboard use. The relatively consistent high correlation between tasks in the SR method might mean that subjects are not able to differentiate between mouse, keyboard and computer use. The high correlation between computer use and mouse use in the EM method suggests that computer users' hands are often in contact with the mouse. Self-report and activity monitoring may be measuring distinct constructs.

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Firefighters' exposures to cardiovascular risk factors: Carbon monoxide, noise, physical exertion and stress.

Kirkham T, University of British Columbia

Objectives: Firefighters are exposed to several cardiovascular risk factors while at work that may put them at risk; however, little is known about their exposure levels to these risk factors. We aim to characterize typical work exposures to carbon monoxide (CO), noise, physical exertion, and stress during typical fire fighting activities.

Methods: Firefighters were recruited from 15 halls based on their activity type, call volume, and presence of specialty units in three municipalities. Subjects were sampled for four consecutive shifts including two day shifts and two night shifts. Full-shift personal noise and CO samples were taken using datalogging devices, Bruel & Kjaer 4436 dosimeters and Drager X-am 3000 confined space monitor respectively. At the end of each shift firefighters completed a questionnaire regarding their physical exertion and stress throughout their shift. Physical exertion was assessed using a standard Borg scale whereas stress was assessed using a five-point Likert scale. In addition, firefighters were observed during their shift and potential sources of exposure to the hazards were noted.

Results: Noise levels (n=109) averaged 83.6 dBA (range: 67.7-126.2); 47.7% of samples exceeded noise limits. Noise exposures were greater on day shifts compared to night-shifts (85.2 vs. 78.5 dBA, $p<0.0001$), and differed by job title. Significant noise sources were identified (ex. air-packs). No CO samples (n=166) exceeded occupational limits. Average physical exertion and maximum exertion levels did not differ (11.0 vs. 11.2). The most frequently reported stress level was 2 (i.e., a-bit-stressful), with the most stressful event reported as driving/barriers faced to reaching destination. Probationary firefighters reported a significant increase in stress to events compared to other job titles.

Conclusions: Firefighters experience elevated noise levels that may increase their risk of adverse cardiovascular events. Information regarding sources of exposure will be valuable for development of new workplace policies aimed at reducing occupational noise exposure among firefighters. Differences found in physical exertion events between job titles most likely reflect differences in job tasks. Interestingly, firefighters reported lower than expected stress levels. Stress levels to particular events varied widely, which may reflect personal differences on perceived stress. As anticipated probationary firefighters reported an increase in the stress they felt during events, which is most likely due to their lack of experience.

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Evaluation of a physician letter to increase awareness of workers' compensation benefits for individuals with mesothelioma

Koehoorn M, University of British Columbia

Objectives: Prior research by the investigators found that less than 50% of individuals with mesothelioma in British Columbia have a workers' compensation claim. Several factors may influence compensation status including awareness of mesothelioma as a work-related compensable disease and eligibility for benefits. In collaboration with the BC Cancer Agency and WorkSafeBC, an educational letter is now sent to the most responsible physician of mesothelioma patients in the BC Cancer Registry. This project evaluated the effect of the letter on compensation status.

Methods: Mesothelioma cases in the provincial cancer registry were linked with accepted mesothelioma claims in the provincial workers' compensation database at the individual level. The proportion of compensation cases in the pre-intervention letter period (Jan 2002 to Oct 2004) was compared to the proportion in the post-intervention letter period (Nov 2004 to Dec 2006), by demographic, clinical and geographic characteristics. Incidence rate ratios investigated the effect of the letter on compensation status, adjusted for covariates.

Results: A total of 342 mesothelioma cases were diagnosed in BC between 2002 and 2006. During the intervention period, 94 of 160 cases received a physician letter. Those with a longer survival time were more likely to receive the letter. The overall proportion of compensation was 43 claims per 100 cases during the pre-intervention period compared to 59 claims per 100 cases during the post-intervention period among those who received the letter (adjusted IRR=1.14, 95% CI 0.72, 1.80). Compensation status increased among females, and for younger (45-54 years) and older workers (65+).

Conclusions: The letter intervention was effective in increasing mesothelioma compensation and among groups with historically low compensation status (e.g. females). However, the effect was not as high as expected because the intervention was not fully implemented - the physician letter was not mailed to all cases, the letter was batch-mailed rather than mailed immediately following registration, and letters were only sent to histological confirmed cases. The intervention has been modified to address the preceding issues to reach as many cases as early as possible. Also, the BC Cancer Agency is investigating mailing letters directly to individuals with mesothelioma and their families.

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New immigrants' experiences after a work-related injury

Kosny A, Institute for Work & Health

Objectives: Immigrants are an increasingly important section of the Canadian workforce. This study examined what happens to immigrant workers who have gotten sick or hurt on the job, as well as their experiences with service providers and community organizations that help them. While other research has investigated risks faced by immigrant workers, we know little about what happens to immigrant workers after they are injured or have gotten sick on the job.

Methods: We conducted 14 in-depth interviews with service providers who work with injured immigrant workers (health-care providers, settlement agency workers, union representatives, etc.) and 29 injured immigrant workers who had and had not filed a workers' claim. Workers interviewed via an interpreter spoke Cantonese, Mandarin, Spanish, Tamil, Arabic, Gujarati, Bengali, Polish, Ukranian and Punjabi.

Results: The study details new immigrant workers' knowledge of their rights at the time of injury, their willingness and ability to file a workers' compensation claim, contact and experience with workers' compensation and health-care providers, the effect of the injury on the family and the financial consequences of the injury or illness.

Conclusions: This study points to ways that workplace practices, health-care services, and compensation policies can be improved in order to keep workers safe and healthy and to help new immigrants who have suffered an injury at work.

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Developing strategies for air management and thermoregulation in the Toronto Fire Services

Kostiuk A, Toronto Fire Services

Objectives: The Toronto Fire Services (TFS) identified significant health risks related to firefighting while wearing the personal protective gear and breathing from the self-contained breathing apparatus (SCBA). In hostile environments firefighters face extreme temperatures and toxic gases.

Methods: Fighting fires in a hot environment while wearing personal protective gear can cause extreme heat loads with risk of severe injury or death. TFS firefighters participated in research projects to evaluate the heat load and to develop strategies for efficient cooling.

Results: The outcomes included a slide rule for evaluating risk and protocols for cooling and rehydration. The air cylinders of the SCBA are nominally referred to as 30-minute cylinders, but experience revealed the true duration of air supply appeared to be less. TFS and researchers collaborated to conduct simulations of high-rise, subway and box store emergencies to determine the actual rate of air consumption and the energy demands. From this research, the basis for an air management strategy has been developed and its implementation for safe exit from large structures will be described.

Conclusions: The collaboration between researchers and TFS personnel has resulted in changes to practice in emergency situations that have reduced risks to firefighter health and safety.

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Context, evidence and facilitation: Adapting a knowledge transfer framework from the health-care system to the construction sector

Kramer DM, University of Waterloo

Objectives: The PARiHS model (Promoting Action on Research Implementation in Heath Services) is a knowledge transfer conceptual framework initiated over a decade ago that focuses on the dissemination of guidelines within the health-care sector. It says that the choice of KT implementation strategy should depend on the strength of the evidence, and the receptivity of the context. This study explores the possibility of adapting the framework to a Diffusion of Innovation study in the construction sector.

Methods: This study is now in its fifth year. Our evidence is made up of innovative ideas, processes and tools to reduce the risk of MSDs. We have identified 125 potential innovations and assessed many of them. Ultimately the team identified, through negotiation and a shared understanding about the benefits and risks of the new ideas over the traditional ways of doing things, 16 companies that used 20 innovations. Secondly, we have studied the construction sector as our context. It is a unique environment that is different from both health care and manufacturing - the sectors that have the largest body of research on diffusion of innovations. We have conducted extensive interviews with key stakeholders in the sector to clarify the characteristics of this sector that may help determine the knowledge transfer strategies that we will adopt and the facilitation techniques that we should attempt.

Results: The construction sector has a very male-dominated culture that seems to accept that hard work and pain is part of the job. The only dependable characteristic of this context is that it is in constant change – the environment, the materials, the tools and the employment contracts. Supervisors and co-workers change between and within every project. It has a non-linear, non-hierarchical reporting structure and there is no clear top-down decision-making. This mitigates against traditional dissemination strategies such as supervisor-training, train-the-trainer, or continuing professional development. On the other hand, it is a very networked and linked sector, with multiple across-company, across-project, within union and trade communication channels.

Conclusions: The three-pronged PARiHS model seems to be helpful in planning our KT interventions in construction. We have determined the evidence we plan to disseminate, and we have gained a good knowledge of the construction sector as our chosen context, we are still determining which facilitation techniques to adopt. What we have learned has told us we need to be very creative in our thinking when it comes to facilitating the knowledge transfer/implementation of innovative ideas in the construction sector, but suggests that using opinion leaders within the existing networks may be an effective way to facilitate the adoption of innovations.

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Workplace social capital and work-related injury in Canada: A cross-sectional analysis

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Objectives: The majority of previous research on social capital and health is limited to social capital in residential neighborhoods and communities. However, recent research from the Finnish Public Sector Study has shown workplace social capital to be associated with poor general health, co-occurrence of lifestyle risk factors, smoking cessation, and depression. The aim of this study was to determine the associations between workplace social capital and work-related repetitive injury and most serious injury.

Methods: Data collected from the 2005 Canadian Community Health Survey were used to measure the occurrence of injury among respondents who were working in the past 12 months. Injury outcomes included 1,400 repetitive strain and 700 most serious injuries at work within the past year. Two comparison groups were used: (1) a non-work related injured group; and (2) a non-injured control group. High, medium or low workplace social capital was determined by responses to three questions about (1) hostility or conflict within the workplace; (2) supervisor helpfulness; and (3) co-worker helpfulness. Covariates considered and controlled for included demographic, health status, behaviour, job and employment status factors.

Results: Females reporting high social capital at work had significantly decreased odds of work-related repetitive strain injury compared to those reporting low social capital (OR = 0.36; 95% CI: 0.15, 0.86) using the first comparison group. No difference was found in males. When injured workers were compared to those who did not have a repetitive strain injury at all, both males and females reporting high social capital at work were less likely to report a work-related repetitive strain injury than those reporting low social capital at work (female OR = 0.45; 95% CI: 0.32, 0.63; male OR = 0.64; 95% CI: 0.43, 0.96). Workplace social capital was not associated with the most serious work-related injury when compared with either the injured or non-injured control groups.

Conclusions: This study provides evidence for an association between workplace social capital and repetitive strain injury at work. The association was more apparent in females than in males. Workplaces employing large numbers of female workers at risk of repetitive strain injury may want to consider focusing on the development of programs to increase social capital in the workplace. However, future studies need to examine this association prospectively to establish the causality of the association.

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L

Mesothelioma surveillance: Validation of diagnoses from a tumour registry

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Objectives: Mesothelioma is a rare cancer associated with occupational exposure to asbestos fibres in 70 to 90% of cases. A recent study reported that 22% of mesothelioma cases from the Quebec Tumour Registry (QTR) were found in the provincial workers' compensation board files between 1983 and 1997. This medical chart review study was set up to assess whether “false positive” mesotheliomas in the QTR could explain some of the discrepancy between the two data sources.

Methods: Clinical information was extracted from medical charts of incident mesothelioma cases identified through the QTR in 2001 and 2002, and was combined with photocopies of medical imaging and pathology reports to constitute chart summaries. Consent was obtained from families to have access to biopsy material and medical imaging media. A panel of 3 specialists reviewed the available information and material. The pathologist gave an independent revised diagnosis using only the available pathological material and additional immunohistochemistry (IHC) staining if necessary and possible. The chest physician and the radiologist gave a common revised diagnosis after reviewing the chart summary and available medical imaging. A final consensus “revised diagnosis” was then attributed to each case from the panel of 3 specialists according to 5 categories: certain/probable, possible, unlikely, not a mesothelioma, impossible to classify.

Results: The QTR reported 190 incident cases of mesothelioma (81% males) for the period. The mean age (±SD) at diagnosis was 68 years (± 10) for males, and 63 (± 13) for females. The specialists classified 62% of the charts as “certain/probable” mesotheliomas, 19% rated “possible”, 11% “not a mesothelioma”, and 8% “unlikely to be a mesothelioma”. When only satisfactory chart summaries were considered (i.e. with missing reports), 73-77% of the charts were rated as “certain/probable” mesotheliomas, and about 10% were still considered “not a mesothelioma”.

Conclusions: Following a screening test paradigm, the positive predictive value of the QTR data was estimated to be around 75%, which implies that about 25% of QTR cases could be false positives. This explains part of the discrepancy between tumour registry and compensation data, but could not assess the underestimation in the QTR, as mesothelioma can be confused with other diagnoses. Tumour registry data appears to be a valuable source of information for the surveillance of mesothelioma but is not sufficient to get a complete estimate of mesothelioma burden.

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Occupational exposures and postmenopausal breast cancer: Impact of sensitivity analysis

Labrèche F, Institut de recherche Robert-Sauvé en santé et en sécurité du travail du Québec

Objectives: Over the last 40 years, incidence rates for breast cancer have increased steadily in Canadian postmenopausal women and, although the increase has stabilized since 1999, it has not decreased as in other jurisdictions. We conducted a case-control study to determine whether organic solvents and other occupational agents, such as polycyclic aromatic hydrocarbons (PAHs), confer a higher risk of developing postmenopausal breast cancer.

Methods: This study was conducted in Montreal between 1996 and 1997 and included 556 incident histologically-confirmed cases of malignant breast cancer among postmenopausal women age 50-75 years. 613 controls were matched for age, date of diagnosis, and hospital, and selected from other sites of cancer, excluding sites possibly associated with solvent exposure (liver; pancreas; lung, bronchus, trachea; brain, central nervous system; leukemia; lymphoma). Face-to-face or telephone interviews elicited information on non-occupational risk factors and on lifetime job history; industrial hygienists then attributed exposure to about 300 chemical and physical agents for each job. Unconditional logistic regression was used to estimate adjusted odds ratios (ORs) and 95% confidence intervals (CI). A first analysis, including all controls, showed elevated risks with exposures to mono-aromatic hydrocarbons (MAHs), to PAHs, and to a few synthetic fibres. Sensitivity analyses were performed by excluding certain control cancer sites based on mechanistic considerations and by adjusting for co-exposures.

Results: Based on the hypothesis that some of these substances behave as xenoestrogens, we compared risks obtained with all cancer controls to risks obtained after excluding hormonal cancers from the control series. We found that after exclusion the ORs increased slightly with exposures to MAHs, and, for certain hormonal phenotypes, to acrylic fibres, to organic solvents with reactive metabolites and to synthetic fibres as a group, without changing the level of association from the first analyses. For the other substances, risks remained similar or decreased slightly, with decreased statistical precision for nylon fibers and PAHs from petroleum sources.

Conclusions: The associations did not change substantially after excluding hormonal cancers from the control series (despite the reduced sample size) for 3 occupational exposures: acrylic fibres (all ages, and exposures before age 36 years); MAHs (all ages); and organic solvents with reactive metabolites (exposures before age 36). This sensitivity analysis adds some support to the finding of increased risks of postmenopausal breast cancer associated with these occupational exposures. Adjustment for co-exposures and exploration of dose-response relationships will complement our analysis. Additional studies are warranted to further our understanding of the role of chemicals in the development of breast cancer.

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Précarité des trajectoires d'emploi et premières lésions professionnelles chez les jeunes de 16 à 24 ans

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Objectives: L'objectif principal de ce projet de recherche est de documenter et de comparer l'historique des occupations des jeunes travailleurs de 16 à 24 ans en lien avec l'apparition des premières lésions professionnelles.

Methods: Ce projet de recherche a eu recours à une approche longitudinale, qui permet de suivre dans le temps une cohorte d'individus, en exploitant les informations recueillies lors de l'Enquête sur la dynamique du travail et du revenu (EDTR) réalisée par Statistique Canada. La position relative dans le temps des phénomènes étudiés (première lésion professionnelle et premier emploi suite à une lésion professionnelle) étant au cœur même de la problématique à l'étude, et la nature des données le permettant, les chercheurs ont utilisé les tables de survie pour l'analyse descriptive et à des régressions dites de survie pour la modélisation explicative et conceptuelle.

Results: Les analyses multi-variées ont montré que : 1) La mobilité en emploi est fortement associée à l'apparition d'une lésion professionnelle. Cette situation est cependant plus fréquente chez les jeunes qui changent plus régulièrment d'emploi au début de leur entrée sur le marché du travail comparativement aux travailleurs plus âgés. 2) Le cumul d'emplois et le nombre d'heures travaillées constituent des facteurs qui augmentent le risque de lésion professionnelle chez les jeunes travailleurs. 3) Les jeunes travailleurs qui n'ont pas connu de changement dans le genre de travail qu'ils accomplissent, occupant un emploi à temps partiel ou non manuelle et mixte ont un risque plus faible d'être victime d'une lésion professionnelle.

Conclusions: Cette étude a permis de montrer l'impact de la précarité des trajectoires d'emploi des jeunes travailleurs sur l'apparition des premières lésions professionnelles. La prévention de ces lésions implique donc une action à la fois sur les conditions d'emploi offertes à ces jeunes et sur les conditions d'accueil et d'intégration. Or les nouvelles formes d'organisation du travail se basant sur la flexibilité de la main d'oeuvre, multipliant les statuts précaires d'emploi, les contrats de courte durée contribuent à accroître la mobilité d'emploi exposant les jeunes travailleurs à des lésions professionnelles précoces. De plus, paradoxalement, le statut précaire de ces travailleurs fait en sorte que les investissements en formation, en encadrement sont limités puisque cette main d'oeuvre est considérée " de passage" dans les entreprises.

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Role of physicians in workers' compensation systems in Québec and Ontario: Relevance for research and practice in return to work

Lippel K, University of Ottawa

Objectives: Physicians are known to play a significant role in return to work (RTW), and interactions with compensation systems may affect the therapeutic relationship. This study compares the legal and policy frameworks governing workers' compensation in Québec and Ontario in order to identify similarities and differences that could affect the practices of physicians involved in the compensation process and their role in the RTW process.

Methods: Workers' compensation legislation, policy and appeal tribunal decisions of two provincial systems (Québec and Ontario) were analyzed in order to identify the roles, responsibilities and powers of physicians in each system. The study examined, notably, the role of the "physician in charge of the worker" (the physician chosen by the worker for treatment, who plays a role circumscribed by legislation), and compared it to the role of physicians in Ontario. It was postulated that system differences affect not only the identification of relevant actors and stakeholders in RTW, but also research design and the comparability of outcome measures. Findngs were analyzed from a transdisciplinary and inter-jurisdictional perspective; the authors include a physician and two sociologists from Ontario and a lawyer from Québec. The analytic process involved systematic iterative comparison of key structural and discursive features of the two systems and conceptualization of the implications for doctors' practices and workers' experience.

Results: In Québec, the opinion of the "physician in charge of the worker," as to diagnosis, treatment, date of consolidation of injury, functional limitations and permanent disability is binding on the compensation board (it may not set aside that opinion at its sole discretion without submitting the matter to medical arbitration). In Ontario, the compensation board is not bound by the opinion of physicians. Workers in Québec may not contest the opinion of their treating physician, while workers in Ontario are free to do so. Treating physicians' approval of early RTW strategies are mandatory in Québec but not in Ontario.

Conclusions: The variation in physicians' roles affects a variety of issues of concern for researchers and practitioners in RTW, including treatment choices, support for RTW, and access to vocational rehabilitation. For example, it is more difficult for the compensation board in Québec to question prescribed physiotherapy than it is in Ontario. Interprovincial comparisons of physiotherapy costs for work-related injury without consideration for system differences could lead to the conclusion that Québec doctors prescribe physiotherapy more often when, in fact, it may be that doctors have similar prescription practices but in Ontario the system does not follow through with their recommendations.

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Assessment of work readiness - Rasch analysis of the spinal function sort

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Objectives: The Spinal Function Sort (SFS), developed to quantify workers' ability to perform work tasks that involve the spine, has been extensively researched in terms of reliability and validity using Classical Test Theory. The SFS is assumed to measure a single contruct (work ability). Our objective was to utilize Rasch Modelling to evaluate if the SFS items function as part of a unidimensional interval level scale.

Methods: The SFS contains 50 items; an item consists of a line drawing of a work task with a description below it. The evaluee scores each item from 1 (able) to 5 (unable) on a Likert scale. SFS item data from 260 individuals with low-back pain presenting for Functional Capacity Evaluation were fit to the Rasch Model. The participants' ages ranged from 21 to 64 years old. There were 125 females and 173 males. The physical occupational demands of the participants' jobs ranged from "Sedentary" to "Very Heavy" according to the DOT (1991) classification. The scoring scheme is predicated on the notion that each item contributes equally to the total score. Since the Spinal Function Sort is a Likert type scale with each item having an equal number of response options and assumed equal intervals between each score, Andrich's Rating Scale Model was used. We measured item fit, threshold ordering, item difficulty (ease of endorsement) and differential item functioning along with unidimensionality of the scale which is prerequisite for calculating summative scores.

Results: Initially 6 of the 50 items were identified as misfitting i.e. mean squares greater than 1.4 and ZSTD greater than 2.0. Once these were removed, other items demonstrated poor fit. Disordered thresholds within items were common. Patterns were not improved by category reduction. Attempts to rectify these problems were fruitless. Some items in the scale also showed gender differential item functioning. Males reported lower abilities on traditionally female tasks such as dish washing and kitchen floor sweeping despite these tasks being less physically demanding than other tasks that they indicated they were capable of performing.

Conclusions: The problems with the SFS lack of unidimensionality and lack of local independence could not be overcome by eliminating items or persons or rescaling items. The order of presentation of the items from lighter to heavier tasks and the clustering of similar tasks influences the response for one item with the response on the similar item. A better model might be as a computer administered test where pictures are displayed in a random order and gender neutrality is maintained. Further investigation using factor analysis would be warranted determine if several discrete constructs are included in this instrument.

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M

"That's not part of the compensable injury": Subcontractor relations and the under-recognition of health problems among injured workers in Ontario's Labour Market Re-Entry program

MacEachen E, Institute for Work & Health

Objectives: Although there have been many studies of return to work, little scrutiny has been applied to injured workers who cannot return to their old jobs or workplace and require vocational retraining for a new kind of employment. This explorative qualitative study examined how vocational retraining is carried out in Ontario by providers subcontracted by the Workplace Safety and Insurance Board (WSIB). This talk focuses on disjunctures between the administrative logic about healthy workers in the program and the practical reality of incapacitating ill health among the workers.

Methods: Using a sociological approach that examines patterns of practice, we examined direct injured worker and provider experience of Ontario's vocational retraining in the Labour Market Re-Entry (LMR) program. The data consist of interviews and focus groups across regions of Ontario with 71 injured workers, employers, labour market re-entry service providers, educators, WSIB staff and worker representatives. Publicly available documents, such as service provider advertising materials, were also included in the analysis. Following general analytic approaches of grounded theory and discourse analysis, we examined the situated narrative of participants and identified contradictory and recurrent themes.

Results: Although the logic of the LMR program is that it adequately prepares workers for the labour market by focusing on vocational goals and retraining within the workers' remaining functional abilities, we found that worker ill-health (depression, chronic pain, strong pain medication use, ongoing surgeries) was a key barrier to retraining success. Administrative rules defining 'maximum medical recovery,' compensable injury, and workers' vocational aptitudes could lead to over-estimated worker abilities and under-recognized health barriers. Incentives associated with provider contracts and contract renewal further stifled communication by and among service-providers about dysfunctions in the LMR program.

Conclusions: It is important to examine the process of how different kinds of RTW programs are carried out in practice. This study found workers and LMR contractors 'going along' with program logic about healthy workers even when it placed each in an untenable position of trying to teach/learn new skills with workers in ill-health. Subcontracting arrangements with vulnerable populations such as permanently injured workers can be susceptible to poor visibility and resolution of problems. This study identifies new dimensions of the return-to-work continuum and directions for further study.

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From research to action - an advocate's perspective

Mantis S, RAACWI

Objectives: • To share our knowledge of stigma experienced by injured workers. • To share our experiences in building partnerships between RAACWI and decision-makers at the WSIB to engage in the development of new practices and behaviours. • To share the lessons learned in our "Blue Sky Discussions."

Methods: Participants will follow the development of RAACWI's first “Blue Sky Discussion” with WSIB management staff. We will explore: some research results describing the effects of stigma on injured workers; the importance of building trust and common ground in initial stages and some of the tools used to facilitate that process; the role of research and researchers; the dynamics of evolving relationships; the importance of having differing view points involved in the process; and how this initiative has changed the individuals involved.

Results: Some of the results achieved in partnership with the Research Action Alliance on the Consequences of Work Injury [RAACWI], the Ontario Workplace Safety and Insurance Board [WSIB] set out to define injured worker stigma, recognize it in language, behaviour and attitudes, and find ways to eliminate it. Using staff-training opportunities, partnering with other internal outreach initiatives, examining the values we look for when hiring new staff, and beginning a dialogue with senior management and front-line staff, the WSIB is working to reveal the “inconvenient truth” about injured worker stigma.

Conclusions: As we are focusing on a knowledge exchange project, our conclusions are still unfolding. In the interim, I believe we have found a cooperative model of engaging staff and volunteers from diverse backgrounds and perspectives, both personally and organizationally, in a project to implement current research findings. In the process, we have built and strengthened relationships that allow us to hear each others' perspectives, allowing for different views, but finding common ground and moving forward with enthusiasm and heart.

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Asbestos and mesothelioma in Ontario

Marrett L, Occupational Cancer Research Centre

Objectives: Asbestos has long been recognized as a carcinogen, most strongly linked to mesothelioma and lung cancer. This presentation will provide an overview of asbestos exposure in Ontario, with emphasis on how its use and regulation affects rates of cancer in the province. Current Ontario data will be reviewed with respect to mesothelioma, workplace asbestos exposure, and compensation, and gaps in knowledge and opportunities for action will be identified.

Methods: Trends in cancer incidence will be presented using age-standardized incidence rates obtained from the Ontario Cancer Registry, and will be linked to asbestos import and export data from the Canadian Minerals Yearbook. Data on compensation filing will be obtained from previous work linking the WSIB Occupational Disease Information and Surveillance System and the Ontario Cancer Registry.

Results: Despite that asbestos use peaked in the 1960s and 1970s, rates of mesothelioma in Ontario continue to rise. It is not known when the number of new cases per year will begin to slow, though it is anticipated that incidence will peak sometime over the next two decades. In addition, there is a disconnect between the attribution of mesothelioma in men to occupational asbestos exposure and levels of compensation, as only 40% of male mesothelioma patients received workers' compensation in recent years.

Conclusions: Additional work needs to be undertaken to estimate when the peak and eventual decline in incidence rates of mesothelioma can be expected based on trends in asbestos use in Ontario and disease latency. The Occupational Cancer Research Centre will contribute to this knowledge gap by undertaking a mesothelioma projections project aiming to forecast rates for the next 50 years.

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Assessment of discomfort and characterization of officer activity in police fleet vehicles

McKinnon CD, University of Waterloo

Objectives: Mobile police officers perform many of their daily duties within vehicles. Combined workspace inflexibility and prolonged driving exposure creates a risk for developing musculoskeletal issues. Given a lack of relevant research, it is difficult to justify specific interventions to improve the working situation until the physical and job demands are well understood. This two-phase study identified perceived musculoskeletal discomfort among a mobile police population, and characterized officer activity during a typical workday.

Methods: Phase 1. Eighty-eight (88) officers completed two questionnaire packages, one at the beginning and one at the end of a 12-hour shift. Each package was designed to determine ratings of perceived discomfort related to specific automobile seat features, occupational equipment, job components and specific body regions. All discomfort ratings were reported using a 100 mm visual analog scale (VAS). Phase 2. Twenty-two (22) patrol officers volunteered for in-car video analysis of their activities. A laptop-based video collection system was assembled and mounted to the interior of one Ford Crown Victoria police cruiser in each of three different patrol districts. Officers were activity matched to one of a group of ten predetermined driver activities for each frame of digital video. Frame counts were used to calculate the percentage of time in each activity for the entire shift and percentage of in-car time in each activity (excluding time outside of vehicle).

Results: Phase 1. Officer discomfort survey responses indicated high levels of discomfort (>30mm) as a result of various aspects of the driver seat and its low-back support, due to use of the in-vehicle computer system, and specific to the lower back and surrounding body areas. Phase 2. Out-of-vehicle officer activities were most prevalent, representing over 44% of a working shift. Driving activities showed the highest percentage time spent in an in-car activity posture occupying over 35% of in-car time. Mobile data terminal use was the most prevalent in-vehicle, non-driving activity, as it represented over 22% of in-vehicle activity time.

Conclusions: A large amount of discomfort was associated with prolonged sitting and non-driving tasks performed within police vehicles. The driver seat was a specific area of concern, as high levels of low back were associated with the driver seat and wearing of the police duty belt. Mobile data terminal configuration and usage were identified as the primary sites for targeted design change, as MDT use elicited high levels of officer discomfort and is the most abundantly performed in-car, non-driving activity. Administrative, structural, and technological changes to seat design and the nature of police work must be made and evaluated from ergonomic, performance and safety stances to reduce both officer discomfort and injury prevalence.

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Laboratory studies to establish the basis for thermoregulatory guidelines and cooling strategies for firefighters

McLellan T, Defence Research and Development Canada (DRDC)

Objectives: Research conducted at Defence Research and Development Canada (DRDC), Toronto on behalf of the Toronto Fire Service has focused on the thermoregulatory challenge of wearing protective clothing in hot environments and the development of hydration and cooling strategies to enhance the firefighters' safety and work performance.

Methods: Heat-stress guidelines have been developed on the basis of laboratory studies conducted with firefighters wearing their protective ensemble and carrying their self-contained breathing apparatus while working at various intensities in 25, 30 and 35°C. Thermal and evaporative resistance coefficients were also obtained from thermal manikin testing that allowed the human physiological responses to be compared with modeled data. Predicted continuous work times were then generated using a heat strain model that established limits for increases in body temperature to 38.5°C. Subsequent experiments were conducted to examine the role of fluid replacement and active cooling to establish optimal work and rest strategies.

Results: An important finding from the initial testing phase was the demonstrated need to provide active cooling during rehabilitation periods. Following exhaustive exercise at 35ºC, for example, core temperature continued to increase from 39.0ºC to 39.5ºC during a 30-min seated recovery period when most of the protective clothing had been removed. An optimal strategy with a rehydration schedule to replenish about 70% of the sweat loss together with forearm and hand immersion during 20-min rehabilitation periods reduced the rise in body core temperature and extended tolerance time and work time by 90% compared with conditions of fluid restriction and no cooling.

Conclusions: A strategy for effectively minimizing the rate of heat accumulation and for providing optimal cooling has been developed during this collaborative work between DRDC and TFS. The primary result is a "heat stress wheel" that can be used by incident commanders to assign work tasks and to determine requirements for fluid replacement and active cooling to increase the safety for the firefighters working in a hot stressful environment.

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Geographic variation of pneumoconioses in British Columbia

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Objectives: To map by census division (CD) and health-service delivery area (HSDA) the cumulative incidence of asbestosis, silicosis, and coal workers' pneumoconiosis in British Columbia (BC) for the period of 1995 to 2006 and to compare the variation in cumulative incidence with historic patterns of respirable dust exposure.

Methods: Data on all outpatient and hospital visits between 1995 and 2006 for asbestosis, silicosis, and coal workers' pneumoconiosis (CWP) were obtained from the BC Ministry of Health. Data on accepted claims was obtained from WorkSafeBC. Data sets were linked by Population Data BC and a case was defined as a person with an accepted compensation claim, any diagnosis in hospital discharge records, or at least two visits in the outpatient records. Individuals with any recorded diagnosis prior to 1995 were excluded. Cases were linked to 32 CDs and 16 HSDAs by postal code in the year an individual met the case definition for the 12 years between 1995 and 2006. Cumulative incidence was calculated using the BC population aged 15 or older in 2006 for men and women. Known historic and current sources of high asbestos, coal and silica exposure were also mapped.

Results: Cumulative incidence rates varied geographically by twenty-fold for all pneumoconioses. For men, the highest cumulative incidence rate was found for asbestosis in the Kootenay Boundary CD (202/100,000), a region that includes a large aluminum smelter, and the Powell River CD (192/100,000), a region with pulp and paper manufacturing. The highest rates for CWP (34/100,000) and silicosis (61/100,000) were in the East Kootenay CD, a region associated with mining. The lowest rates were generally in coastal regions that did not have a history of industrial exposure. Similar trends were observed among women although they tended to have lower rates.

Conclusions: The association of geographic variation in the cumulative incidence of pneumoconioses with historic sources of respirable dust exposure provides face validity to the use of administrative medical databases for occupational health disease surveillance. These finding also highlight regions where there should be a focus on case ascertainment, workers' compensation, exposure monitoring related to these diseases.

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Examining trends in the incidence and cost of workers' compensation claims

Mustard CA, Institute for Work & Health

Objectives: The goal of this study is to examine trends over time in compensation claim activity and benefit expenditures for work-related health conditions among employees in the long-term care sectors in the Canadian provinces of British Columbia and Ontario over the period 1998-2007. The study has a particular interest in understanding the influence of policy initiatives in the two provinces on practices within the long-term care sector related to the prevention of work-related injury and illness, and practices related to the management of work disability. The study focuses in a single health-care sector, long-term care, to ensure comparability of job characteristics, occupational exposures and workplace organization.

Methods: The project will compare the patterns of lost-time and no-lost-time compensation claim reporting in the long-term care sectors in British Columbia and Ontario over the period 1998-2007 and compare the nature of injury and source of injury for workers receiving lost-time compensation benefits over time in these two provinces. In addition, the project will compare workers' compensation expenditures over the period 1998-2007 for long-term care sector workers. The duration of disability episodes, wage replacement benefits (in the case of lost-time claims) and health-care expenditures (for both lost-time and no-lost-time claims) will be described. Data sources for the study will be drawn from administrative records of workers' compensation claims, supplemented by a detailed inventory of key changes to legislation, policy and programs in each province over the 10-year observation period.

Results: Preliminary findings will be reported, drawn from the mid-point of this 24-month research project. There are more than 60,000 full-time equivalent workers in Ontario and 14,000 full-time equivalent workers in British Columbia. Staff-to-bed ratios in the two provinces are very similar. While there appears to be a higher incidence of work-related injuries in the British Columbia long-term care sector relative to the province of Ontario, the distribution of nature and source of injury is similar. Preliminary findings suggest longer durations of disability among workers receiving wage replacement benefits in British Columbia and a strong temporal trend towards shorter disability durations in Ontario.

Conclusions: There appear to be important differences between Ontario and British Columbia in the duration of disability arising from work-related injuries among workers in long-term care.

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Suicide mortality by occupation in Canada, 1991-2001

Mustard CA, Institute for Work & Health

Objectives: To describe the association between occupation and risk of suicide among working-age men and women in Canada.

Methods: A cohort study of suicide mortality over an 11-year period among a broadly representative 15% sample of the non-institutionalized population of Canada aged 30-69 at cohort inception. Age-standardized mortality rates and rate ratios were calculated for men and women in five categories of skill level and 80 specific occupational groups as well as for persons not occupationally active.

Results: The suicide mortality rate was 20.1/100,000 person years for occupationally-active men (during 9,600,000 person years of follow-up) and 5.3/100,000 person years for occupationally-active women (during 8,100,000 person years of follow up). Among occupationally-active men, elevated rates of suicide mortality were observed for 9 occupational groups and protective effects were observed for 6 occupational groups. Among women, elevated rates of suicide were observed in 4 occupational groups and no protective effects were observed. For men and women, age-standardized suicide mortality rates were inversely related to skill level.

Conclusions: The limited number of associations between occupational groups and suicide risk observed in this study suggests that, with few exceptions, the characteristics of specific occupations do not substantially influence the risk for suicide. There was a moderate gradient in suicide mortality risk relative to occupational skill level. Suicide prevention strategies in occupational settings should continue to emphasize efforts to restrict and limit access to lethal means, one of the few suicide prevention policies with proven effectiveness.

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N

Health and safety preoccupations trough the Quality Clinic Process Chart (QCPC)

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Objectives: Continuous improvement programs use diverse methods in order to improve businesses results in terms of productivity, quality, health and safety and ergonomics (HS&E). Quality Clinic Process Chart (QCPC) is one methodology used for continuously analysing the process at the level of the cell, in order to identify improvement opportunities and probable inefficiencies, called “turnbacks.” The paper’s goal is to describe the nature of “turnbacks” related to HS&E and to analyse their management in the different steps of the process.

Methods: Quantitative and qualitative analyses were practiced by a team of ergonomists on “turnbacks,” collected over approximately one year in cells originated from four different branches of the same manufacturing company. First, “turnbacks” collected and summarised were categorised upon the main type of problem reported. Secondly, “turnbacks” were classified and the impact on productivity, quality and health and safety issues assessed. Four levels of assessment were considered to estimate impact. Qualitative analyses enable to describe, in detail, for each map process, and type of issue, the main steps, structures, and sequences, in place or envisaged for resolving problems raised, more particularly in terms of health and safety preoccupations.

Results: One of the five main types of “turnbacks” described health and safety issues. The routine procedure of treatment for these “turnbacks” was to remove them from the QCPC process analyses, and to redirect them toward the health and safety committee. Then, the members of the committee decide what analyses are appropriate to do, whether consulting an ergonomist or another specialist in order to resolve the complex problems, adopting appropriate changes, and implanting adequate modifications. Analysis of “turnbacks” associated with each step of the process determines process improvement priorities and orient improvement initiatives. Applying the QCPC method allowed identifying, analysing, and resolving “turnbacks”, and that in order to prevent a process from delivering perfect quality on the “first pass through” in the shortest time possible and by discovering which steps in a process are causing the most detriment to overall process performance and health and safety issues.

Conclusions: Collecting and summarizing “turnback” data at established intervals enabled the QCPC teams to eliminate root causes for some important problems, and to determine greatest opportunities for improving process. Analysis to identify appropriate situations and to find adequate solutions, taking into account health and safety issues, and monitor the effectiveness of actions for correct implementation, gives employees a voice in the process of improvement. However, addressing health and safety problems through continuous improvement process suppose to have preoccupations for health and safety in each step of the quality clinic process, and to conduct more analyses of activity in cases when workers report turnbacks related to their health and safety.

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Playing where you work: Rural Newfoundland youth and intersections of work, play and health

Norman ME, Memorial University of Newfoundland

Objectives: While there is an emerging body of research on youth, rurality and work experience (McGrath, 2001; Shucksmith, 2004), on the one hand, and youth, rurality and recreation (Kenway and Hickey-Moody, 2009; Shoveler, Johnson, Prkachin, and Patrick, 2007), on the other, there is scant research that brings the two together and explores the intersections of rural youth, work, and recreation. Using data collected as part of the Community-University Research for Recovery Alliance (CURRA) initiative at Memorial University, this paper examines how youth (19-24 years) living in rural communities on the west coast of Newfoundland experience work and recreation relationally and the health implications associated with this relationship.

Methods: The research employs multiple methods including qualitative interviewing and focus groups as well as a quantitative surveys. This paper focuses on results drawn from the qualitative research.

Results: The paper argues that youth have deep, albeit ambivalent, emotional, symbolic, and material-economic investments in the commercial consumer outlets located in their communities, and position them as complex sights of play, recreation, community identification, as well as places of employment. Indeed, while youth understand and articulate the relative success of their communities in and through such retail consumer establishments, at the same time, they see them as offering “bad” jobs, suggesting that they are poor paying, degrading and, in some cases, outright unsafe. For these youth, work and recreation reside at the interface of local and global forces, a phenomenon that increasingly characterizes work relations more broadly within a changing world.

Conclusions: This paper concludes by suggesting that the tension between consumer retail establishments as both spaces of play and places of work is a fruitful one for getting at the intersections of rural youth, recreation, and occupational health.

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P

Occupational exposure limits in Canada: A comparison across the provinces and territories

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Objectives: Canada's occupational exposure regulations vary by jurisdiction, which could lead to regional differences in workers' exposure to hazardous substances. This has implications for exposure assessment, as well as for human health. The objectives of this project are to perform a survey of threshold limit values for a set of high priority carcinogens (selected for CAREX Canada, a national exposure surveillance project), and qualitatively review differences between the provinces/territories, highlighting where improvements could be made.

Methods: We located and reviewed the occupational exposure regulations for the jurisdictions covering Canadian workers (10 provinces and 3 territories, and the Canada Labour Code for federally legislated workers). For comparison, we also reviewed the ACGIH recommended standards, and a select group of international exposure limits known for being especially protective of worker health. We summarized the organizations responsible for setting occupational limits and reviewed their legislation for comparison and contrast. We categorized jurisdictions with respect to how flexible and current their regulations were (i.e. fixed in time, or updated with ACGIH yearly), how much they varied from accepted ACGIH standards, and where they provided exceptions for specific substances. We also summarized information on substances where a wide variation in occupational exposure limits occurred across Canadian jurisdictions.

Results: Canadian jurisdictions regulate occupational exposure limits very differently. Responsibility is held by a variety of institutions and transparency about how limits are set, and even what those limits are, differed regionally. The most striking regulatory finding was that of the 14 Canadian jurisdictions, only four (29%) automatically adopt widely accepted ACGIH recommended standards yearly (MB, NL, PE, NS). Several other provinces adopted ACGIH regulations for a fixed year (i.e. 1997 for New Brunswick) and then have, in some cases, applied updates for specific substances at various times since. Some substances (e.g. formaldehyde) have very different exposure limits depending on jurisdiction.

Conclusions: Regional variation in occupational exposure limits exists in Canada, and sometimes within a single province. This is likely to lead to differences in exposure levels experienced by Canadian workers. This is of particular importance for human health, and also for exposure assessment at a national level (such as the work of CAREX Canada). Differences in exposure limits were due to bureaucratic barriers (i.e. legislation not designed for flexibility), lack of resources (i.e. the territories), and industry pressure (i.e. for formaldehyde). We recommend that a national standard for occupational exposure limits would be the best practice for protecting the health of Canadian workers.

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Workplace-based interventions for return-to-work or work functioning outcomes among workers with common mental health conditions: A systematic literature review

Pomaki G, Occupational Health and Safety Agency for Healthcare (OHSAH) in BC

Objectives: The present study is a systematic literature review that examined the effectiveness of workplace-based interventions in improving return-to-work (RTW) outcomes or work functioning (WF) in workers with mental health conditions (MHCs) who are on sick leave. Workplace-based interventions are initiatives that employers or insurers can undertake or strongly facilitate. MHCs include mood, anxiety and adjustment disorders as primary or secondary diagnoses.

Methods: We searched six electronic databases and hand-searched articles for reviews, qualitative studies and quantitative intervention studies published in English, French, Dutch and German between 2004 and 2009. We also searched websites of established international institutions for related guidelines and reports. Two reviewers screened abstracts (and when necessary, full-text articles) applying pre-established inclusion/exclusion criteria. Quality assessment and data extraction were performed in separate stages, each by two independent reviewers. Disagreements were resolved by consensus and involved a third reviewer as needed. We categorized evidence as high quality, medium quality or low quality; synthesized evidence to reach conclusions; and organized conclusions into three main themes: individual-, disability management practice-, and organizational-level interventions.

Results: Our search yielded 1,483 abstracts from reviews and 673 abstracts from primary studies. Following eligibility screening and quality assessment, we retained a total of 7 reviews, 9 quantitative studies, 6 qualitative studies, 4 guidelines, and 4 reports in our evidence synthesis. Disability management practice-level interventions were most commonly examined, with little attention paid to organizational-level interventions. Effective interventions include: (a) structured and planned, close communication between worker, employer, care providers and other disability management stakeholders; (b) facilitated access to evidence-based treatments; and (c) systematic and coordinated (often guideline-based) RTW practice.

Conclusions: Our review supports the effectiveness of workplace-based interventions for worker with MHCs who are on sick leave. Specifically, interventions that promote structured RTW practice or communication among those involved in RTW practices were found to be effective. Individual-level interventions based on cognitive behavioural therapy principles that were delivered by the employer or insurer were also effective in reducing sickness absence. There is a need to examine the effectiveness of organizational-level interventions that aim at raising awareness of MHCs or supporting the workplace as a way to improve RTW or WF outcomes.

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Long-term impact of an early multidisciplinary return-to-work program for workers on sick leave due to musculoskeletal disorders

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Objectives: This study assesses the impact of a pilot project implemented in Quebec between 2000 and 2004: the PREVICAP program (Sherbrooke model). PREVICAP consists of an early comprehensive intervention aimed at returning injured workers with musculoskeletal disorders to their regular job. The efficacy of PREVICAP has been demonstrated and replicated in two randomized controlled trials, that is, in ideal settings. However its effectiveness and cost-benefit in real-world situations subject to implementation constraints has never been demonstrated.

Methods: A mixed-methods research strategy was used with a multiple case study design combined with two quasi-experimental designs, including a cohort study of injured workers. In total, 117 subjects referred to PREVICAP were compared with 391 controls receiving usual care. Controls were matched to experimental subjects according to date of injury, Quebec compensation board regional office, history of disability compensation in the previous year, and duration of compensation benefit between accident and program referral (lead-time for referral). Data were collected over a three-year follow-up period. Main outcomes are time until sustainable return to work, duration of compensation benefits, disability management costs and net benefit (NB) over a three-year period. Data were analyzed using multivariate Cox models and NB regression models.

Results: PREVICAP is more effective in terms of sustainable return to work (adjusted (HR)^ = 2.86; 95%CI 1.99–4.12). Effect on duration of compensation benefits was also substantial (adjusted (HR)^ = 1.75; 95%CI 1.27–2.40). Overall, mean costs are higher for PREVICAP workers ($60,873 vs $53,990). However, when taking into account the difference in saved compensation days, six months on average, PREVICAP is more cost-beneficial. In particular, among workers with no history of compensation in the last five years, the difference in adjusted NB between groups is $17,119 in favor of PREVICAP (adjusted NB: +$918 vs -$16,201; p=0.003).

Conclusions: Our evaluation confirms the positive value of the PREVICAP intervention. Furthermore, these results were observed in a vulnerable population of workers with prolonged disability, referral to the program occurring six to 12 months after the accident for a majority of them. Long-term cost-benefit results suggest that this program is worthwhile from a social insurer perspective.

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Something might be missing from OHS audits: Findings from a content validity analysis of five audit instruments

Robson L, Institute for Work & Health

Objectives: The specific objective of the project was to examine the content validity of OHS management audit methods. This was part of a broader objective to contribute to the gap in the research literature regarding the measurement properties of OHS management audit instruments.

Methods: Evaluating content validity requires a definitional standard against which concepts or items can be compared. The standard for this study was the OHS management standard developed by the Canadian Standards Association, CSA Z1000. There are five major elements in this standard (Commitment, Leadership, and Participation; Planning; Implementation; Evaluation and Corrective Action; Management Review and Continual Improvement) and these were subdivided into 163 content units for the purpose of analysis. Using the documentation for an audit instrument, two independent raters determined, for each unit, whether the instrument, when used in the field, assesses the concept described by the unit (fully, partially, or not at all). Results for the elements of CSA Z1000 were derived by aggregating the results for the constituent content units. This analysis was carried out for five of the more comprehensive OHS management audit instruments used by public and not-for-profit OHS organizations when serving workplaces in Ontario.

Results: A relatively high proportion of CSA Z1000's content (74%) was partially or fully represented on average in the audit methods. However, six management elements were found to be incompletely represented in three or more of the methods**:** general [OHSMS] (i.e. integration with other management systems), objectives and targets, documentation, internal audits, management review input, and management output. The most extreme example is the internal audits element whose content was completely missing for three of the audit methods.

Conclusions: Some OHS management audit instruments in current use are incomplete relative to a recent OHS management standard. It may be that some instruments warrant revision in order to better reflect current expert consensus.

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A systematic review of the effectiveness of training & education for the protection of workers

Robson L, Institute for Work & Health

Objectives: The primary objectives of the literature review were to answer the following research questions: 1) Does occupational health and safety (OHS) training have a beneficial effect on workers and firms? 2) Does higher engagement OHS training have a greater beneficial effect on workers and firms than lower engagement OHS training?

Methods: Systematic review methods were used. Ten electronic databases were searched for articles meeting relevance criteria. Key criteria were that the study design be a randomized trial with pre- and post-intervention measures. Also, criteria allowed the inclusion of a wide range of OHS training and education intervention studies. The methodological quality of all relevant articles was assessed using a standardized form focused on internal validity. Information on the effectiveness of education & training interventions was extracted with respect to four broad outcome categories: knowledge, attitudes & beliefs, behaviours (including behaviourally-influenced hazards), and health (i.e. injuries, illnesses, symptoms). Effect sizes were also expressed as standardized mean differences to facilitate aggregation of and comparisons between studies. Training interventions were classified into categories of low, medium and high engagement, based on the degree of engagement of the learner in the training, as derived from the description in the article. Evidence was synthesized qualitatively using the Centers for Disease Control “Guide to Community Preventive Services” algorithm, which considers the quantity of evidence (number of studies), methodological quality, consistency of effect, and effect size.

Results: Twenty-two studies, involving 36 training interventions met the relevance criteria. Intervention exposures were usually modest, consisting of one or two sessions, which were most often two hours or less each. A variety of methods were used to deliver training (i.e. lecture, printed materials, hands-on practice, etc.). The OHS hazards addressed by the interventions included all five possible types, but ergonomic was the most frequent. Effects were most often measured between 1 and 6 months post-intervention. Twelve of the 22 studies addressed the two research questions and were of Fair/Good methodological quality. These were used in the final evidence syntheses.

Conclusions: Based on the studies reviewed, there is INSUFFICIENT evidence that training AS A LONE INTERVENTION impacts health (i.e. injuries, illnesses, symptoms), because effects have been inconsistent in direction and too small. The research team nevertheless recommends that workplaces continue to conduct training programs because STRONG evidence has been found for training impacting targeted behaviours (work practices) on the job. Regarding research question 2, there was INSUFFICIENT evidence that a single session of high engagement training was more effective than a single session of low/medium engagement training, because observed effects were too small. Thus, no recommendation has been made regarding engagement.

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Analyse de la littérature francophone sur les interventions ergonomiques de type participatives initiées pour la prévention des TMS

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Objectives: Pour prévenir les TMS, des interventions d'ergonomie ont été menées en entreprise, avec un engouement particulier pour les interventions participatives. L'évaluation de ces interventions est rapidement devenue une priorité Diverses recensions d'écrits se sont penchés sur cette question. Pour diverses raisons, la littérature d'origine francophone y est très mal décrite. Le but de l'étude présentée était de caractériser l'apport de la littérature francophone par une stratégie de recherche originale.

Methods: Une recherche bibliographique sur les documents francophones des bases de données suivantes a été réalisée : Pascal, Francis, Cisod, INRS, Ergonomics Abstract. Se sont ajoutés des documents provenant des rapports des journées de Bordeaux et des rapports de l'IRSST de même que des documents trouvés pour compléter des études sélectionnées ainsi que des thèses et mémoires. Sur un total de 450 documents, 117 répondaient à nos critères d'inclusion. Après une révision et dû au fait que plusieurs documents étaient liés à la même étude, 78 études ont été décrites. Pour bien caractériser les interventions ergonomiques, un cadre conceptuel et une grille d'analyse ont été développés selon un mode itératif. La grille couvre plusieurs thèmes : caractéristiques de l'entreprise et de la population; caractéristiques de la demande, de l'intervenant et du travail analysé; organisation de la SST, obstacles et facteurs facilitants; processus de l'intervention; structures participatives; effets de l'intervention.

Results: L'étude révèle toute la richesse de la littérature francophone sur le processus d'intervention. Les outils, méthodes, informations recueillies sont très bien décrits de même que les structures participatives. On rapporte les impacts sur la situation de travail, et moins souvent les effets plus généraux sur le milieu de travail. Les éléments du contexte de travail et l'organisation de la SST sont peu rapportés. La collaboration, la disponibilité de divers acteurs et le soutien de la direction sont les facteurs facilitants les plus fréquents. Les difficultés les plus mentionnées sont la marge de manœuvre économique, la dimension temporelle de l'intervention et le manque de disponibilité du personnel.

Conclusions: Cette étude est originale, car elle dresse pour la première fois un portrait de la littérature francophone sur les interventions participatives visant la prévention des TMS. Une grille d'analyse novatrice a permis de bien formaliser la complexité d'une intervention ergonomique. Il ressort notamment toute la richesse de cette littérature sur le processus d'intervention. Une lacune apparaît quant à la description du contexte et de l'organisation de la SST. L'idée de cette étude était de mieux connaître les interventions ergonomiques dans une perspective d'amélioration de nos pratiques. Pour aller plus loin, il serait important de poursuivre ce genre de recherche.

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Workplace injuries and job flows

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Objectives: The growth rates of workplace injury and illness rates exhibit a negative (time varying) mean and a pro cyclical response to variations in economic activity, as they decline in recessions before rebounding (and overshooting) during economic recoveries. Using a structural time series model, it is shown that this business cycle behaviour is driven by job flows. In recessions, the acceleration of job destruction increases the growth rate of workplace injury and illness incidence rate (which is indicative of moral hazard), while the slowdown in job creation depresses this growth rate by reducing the proportion of workers of short job tenure.

Methods: The analysis rests on data from the Bureau of Labor Statistics (BLS, www.bls.gov). The workplace injury and illness incidence rate - frequency, for short - is defined as number of cases per 100 full-time equivalent employees. Frequency is available on an annual basis for manufacturing since 1926, and for all private industry since 1972. Due to the manufacturing series being considerably longer, the analysis focuses on this industry; yet, for key hypotheses, evidence is provided for the private sector as well. The analysis proceeds in two steps. First, a state space time series model is estimated for the (log) growth rate of frequency over the entire time period of available data; this model identifies the (geometric) mean rate of growth and the autoregressive process. Then, in a second step, the model is expanded to a structural (state space) time series specification by introducing de trended (log) growth rates of job flows as covariates; these covariates substitute for the autoregressive process for the time period for which they are available (1993 2007).

Results: The non-fatal workplace injury and illness incidence rates in manufacturing and the private sector have experienced steep declines over their respective recorded histories. By 2007, the incidence rate for the private sector had dropped to 40 per cent of its 1972 value (which is the first value on record). It was shown (for the period 1977-2000) that only 15 per cent of this decline is due to structural change in the economy; the remaining 85 per cent are due to workplaces being safer by design. There is a “the dog that did not bark” issue to the behaviour the growth rate of the injury and illness incidence rate during recessions. This growth rate does not drop because of the jobs that are destroyed (which lengthens the average job tenure if short tenured workers are over-represented in layoffs) but because of the jobs that are not created.

Conclusions: There is an important difference between jobs created at existing establishments (expansions) and jobs created at openings. Whereas an acceleration of job creation through expansions increases frequency growth, a quickening of job creation through openings has the opposite effect for the private sector and no effect for manufacturing. This finding suggests that workplaces at openings are safer than the average existing workplace, thus pointing to new establishments as an important avenue toward safer workplaces. The established positive relation between the growth rates of the workplace injury and illness incidence rate and job destruction points to moral hazard, as laid-off workers have an incentive to use the workers' compensation system as a social safety net. Although the evidence was established for aggregate data only, the finding agrees with evidence of moral hazard in the workers' compensation system established by Krueger (1988, 1990) at the level of individual claims.

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Language literacy and labour market outcomes among recent Canadian immigrants

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Objectives: Immigrants are an increasingly important part of the Canadian labour market. The objectives of this paper were to examine the impact that English and French language proficiency had on labour market outcomes among a recent cohort of immigrants to Canada - in particular employment in occupations with higher physical demands, and occupations with lower skill levels, than those worked before coming to Canada.

Methods: This study utilized data from the Longitudinal Survey of Immigrants to Canada, a cohort of immigrants followed for four years after their arrival. For both studies, we restricted our sample to those respondents who had worked before immigrating, and who were working when re-interviewed at two (N approx 4,300) or four (N approx 4,200) years after arrival in Canada. A further restriction in our examination of overqualification was to limit our sample to respondents with secondary education or higher. Regression models then explored the associations between language proficiency and each labour market outcome, after adjustment for a variety of other personal and immigration-related characteristics (e.g. age, applicant status, country of origin, marital status, claimant category).

Results: There was a step-graded relationship between lower levels of English-language proficiency and an increased likelihood of being employed in occupations with higher physical demands (OR ranging from 1.94 to 5.08, all confidence intervals above one). Adjustment for personal and immigrant-related characteristics attenuated this relationship, although in our fully adjusted model a significant gradient still remained. Similar results were obtained when examining over-qualification, with respondents with lower levels of language proficiency more likely to be employed in jobs that under-utilized their educational obtainment.

Conclusions: Poorer English- and French-language proficiency was associated with sub-optimal labour market outcomes in this representative cohort of recent Canadian Immigrants. Low English- and French-language proficiency may also increase the risk of workplace injury when combined with hazardous workplace environment. Currently, no structured information on occupational health and safety or worker rights is provided to immigrants when they arrive in Canada. Based on our results we suggest more needs to be done to ensure vulnerable groups of immigrant workers are able to access the Canadian labour market.

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Understanding the longer term impacts of disability onset

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Objectives: Very little literature is available about how onset of a permanent condition while at work affects the nature subsequent employment history. Furthermore, despite considerable emphasis on return to work, there is little analysis related to indicators of re-integration, such as job retention or career progression. This paper examines trends in a series of measures related to these indicators, measured over the mid-term (defined here as 3-4 years following onsets) using Statistics Canada survey data.

Methods: Using Statistics Canada's Survey of Labour and Income Dynamics, this work examines longitudinal work-history trends of people who experience the onset of an on-going disability while employed. A combination analysis of variance/covariance, and multi-level modeling regression techniques will be used to examine: employment status; job mobility; changes in the terms of work (hours, weeks worked); surrogates of employment progression (job status; responsibilities etc) and changes in salary/wages/employment income will be examined. Comparison will be provided between samples experiencing onset of a continuously reported health and activity limitation over a four-year period and those indicating no disability, holding age, sex and initial job skill level (as indication in the National Occupational Classification (NOC)) constant.

Results: Results to date indicate that in the mid-term there is no discernible difference in the likelihood of either being employed at the same job or likelihood of full-time work between those experiencing onset of a permanent conditions and those indicating that they had no disability (Spector et al. 2008), hold age, sex and occupation (single-digit NOC). Results reported here are similar but also show a lag in total employment income, largely related to a lower likelihood of employment progression and some curtailment in hours worked (beyond "full time").

Conclusions: In many respects, people experiencing onset of a permanent health or activity limitation while at work are very likely to find themselves, in the mid-term back, at their job, working at the same "intensity." However, there is significant evidence that this population experiences barriers in "keeping up" with others in terms of career progression, and earnings capacity.

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Social inequalities, musculoskeletal health and work: Does the perception of work-relatedness matter?

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Objectives: This gender-based study examines the socioeconomic gradient associated with musculoskeletal outcomes in Quebec workers and measures the influence of work exposures on the gradient in musculoskeletal health associated with occupational class. It also examines how these relationships vary for work-related musculoskeletal disorders (MSD), non-work-related MSD and when work-related and non-work-related MSD are combined (i.e. MSD in which work-relatedness is not distinguished).

Methods: Using data from the 1998 Quebec Social and Health Survey, 4149 male and 3116 female workers meeting inclusion criteria were identified. MSD was defined as the presence of significant musculoskeletal pain interfering with activities frequently or all the time in the previous 12 months and identified using a self-administered questionnaire. Perception of whether symptoms were partly or entirely related to work was measured. Three main outcomes were studied: work-related MSD, non-work-related MSD and MSD without distinction of work-relatedness. SOC occupational codes were categorized into 5 occupational classes from senior managers and professionals to unskilled manual workers. Work exposure measures included a 5-item index of physical work demands, general work posture, Karasek decision latitude and psychological demand 9-item scales, intimidation at work, difficult situations with the public and work hours. For each MSD outcome, the Adjusted Risk Ratio (ARR) for each occupational class was compared in 4 multinomial logistic regression models: Model 1) occupational class alone; Model 2) model 1+ physical work demands and work posture; Model 3) model 1 + psychosocial work demands; Model 4) model 1 + all significant work exposures. All models were adjusted for age, BMI, smoking, leisure time physical activity, social support & work hours. Separate analyses were carried out for men and women.

Results: A very strong and highly significant occupational class gradient was found for work-related MSD, steeper for men that women (Men: skilled manual workers ARR 3.1 (2.3-4.2) vs senior managers/professionals; Women: Skilled and unskilled manual workers ARR 1.9 (1.3-2.6) vs senior managers/professionals). This occupational class gradient disappeared or greatly diminished when physical work demands were taken into account (Men: skilled manual workers ARR 1.4 (0.99-1.9); Women: Skilled and unskilled manual workers ARR 0.98 (0.7 -1.4)) but not when psychosocial job demands were taken into account. An inverse and highly significant occupational class gradient was found for non-work-related MSD that also disappeared when physical work demands were taken into account. When work-relatedness of MSD was not taken into account there was a much smaller occupational class gradient for MSD found in both men and women (Men: skilled manual workers ARR 1.4 (1.1-1.6) vs senior managers/professionals; Women: Skilled and unskilled manual workers ARR 1.2 (1.04-1.5) vs senior managers/professionals) that disappeared when physical work demands were taken into account. Strong social gradients in prevalence of work exposures variables were found for physical work demands, work posture and decision latitude; a quite significant inverse social gradient was found for psychological job demands.

Conclusions: The relationship between MSD and occupational class is complex. Work-related MSD (WMSD) are associated with lower occupational class, while non-work-related MSD are associated with higher occupational class. Moreover, the relationship between WMSD and occupational class is largely explained by differences in the prevalence of physical work demands among occupational classes. Thus, the associations between WMSD and lower occupational classes largely disappear when one adjusts for physical work demands. If work-relatedness is not taken into account, the relationships between MSD, occupational class and occupational exposures will vary according to the distribution of occupational classes in the study population. Improving physical work demands among the lower occupational classes would help reduce socioeconomic inequalities in musculoskeletal outcomes.

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Women's occupational health coverage in traditional occupational health journals versus women's health specialty journals, 1987-2007: A quantitative content analysis

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Objectives: Leading medical journals are influential in developing health policy and best-practice guidelines. Peer-reviewed health research is instrumental to identifying the relative magnitude and importance of specific topics that are of scholarly and clinical concern. Women's occupational health (OH) has received little attention in leading journals. This exploratory study has two objectives: (a) to examine the nature/extent of women's OH coverage in eight leading health journals, 1987-2007; (b) to identify publication trends during the sampling period.

Methods: Using quantitative content analysis, a non-proportionate stratified sample of 235 peer-reviewed journal articles was purposively selected from five leading OH journals (n=165) and three women's health specialty (WHS) journals (n=70) based on database searches, key words, and specific inclusion criteria. Journal articles were read through twice in their entirety by the researcher. Each article was analyzed using a semi-structured content analysis protocol to assess different variables including author and sample characteristics, study design and health topics evaluated in each article; the protocol also included a sex-and-gender-based analysis (SGBA) component to determine if and how sex and gender was addressed in the article. The data were collected and entered into SPSS 17.0 for statistical analysis, including primary cross tabulation and time-trend graph analysis.

Results: Five key findings emerged from the data: (1) traditional OH journals covered women's OH issues less frequently and in less detail than did WHS journals; (2) gender insensitivity for data collection and analysis procedures was the "norm" in traditional OH journals; (3) sex-disaggregated data did not always result in sub-group analyses or analysis of gender differences in both traditional OH and WHS articles; (4) results were discussed from a gender perspective more frequently in the context of research outcomes or policy implications in WHS journals; (5) SGBA was not applied consistently or with regular frequency in traditional OH journal articles.

Conclusions: Broadening the definition for what constitutes "women's OH" is fundamental to developing new research initiatives in women's workplace health. There is a need for increased capacity-building for sex-and-gender-based analysis (SGBA) in health research, particularly in the area of women's occupational health. Sex-and-gender-based analysis is an analytic framework upon which future gender-sensitive systematic reviews of the OH literature may be based. Strategies for developing gender-based approaches to OH research are also discussed.

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Assessing the impact of supervisor support on workers' work ability

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Objectives: Since the work ability model has been designed by Ilmarinen, researchers have tried to identify factors that influence workers' work ability. The aim of this study is to assess whether or not support from supervisors influences workers' ability to work.

Methods: The study was conducted in an information technology company located in Tokyo. The number of participants was 1,157 men. Two surveys using the Brief Job Scale Questionnaire and the Work Ability Index (WAI) were conducted, one in the fall of 2007, one in the fall of 2008 with the same cohort. Two cross-sectional analyses and a one-year longitudinal analysis were conducted using multiple regression analysis. In addition, the relationship between supervisor support and each dimension of WAI was analyzed separately.

Results: Significant relative risks and correlation coefficients were observed between supervisor support and WAI scores in both survey periods after adjusting for job demand, job control, age, job rank and job type. Fall 2007 supervisor support was a significant predictor of fall 2008 WAI, which means that supervisor support does influence WAI score. From the analysis of each dimension of WAI, a strong relationship between supervisor support and WAI was observed for the sections of the WAI that assessed work capacity but not for the sections that assessed personal health status of the respondent.

Conclusions: Supervisor support is an important predictor of workers' work ability. Supervisor support is associated with the questions of the WAI that assess not only work demands but also persons' resources of the work ability model.

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Sarcoidosis cases in workers from British Columbian industries with potential beryllium exposure

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Objectives: Chronic beryllium disease (CBD) is a growing problem for nations with industries that use beryllium, with cases reported from U.S., eastern Canada, Germany, France, the U.K., Sweden, Poland, S. Korea, Japan, Israel and Kazakhstan. No cases of CBD have been diagnosed in workers of British Columbia (BC) despite many potential exposure settings. This investigation identified cases of sarcoidosis, a disease often confused with CBD, between 1991 and 2006 in BC workers with potential beryllium exposure.

Methods: The study utilized administrative databases from BC's single payer health system to link cases of sarcoidosis to employers with potential beryllium exposure. Such employers were selected a-priori based on census data, industry directories, website searches and expert opinion. Cases were either ICD-9 or ICD-10 classified sarcoidosis. Denominators were from industry estimates from 2006 Canadian Census data.

Results: A total of 2,663 sarcoidosis cases were found in the cohort, with 201 cases in high-risk industries. The overall sarcoidosis rate in non-beryllium industries was 11.6/10,000 workers for the larger ICD-9 derived cohort (n= 1958) and 2.9 for ICD-10 cohort (2001-2006, N=504). This mean was used as a threshold to indicate elevated rates in beryllium industries. Twelve potential beryllium industries had rates > 11.6, in the early years and eight > 2.9 in the later years. The highest rates were in electric power generation, boiler, tank and container manufacture and aircraft maintenance.

Conclusions: We used the BC health linked databases to identify several industries in the province with potential beryllium exposure and elevated rates of sarcoidosis. Sentinel cases of beryllium sensitization or early disease might be identified in these industries using the beryllium lymphocyte proliferation test.

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Case study investigation of birth defects in a newspaper office environment

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Objectives: A cluster of birth defects occurred among children of mothers working in a small area of a large newspaper office. The Health & Safety Committee requested the occupational health clinic's assistance in identifying the cause. Other workplace exposure concerns were also identified and workers wondered whether they could be related to the birth defects. A comprehensive approach was proposed to assess not only the reproductive problems but also other exposures commonly found in office environments.

Methods: A list of conceivable reproductive risk factors was collected for investigation. However, based on previous experience with cluster investigations, it was decided to use a broad investigation strategy rather than focusing only on reproductive hazards. A survey instrument was constructed from recognized questionnaires, which dealt with ergonomics, indoor air quality, asthma and workplace stress, along with customized exposure questions. Measurements were taken for temperature, humidity, carbon dioxide, carbon monoxide, particulate, magnetic fields and noise. Measurement results were compared to existing standards. Symptoms were logged during the sampling period to determine if there was an association with measure air parameters. The questionnaires' results were analyzed using regression techniques. The two departments where the birth defects occurred were compared to other departments. Workers were given the time from work to fill out the questionnaire in a specific room at the worksite.

Results: Despite administering the survey on site, the response rate was 67%, largely due to workers on vacation (the survey was administered in July). Measurements showed that air quality was mostly within standards, however, particulate was associated with throat symptoms. Stress, musculoskeletal and air quality symptoms were highest in the two departments of concern. Magnetic fields and low frequency noise levels were also above background levels in these departments. There was evidence for an association between asthma and particulate (both internal and ambient); and, headache, nausea and ear symptoms with low frequency noise.

Conclusions: The departments of concern had higher levels of exposure to some of the possible risk factors, however, any association was rather tenuous and fraught with uncertainty. Practical advice included to offer the possibility of relocation for concerned pregnant workers. While affected workers did not directly engage tertiary prevention services, the JH&SC was satisfied that the investigation was thorough. Although a workplace cause could not be completely ruled out, there were recommendations for other workplace concerns based on secondary and primary prevention investigation activities, which the JH&SC could be act upon.

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Comparative benefits adequacy and equity of three Canadian workers' compensation programs for long-term disability

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Objectives: In this study we compare three Canadian workers' compensation programs for long-term disability. The two objectives of the study are: 1) To determine the earnings losses of workers' compensation claimants sustaining a permanent impairment from a work accident; and 2) To compare the adequacy and equity of benefits proved by the three distinct programs.

Methods: The three long-term disability programs under investigation were: 1) The Ontario program from prior to 1990, which was an impairment-based program; 2) The Ontario program from 1990 though to 1997, which was a loss of earnings capacity program; and 3) The British Columbia program in existence till June 2002, which was a bifurcated program that provided the higher of an impairment-based benefit or a loss of earnings capacity benefit. The study is based on a linkage of workers' compensation administrative claims data from each of the programs with individual tax information contained in Statistics Canada's Longitudinal Administrative Databank. A matched cohort-control method was used to identify labour-market earnings losses of claimants and to assess the adequacy and equity of benefits provided by each program. Analyses of earnings recovery and earnings replacement rates considered labour-market earnings and benefits receipt over a ten-year period post accident.

Results: In each of the three programs, approximately a quarter of the sample recovered less than 25% of their control-counterpart earnings through labour-market activity, and approximately half recovered more than 75%. Few had mid-range earnings recovery in the entire sample and in each impairment brackets. In terms of benefits adequacy, the bifurcated program provided the highest average earnings replacement rates, with all impairment brackets achieving substantially more than 90% of control counterpart earnings. An analysis of the quartile distribution of earnings replacement rates also indicated that more claimants in the bifurcated program fared better than the other two programs.

Conclusions: Earnings replacement rate findings indicate that, on average, the three programs are mostly adequate, with the bifurcated program providing the highest replacement rates and the most favorable distribution of replacement rates. The finding that labour-market earnings recovery is polarized in the entire sample and within each impairment bracket suggest that earnings recovery is an almost all or almost nothing phenomenon for most claimants. Even low levels of impairment can be associated with large earnings losses, suggesting the need to consider each case individually since a one size fits all approach may not adequately meet the needs of all claimants.

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Health perception in workers exposed to hand-arm vibration: Prerequisite for putting in place an effective preventive program in the workplace

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Objectives: Knowledge of risks from exposure to hand-arm vibration is usually presented by clinicians and researchers from a medical and engineering point of view. There is a strong need to develop innovative health promotion programs for exposed workers. Risk perceptions by vibration exposed workers and HAVS (hand-arm vibration syndrome) affected workers are less well known. Risk awareness on the part of exposed workers and their employers, as well as knowledge and acceptance of available preventive solutions, are necessary steps before, installing adequate preventive measures whether organizational, behavioural or environmental. Our research objectives are: 1) to document knowledge, beliefs, perception and attitudes with regards to risk exposure and health effects, 2) to document knowledge, beliefs, perception and attitudes with regards to preventive strategies including barriers and facilitating factors towards these measures, 3) to document the latter form the standpoint of employers and public health physicians involved in the promotion of worplace safety.

Methods: A descriptive exploratory study with workers exposed to hand-arm vibrations has been used. It uses qualitative methods that include focus group discussions with workers exposed to hand-arm vibrations, as well as individual interviews with other key informants (health-care professionals and employers). An open-ended questionnaire was developed to collect qualitative date on perceived risks and solutions to prevent or reduce HAVS. Based on integrated theoretical framework related to known determinants of behaviour change, the analysis will focus on the following 2: 1) knowledge of health effects, safety, well-being and/or quality of life 2) related beliefs about individually susceptibility and severity of consequences 3) attitude and values related to hand-arm vibration exposure 4) knowledge and attitudes towards exposure reduction, as well as perceptions of barriers and facilitating factors for the measures, in the workplace environment or otherwise Interviews were transcribed. We proceeded to the content analysis using N'Vivo and a thematic approach.

Results: Several obstacles exist that need to be addressed, when putting in place preventive measures in the workplace. Problem identification by workers and employers is an important stage for empowering employees and employers to control the design of their workplace. Risk perception of vibration is quite low form the standpoint of workers, employers and health physicians. For workers, vibration exposure is an inevitable risk, it is part of the job. Knowledge of health effects from the vibration exposure as well as preventive strategies is low among workers, employers and health physicians.

Conclusions: This study highlights the importance of taking into account determinants of behavioral change within a theoretical framework while respecting the workers' and employers' perspective, when setting up HAVS preventive programs. There is a lot of work to be done. An individual approach is not beneficial, rather a broader approach from a macroscopic point of view such as the putting in place of standards and putting close attention to more efficient knowledge transfer models." Health profesionals must consult the people who are the intended target of health programs to determine their needs, problems and aspirations concerning quality of life. If professionals do not take this vital step, health policies will remain sterile technocratic solutions to problems that may not exist or that hold a low priority in the minds of the people."

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V

The evidence on effectiveness and implementation of participatory ergonomics

Van Eerd D, Institute for Work & Health, University of Waterloo

Objectives: Participatory ergonomics (PE) is an effective approach to improving worker health. This presentation will cover evidence from two systematic reviews of the literature on the effectiveness and implementation of participatory ergonomics (PE) interventions. One review focused on effectiveness of PE in reducing adverse health outcomes of workers and the other focused on the implementation and process of PE interventions in workplaces. In addition, an evidence-based tool on how to implement PE will be presented.

Methods: Two systematic reviews were done with researchers and ergonomists, and input from occupational health and safety stakeholders. The review on PE effectiveness focused on peer-reviewed literature which reported on evaluating PE on worker health outcomes. Quality criteria addressed internal and external validity. Data extraction and best evidence synthesis focused on three outcomes: Lost days/sickness absence, worker compensation costs, symptoms/disorders. The review on PE process included peer-reviewed and grey literature describing PE. Documents were relevant if they described a PE intervention, and quality criteria were adapted for non-scientific documents. Data was synthesized according to most often reported process and implementation approaches. An evidence-based tool for PE implementation was developed by review team members with input from stakeholders from across Canada. Stakeholders suggested the format and provided feedback about the content. The evidence came from the review on PE process and was augmented by case studies.

Results: The effectiveness review yielded 442 articles, 23 were relevant and 12 met quality criteria. Using best evidence synthesis we found some evidence that PE can reduce lost days/sickness absence and MSD injuries/compensation claims and moderate evidence that PE can reduce MSD symptoms. The process review yielded 2,151 documents, 190 were relevant and 52 met content/quality criteria. Different ergonomic teams and training were described. PE interventions tended to be ongoing, use group consultation, focus on physical changes and report positive impacts. Resources, program support, training, and communication were the most often noted facilitators/barriers. An evidence-based tool was developed and disseminated.

Conclusions: Research evidence suggests that PE can be effective in improving worker health. However, more high quality research is needed to achieve higher levels of evidence for effectiveness of PE. To implement successful and sustainable PE interventions the literature suggests that the right people need to be involved with appropriate training and clear responsibilities. Addressing key facilitators and barriers such as program support, resources, and communication is paramount. An evidence-based tool has been developed that summarizes the research evidence along with case study examples. Health and safety practitioners and workplace parties can use this tool to initiate PE interventions in workplaces.

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W

Thinking outside the risk: Identifying barriers and promoting insights in workplace injury prevention

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Objectives: The research study focused on identifying and overcoming barriers to the implementation of workplace safety measures. The study sought to clarify the barriers, human and organizational, impeding the success of workplace risk management programs, and to explore and develop factors critical to overcoming these barriers.

Methods: The study explored the perceived human and organizational barriers impeding the effective implementation of workplace safety best practices through interviews and focus groups conducted with directors, managers, supervisors and employees at both participating organizations (District of Saanich and The City of Victoria). Data was analyzed using content analysis. Coding of the data was based on categories derived from cognitive appraisal, work stress and problem-solving literature.

Results: Several generalizable barriers were identified including communication gaps, lack of role clarity, and competing priorities, as well as several more specific to the cultures of the participating organizations. Implications for the role of supervisor as an integrative problem solving catalyst, and factors related to organizational culture are discussed.

Conclusions: Prevention of workplace injury continues to pose costs and concerns for both workers and the organizations that employ them. It is not that we lack the knowledge for effectively addressing workplace risk, it is that we continue to struggle with the implementation of this knowledge. Kari-Pekka Martimo (2006) of the Finnish Institute of Occupational Research explains that "either the prevention techniques do not work, or employees don’t change their habits." The supervisor has the unique capacity to facilitate integrated solutions that incorporate the values of both administration and front-line employees and creatively generate practices that can reconcile and meet both sets of priorities.

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Evolutions des organisations dans le secteur du transport routier de marchandises : effets sur la santé et la sécurité des salariés

Wioland L, Institut National de Recherche et de Sécurité, France

Objectives: Le transport routier de marchandises constitue l'un des maillons essentiels de l'économie française, en assurant l'acheminement d'environ 80% des marchandises. La situation de ces entreprises est difficile (intensification de la concurrence, augmentation des coûts du gasoil). Pour rester compétitives, elles cherchent à faire évoluer leur activité notamment en s'orientant vers une activité de transport régional. L'objectif de cette étude est d'analyser ces mutations et leurs effets sur les conditions de travail et la santé des conducteurs

Methods: Un bilan concernant les aspects économiques et réglementaires de ce secteur a d'abord été élaboré. Ensuite, des analyses de terrain ont été conduites dans trois entreprises de transport routier. Des entretiens y ont été menés avec les dirigeants et ont permis d'identifier leurs stratégies pour rester concurrentiels dans ce contexte de mutation. Une analyse de l'activité des conducteurs et de leurs conditions de travail a été réalisée à partir d'entretiens, d'observations en situation réelle de livraisons (chargement, conduite du camion et déchargements des marchandises chez plusieurs clients), de passations de questionnaires sur les facteurs de risques psychosociaux et sur les sièges de douleurs physiques

Results: Les résultats montrent que pour être compétitifs, les dirigeants des entreprises n'offrent plus uniquement de la traction de marchandises, mais proposent des prestations complexes comme le transport régional et/ou de la logistique. Les conducteurs, déjà exposés à des risques liés aux vibrations, au bruit, ou à l'accident sur route, ont vu émerger de nouvelles contraintes issues de ces réorganisations. Ainsi, le nombre de livraisons dans une même tournée a augmenté. Les conducteurs doivent plus souvent faire face aux difficultés rencontrées en livraisons, comme les problèmes d'accès aux sites ou les confrontations avec les clients. Ils ont davantage de tâches administratives et de manutentions à réaliser et sont contraints d'effectuer en parallèle de la conduite, des réajustements de leur tournée pour atteindre leurs objectifs tout en absorbant les retards provoqués par ces différentes contraintes. Les résultats montrent également que leurs conditions de travail dépendent largement de l'organisation et de l'efficacité de l'activité des plates-formes sur lesquelles ils viennent décharger ou charger.

Conclusions: Les organisations de transport se complexifient et augmentent la charge mentale et physique des conducteurs, en plus des risques auxquels ils sont déjà exposés. En termes de prévention, sensibiliser les clients livrés, former les conducteurs à la gestion client ou encore fournir un matériel de manutention adéquat sont quelques pistes. Améliorer les organisations des plates-formes serait un autre axe de prévention. Les effets de ces réorganisations devraient se propager sur les conditions de travail des conducteurs.

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Shift work trends and risk of injury among Canadian workers

Wong IS, University of British Columbia

Objectives: Working outside of regular daytime hours has raised concerns about fatigue and the increased risk of accidents or injuries. Due to added demands from work-life imbalances, women working non-daytime hours may have an elevated risk of injury. The objectives of this study were to examine the trends in shift work and workers' compensation claims in Canada; the risk for injury across shift work types; and to determine if there is a difference in risk between men and women.

Methods: This study used responses from the Survey of Labour and Income Dynamics, a survey administered by Statistics Canada. Cross-sectional data from 1996 to 2006 were used to develop trends in shift work populations and receipt of workers' compensation. Logistic regression models were developed using 2006 cross-sectional data to examine whether shift work was associated with the likelihood of receiving workers' compensation after adjusting for potential confounders (e.g. demographics, socioeconomic status, occupational physical demands and work stability and geography). Stratified analysis was conducted to examine if gender was an effect modifier.

Results: Growth in the workforce population was primarily among non-regular daytime workers (regular night shifts 30%, rotating 43%). In comparison to men, the number of women in night and rotating shift work almost doubled. Compensation claims have decreased among the workforce as a whole (-27.9%). However, there was little change among night shift workers (-2.0%) and an increase among women working night shifts (5.3%). Results of the logistic regression model showed there is a higher risk of injury among night (OR 1.92, 95% CI: 1.34, 2.73) and rotating shift workers (OR 1.48, 95% CI: 1.12, 1.97). The risk was higher among women in regular night shift work (OR 2.04, 95% CI: 1.13, 3.69) and rotating shift work (OR 2.29, 95% CI: 1.37, 3.82) than in the overall model and among men.

Conclusions: Among women in night shift work, the combined effect of increasing numbers, rising trend in workers' compensation claims and a higher risk of injury in comparison to men in night shift work, suggest that additional occupational health and safety policies and programs should be focused on this portion of the workforce to reduce the risk of injuries.

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Abstracts for posters

(alphabetical by author)

A

Exposures causing work-related allergic contact dermatitis, evidence for causation of work-related asthma and review of occupational hygiene sensitizer notations

Arrandale VH, University of Toronto

Objectives: Workplace exposures that can cause both occupational allergic contact dermatitis (OACD) and occupational asthma (OA) are not clearly identified. This study reports on the occupationally-related positive patch test (PPT) results in the 2001-06 North American Contact Dermatitis Group (NACDG) data. The aim of this study was to identify common occupational contact allergens (OCAs), to determine which OCAs have also been linked to OA and to report which OCAs have been identified as sensitizers.

Methods: Common OCAs were identified from the Canadian portion of the NACDG data (2001-06) using allergen specific response and work-related variables. Two reference documents were consulted to determine whether the OCA was also associated with OA: Asthma in the Workplace and the UK's HSE Asthmagen?. If the OCA did not appear in either document, a systematic review of the peer- reviewed literature was completed. Common OCAs were then cross-referenced with three sources of occupational hygiene (OH) information: ACGIH TLV Handbook, NIOSH Pocketbook and NLM Haz-Map database, and the presence or absence of a skin sensitizer notation was recorded.

Results: There were 3,676 patch test records in the dataset. Overall 397 (64%) subjects met the definition of OACD. Forty-one allergens were identified as OCAs; the 10 most common were: epoxy resin, thiuram, carba mix, nickel sulphate, cobalt chloride, potassium dichromate, glyceryl thioglycolate, p-phenylenediamine, formaldehyde and glutaraldehyde. Seven OCAs were listed as possible causes of OA in the asthma reference materials; three OCAs were not (thiuram, carba mix and glyceryl thioglycolate). In the OH materials only two OCAs were listed as sensitizers in all sources. The NLM Haz-Map database was the only source to identify all 10 OCAs as skin sensitizers.

Conclusions: Several common OCAs can also cause OA; seven of the 10 most common were found to have some association with OA. In workers with exposure to these agents, both inhalation and dermal exposures should be controlled; as well, both OA and OACD should be considered as possible health outcomes. Though the common OCAs are known allergens in the clinical setting, the majority were not consistently recognized as sensitizers in the OH literature. In many cases the information available to the practicing occupational hygienist was contradictory. Efforts to improve the consistency in these notations is needed.

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B

Predicting injured workers' experience of "absenteeism -- at-work productivity loss" over one year after WSIB specialty clinic attendance

Beaton DE, Institute for Work & Health

Objectives: Health- and workplace-related factors associated with more successful work outcomes (less work absenteeism and presenteeism) are unclear for injured workers (IWs) attending a Workplace Safety and Insurance Board (WSIB) Shoulder and Elbow Specialty Clinic in Ontario. Our aim is to develop a prognostic profiling system for clinic attendees and to evaluate its ability to predict for work disability outcomes one year after specialty clinic attendance.

Methods: IWs recruited by convenience sampling (n=614) were followed for four time-points over one year (baseline and follow-up at 3, 6 and 12 months). A latent class analysis was initially performed to characterize IWs based on relevant disease-related, sociodemographic, workplace or job characteristic variables collected at baseline (i.e. demonstrating $p<0.05$ during bivariate analysis). Established prognostic clusters from the latent class analysis were then evaluated for the ability to predict a reduction in both work absenteeism (increased probability of working) and presenteeism (decreased at-work productivity loss measured by the Work Limitations Questionnaire [WLQ] Index, range: 0–28.6, 28.6=most productivity loss) using two-part (logistic/linear) growth modeling approaches based on structural equation modeling techniques.

Results: A 4-cluster model based on 16 key factors (8 disorder-related and 8 workplace/job-related variables) was found to best describe the prognostic characteristics of IWs. By this approach, workers were classified into one of the following subgroups: "low pain/disability, high support" (26.5%), "low pain/disability, low support" (17.8%), "high pain/disability, high support" (36.0%), or "high pain/disability, low support" (19.7%). Compared to the latter group (as reference), membership in any of the former 3 groups predicted a greater likelihood of remaining/returning to work (OR range = 2.5 – 13.9, $p<0.001$) and less productivity loss at-work (β range = -0.3 – 4.6, $p<0.01$) over one year.

Conclusions: The current results demonstrated the ability of a novel and comprehensive prognostic classification system to concurrently predict both work absenteeism and presenteeism outcomes in IWs recovering from upper-limb disorders, within a single analytic model. Application of this system at WSIB Specialty Clinics may have the potential to help clinicians and IWs better understand and negotiate recovery expectations, and to help target workers at high risk for less successful work outcomes, who may have the greatest needs for appropriate health and/or workplace interventions.

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Perceived constraints to safe work: A narrative study of the construction industry

Blacklock J, University of Waterloo

Objectives: To inspire readers to reconsider how health and safety (H&S) could better serve the construction worker under the paradigms of identity control theory, social learning theory and risk homeostasis theory, I refer to Gray's (2009) work in relation to the Ontario Ministry of Labour ticketing act as a means to introduce issues of applicability, practicality and equity of H&S in the construction industry.

Methods: This narrative study provides an in-depth personal account of a single worker from a small company within the construction industry, conducted from a constructionist perspective. Data was collected through a single, lengthy, semi-structured interview. The interview was first recorded and then transcribed by the researcher. The data are presented through a detailed script allowing the audience to look through the lens of the researcher and make their own interpretation of the interview data. The researcher later presents her own interpretation as she discusses the results of the interview in terms of what she deems as applicable theories: social learning theory, identity theory and identity control theory, risk homeostasis theory.

Results: H&S attitudes and practices within the construction industry revealed a negative stigma toward the safety inspector, lack of knowledge about H&S rules and regulations, and informal, unstructured on-the-job H&S training. When making decisions about H&S, key influencers were the boss and the self (not peers or co-workers). The boss' H&S attitude seemed to reinforce the social and political culture within their small company. The workers' H&S attitude seemed to reinforce personal morals, beliefs and values as a worker. The applicability of social learning theory, identity and identity control theory and risk homeostasis theory are discussed in relation to the data.

Conclusions: The construction industry is a Canadian leader in workplace fatalities. Many workers accept and engage in unsafe work practices on a regular basis. These workers face constraints when making decisions about H&S practices that have to do with trade-offs between risk and duty, risk and identity, risk and cost, and so forth. These constraints stem from structural, personal, and emotional pressures that are complex, multi-faceted and individualistic. Simply issuing tickets doesn't even begin to address the issue of reducing unsafe work practices. A more comprehensive solution is required.

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Les lésions professionnelles indemnisées référées en réadaptation: un portrait statistique de la situation au Québec pour la période 2005-2007

Boucher A, Institut de recherche Robert-Sauvé en santé et sécurité du travail

Objectives: Dresser le portrait statistique des lésions professionnelles indemnisées au Québec par la Commission de la santé et de la sécurité du travail (CSST) qui se sont produites au cours de la période 2005-2007 et qui ont été référé en réadaptation.

Methods: À partir des fichiers administratifs de la CSST, nous avons calculé, tant pour l'ensemble des lésions professionnelles indemnisées que celles référées en réadaptation, divers indicateurs tels les durées moyenne et médiane d'indemnisation, les débours moyens, puis l'atteinte permanente à l'intégrité physique ou psychique (APIPP) moyenne selon la catégorie professionnelle, le sexe ou le groupe d'âge. À ceci, les différents sièges de lésion, agents causaux et genres d'accident ou d'exposition sont classés en ordre décroissant du nombre de cas afin de faire ressortir les plus fréquents.

Results: De toutes les lésions professionnelles indemnisées survenues au cours de la période 2005-2007, 7,6 % ont été référée en réadaptation. Toutefois, ces lésions comptent pour plus de 52 % des jours indemnisés et des débours versés. Alors que la proportion de cas référés en réadaptation diffère peu selon la catégorie professionnelle ou le sexe, il en est tout autrement selon le groupe d'âge; celle des 45 ans et plus étant plus élevée que celle des 15-24 ans et des 25-44 ans. Qu'il y ait référence en réadaptation ou non, le dos est le principal siège de lésion et le mouvement corporel ou la posture le principal agent causal de la lésion (près de 30 % chacun). Pour ce qui est du genre d'accident ou d'exposition, les efforts excessifs devancent légèrement les chutes, sauts et glisser-trébucher sans tomber (de 16 % à 20 % chacun).

Conclusions: Sur les quelques 120 000 nouvelles lésions professionnelles indemnisées annuellement en 2005-2007, moins de 8 % sont référées en réadaptation. Cependant, ces lésions ont généré plus de la moitié des jours indemnisés et des débours versés aux travailleurs. Quatre des cinq sièges de lésion les plus fréquents pour les cas référés en réadaptation figurent aussi parmi les cinq principaux sièges de lésion pour l'ensemble des lésions, mais pas nécessairement dans le même ordre. Il en est de même pour le genre d'accident ou d'exposition et l'agent causal de la lésion.

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Indicateur de fréquence-gravité des lésions professionnelles indemnisées par taille d'entreprise, Québec, 2004-2006

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Objectives: Au Québec, les obligations légales des employeurs en matière de prévention varient selon la taille de leur établissement. Il apparaît donc légitime de s'interroger sur les divergences possibles en matière de bilans lésionnels des entreprises selon leur taille. Ainsi, cette étude vise à évaluer si les petites entreprises (PE) québécoises présentent un indicateur de fréquence-gravité des lésions professionnelles différent des moyennes et grandes entreprises (MGE).

Methods: Les entreprises couvertes par la Commission de la santé et de la sécurité du travail (CSST) de 2004 à 2006 ont été classées soit parmi les PE (1-49 employés), soit parmi les MGE (50 employés et plus). En l'absence de données sur le nombre de travailleurs par entreprise, nous avons divisé la masse salariale assurable de l'employeur fournit par la CSST par une estimation de la rémunération annuelle moyenne d'un travailleur du secteur d'activités économique SCIAN-3 correspondant, obtenue à partir de l'Enquête sur l'emploi, la rémunération et les heures (EERH). Pour chaque entreprise, nous avons produit un indicateur de risque estimant les débours en indemnités de remplacement de revenu versés par tranche de masse salariale d'un million de dollars (IRS). Afin d'évaluer les différences de risque entre les entreprises d'une même activité économique selon la taille, nous utilisons cet indicateur pour calculer un indicateur de risque relatif (IRR) calculé par activité économique (SCIAN) selon la formule suivante : IRR = IRS des PE du SCIAN X / IRS des MGE du SCIAN X.

Results: Nous avons obtenus un IRR global de 1,70 pour l'ensemble des secteurs d'activités économiques, et ce en standardisant selon une distribution similaire de la masse salariale par secteur d'activités pour les PE et les MGE. Au niveau des secteurs d'activités SCIAN-2 (ce qui répartit les entreprises en une vingtaine de secteurs), un seul présente un IRR inférieur à 1, le secteur Finances et Assurances avec 0,93. Dans tous les autres cas, à masse salariale assurable égale, les débours en indemnités de remplacement de revenu sont plus élevés pour les PE que pour les MGE.

Conclusions: Nos résultats tendent à montrer que l'indicateur de fréquence-gravité des lésions professionnelles est plus élevé dans les PE québécoises que dans les MGE. Cependant, il est possible que ce risque différentiel ne soit pas uniquement l'effet d'une différence de taille, mais provienne aussi, par exemple, de modes de production différents selon la taille, et ce dans un même secteur d'activités. Par ailleurs, ces résultats montrent également toute la pertinence qu'il y aurait à obtenir des employeurs assurés des informations précises sur le nombre de travailleurs par entreprise, permettant d'approfondir davantage les recherches sur le risque différentiel selon la taille des employeurs.

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C

Shift work and health: Estimating the population attributable risk

Chambers A, Institute for Work & Health

Objectives: The objectives of this project were to review the quality and availability of observational studies estimating the association between shift work and sleep disorders, workplace injuries, gastro-intestinal disorders, cardiovascular disease, cancer, psychological distress and diabetes, to determine whether there is sufficient information available to estimate a population attributable risk (PAR) for each disease or condition.

Methods: The most up-to-date literature reviews summarizing the association between shift work and each disease or health condition were identified, along with any other cohort studies not included in the reviews. Data from the Survey of Labour Income Dynamics (September 2007) was used to calculate the proportion of Canadians currently engaged in different forms of shift work. The relative risks estimated in observational studies were used to estimate the %PAR. While there have been several observational studies looking at the association between shift work and various health outcomes, study findings are frequently inconsistent and there are often several issues with the study design. A PAR was calculated only if there was: at least one cohort study available that provided relative risk estimates; a consistent positive association; and reasonable efforts to account for important confounding variables.

Results: Due to methodological limitations and scarcity of studies providing relative risk estimates, a %PAR could only be calculated for two of seven conditions: workplace injuries and breast cancer. For workplace injuries, the cumulative %PAR for all types of shift work is 7.65%. For breast cancer, several assumptions were made to estimate the proportion of Canadian women who would have worked 30 or more years in shift work. Based on these assumptions, the %PAR for breast cancer arising from 30 or more years of shift work is 0.47%.

Conclusions: The estimates that have been obtained for workplace injuries and breast cancer demonstrate a modest impact of shift work on the overall risk for workplace injury and for breast cancer. However, due to issues with exposure classification, the current risk estimates may be underestimated. Furthermore, the causal relationship between shift work and workplace injuries as well as breast cancer has not yet been established and there may be residual confounding. The review of the available observations studies demonstrates the need for well-designed cohort studies to explore the impact shift work has on chronic diseases and workplace injuries.

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Drug abuse at workplaces in Industrial City Jubail, KSA

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Objectives: Jubail is a major industrial city custom built over the last decade as a location for major primary and secondary industries including steel, refineries, and petrochemical complexes. Pre-assignment and periodical urinalysis for detection of drug use should be considered in the context of an overall plan to reduce and prevent accidents or inflicting injury upon themselves or others if they are under the influence.

Methods: Urine samples of 1,348 workers from 12 industries were tested for the six most common illicit drugs of abuse in the country. Enzyme multiplied immunoassay technique (EMIT) and gas chromatography coupled with mass spectrometry (GC/MS) were the techniques utilized for urine testing.

Results: Of all samples analyzed, 2.1% were found to be positive for drugs: the majority of them were expatriates (78%) working in shift duties and belonging to low socio-status groups.

Conclusions: The distribution of drugs found in the samples shows a regional variation. Marijuana was found in all regions. Despite significant national efforts, drug abuse remains a serious health and security problem among the workforce.

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Trends of the Ontario Ministry of Labour High Risk Firm Initiative for deaths from traumatic injuries and LTI in the construction sector

Christenson J, Ryerson University

Objectives: The Ministry of Labour (MOL) has reported a 35% inspection increase, a 117% increase in stop work orders and a 50% reduction in work refusals during the four years after the introduction of the High Risk Firm Initiative (HRFI). Trends for traumatic fatalities and lost time injuries from 2000-2008 have not been reported. This paper seeks to examine the impact of the Ministry of Labour's HRFI on the construction industry through a time-series analysis of industry safety indicators.

Methods: Four years prior to the HRFI and four years post HRFI were investigated. Monthly employment statistics from 2000-2008 for full-time and part-time construction workers were obtained. Annual average employment was calculated using monthly reports. Annual fatalities and hours worked were obtained. Validity of reported fatalities were confirmed with the MOL's regional analysis of deaths. Ages of the traumatic fatalities were obtained from the CSAO annual reports and categorized based upon employment statistics from the Labour Force Surveys. Fatality rates were calculated by dividing the number of fatalities by the number of workers for each age category, for each year. The rate represents the number of deaths per 100,000 workers. A severity rate for each year was calculated. Safety indicators for pre- and post-HRFI were compared.

Results: For the eight-year period of study, the highest fatality rate occurred before the HRFI for 2/3 of age categories. A post-HRFI trend indicates all age categories demonstrate a reduction in fatality rate, with the greatest reduction occurring in the 55 and over category. LTI Fr has decreased from 3.4 injuries per 100 workers in 2000 to 2.0 injuries per 100 workers in 2007. Analysis of statistical significance is required. Future days of work lost, a measurement of negative impact to the workforce, was found to be reduced by 24% following the HRFI.

Conclusions: Conclusions regarding the effectiveness of the HRFI are not clear. Only age-categorized fatality rates appear to demonstrate a reduction trend associated with the implementation of the HRFI. LTI rate and severity do not demonstrate an association with the implementation. It must be recognized that the HRFI is a relatively new initiative which may require more time before a significant effect is demonstrated statistically. Since 2004 all MOL performance stats have significantly increased. The years examined in this report, 2005-2008 may be "process years" where the outcome indicators have not yet been significantly influenced.

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D

Bridge employment, work demands and musculoskeletal discomfort: Findings from an active Albertan cohort

Doan J, University of Lethbridge

Objectives: Bridge employment (scheduled paid work after retirement age) may promote mental and physical health, as work can be an important component of daily physical activity. Questions remain, however – appropriate work demands for older adults are neither well-established nor well-applied, and excessive musculoskeletal loading or increased perceptions of discomfort may negate health benefits of work activity. The current research examined work status, work history and musculoskeletal discomfort among active older Albertans using a structured retrospective survey.

Methods: Approximately 1,050 Albertans aged 55 years and older participated in an organized 'Games' that included sociocultural events and athletic competitions. All participants had previously qualified in regional competitions and had attended a regional organizational meeting two to four weeks before the Games. At those meetings, every participant received a survey package. Enclosed in the package were an introductory letter, a confidential return envelope, and modified versions of several validated questionnaires examining leisure and work activities and frequency (Torgén et al., 1997), along with general and localized perceptions of musculoskeletal health (Kuorinka et al., 1987). Respondents were also asked to document their current and historical work status. One underlying assumption in this research is that older adults who self-selected to compete in a sport or hobby at the provincial level were experiencing 'successful aging,' defined, in part, as 'maintenance of physical and cognitive function AND active engagement with life' (Bowling, 2007).

Results: A total of 196 participants returned completed questionnaires – 49 BRIDGE employed, 44 FULL employed, and 103 RETIRED. Groups differed in age, with RETIRED>BRIDGE>FULL. Both employed groups more frequently reported musculoskeletal discomforts (MSDs) in all body areas. BRIDGE reported MSDs in the neck and shoulder with significantly increased frequency compared to FULL. While causality cannot be established under this experimental paradigm, BRIDGE reported increased 'occasional' frequency of established musculoskeletal injury risk factors, specifically awkward trunk postures, lifting of 5 to 15 kg, and precision work. Both groups reported similar overall ratings of work-related exertion.

Conclusions: The results support the concept that fully employed older adults demonstrate a 'healthy worker survivor effect,' with less frequent reports of MSDs in all body regions as compared to bridge-employed individuals. We suggest that this effect may be propagated by regular work activity at age-appropriate levels (Cassou et al., 2002), while the increased MSDs reported by bridge-employed adults may be the result of advanced age and/or increased irregularity of work activity and soft tissue loading. Detailed examination of work demands and musculoskeletal injuries among bridge-employed older adults will help define safer levels for less regular work activity.

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E

Occupational dental erosion: A review

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Objectives: Dental erosion is the chemical wear of dentin and enamel due to chronic or frequent exposure to internal or external acids. Distinguishing dental erosion from other types of tooth wear, specifying underlying etiologic factors, and recognizing damage early can be challenging. Certain occupations pose a higher risk of developing dental erosion from workplace acidic exposures. The objective of this systematic review was to increase awareness of this preventable occupational disease, particularly relating to airborne acid exposures.

Methods: To better understand the relationship between dental erosion and occupational acid exposures, we searched the medical/dental literature using appropriate systematic review searching protocols. The search was conducted through Pubmed, Embase and the Cochrane Library, including studies published until November 2009. We included all study styles. Studies not in English, exclusively on internal acid exposures, or on children were excluded. After reviewing the abstracts we selected relevant studies and hand-searched their reference lists for additional studies. We critically appraised 22 studies, which focused on dental erosion in relation to workplace airborne acids. One of these was a case-control study; 18 were cross-sectional studies; and three were case series/case reports. We also included one cross-sectional study on professional swimming (HCl exposure) and two on wine tasting (various organic acid exposures).

Results: Workers in the mineral, battery, chemical, tin, dyestuff, fertilizer and metal (galvanizing, plating, silicone sealing, acid pickling) industries have higher risk of airborne acid exposures, and hence dental erosion. Studies found that: dental erosion usually occurs at the labial surface of anterior teeth; canines are affected less than central and lateral anteriors; areas unprotected by lips/cheeks are at higher risk; prevalence is higher in battery and galvanizing industries; significant correlation exists between ‘duration of exposure’ and ‘severity of erosion.’ Professional swimmers and wine tasters face increased erosion risk due to HCl and organic acid exposures, respectively.

Conclusions: Identification of contributing etiologic factors is important for appropriate management of dental erosion. There are various occupations with increased risk of workplace acid exposures, hence dental erosion. If dental erosion is recognized at early stages, further damage can be minimized. Preventive measures pertaining to lifestyle and work environment, and treatment of any underlying medical conditions, may change the ultimate outcome. Current literature on this topic consists of studies with low quality evidence. Higher quality studies are needed to better guide evidence-based dental practices and workers’ compensation processes.

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F

Trends in serious work-related injuries in B.C.

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Objectives: In B.C., claims for serious injuries account for only one-third of the overall claim rate, yet they are more likely to require extensive treatment and cause longer durations of disability over the course of the claim. Although reports have shown that work-related injuries have declined over the past decade, little research has examined if serious injuries have experienced a similar reduction over time. The objective of this research was to estimate the trends in serious work-related injuries in British Columbia from 1996-2007.

Methods: Workers with a serious injury claim were identified from workers' compensation data for the period 1996 to 2007. Serious injuries were defined by a set of 275 ICD-9 medical diagnosis codes that are related to long return-to-work times and high claim costs. Census workforce estimates from Statistics Canada's Labour Force Survey (1997-2007) and the Canadian Census (2001, 2006) were used to calculate serious injury rates for each year by age, gender and occupation.

Results: The serious injury rate was relatively constant between 1996 and 2007, ranging from 1.8 to 2.4 cases per 1,000 workers. The rate for men ranged from 2.8 to 3.7 per 1,000, while for women the injury rate was never more than 1.0 per 1,000. Rates for younger and older men were similar; however, older women had a higher rate (1.7 per 1,000) than younger women (0.6 per 1,000). In 2001, the serious injury rate was highest in occupations related to trades and transport (7.2 per 1,000), primary industry (4.8 per 1,000) and processing, manufacturing and utilities (5.8 per 1,000). By 2006, the rate had risen in trades and transport (7.8 per 1,000) and in processing, manufacturing and utilities (7.2 per 1,000), but had fallen to 4.0 per 1,000 in primary industries.

Conclusions: While overall work-related injury rates have declined in British Columbia over the past decade, the serious injury rate has remained relatively stable. There is significant variation in the serious injury rate by age, gender and occupation. In particular, serious injury rates have risen in some high risk occupations and are higher for older women relative to younger women. Future research and prevention efforts should focus on understanding the reasons for these differences across groups.

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In sickness and in health: A critical literature review of Canadian home care workers' health issues

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Objectives: There is limited research on occupational health and safety in female-dominated occupations, particularly those involving vulnerable workers. This gender and sex-informed review of the occupational health of male and female paid home care workers living in Canada identifies major themes, critically analyzes and identifies gaps in the research, and suggests future research topics.

Methods: This review of research on the occupational health of paid home care workers living in Canada used the following keywords: home care workers, home support workers, home nurses, personal support workers, and homemakers to search for academic articles and books in PubMed, Geobase, Wilson Omni File and Sociological Abstracts. A range of search engines was used because occupational health issues fall into multiple disciplines. Bibliographies and references of identified relevant publications were also examined and all books and articles on the working conditions and occupational health of home care workers in Canada were reviewed and analyzed using a gendered lens. The dates of the material reviewed ranged from 1996 to 2009.

Results: The 23 articles on the health of home care workers suggest that it is under-researched. The following themes have been addressed in the limited research on Canadian home care workers: precarious working conditions and job and employment strain; injury reduction strategies and home care workers; musculoskeletal disorders; and other occupational health concerns. Some major research gaps exist including: systematic comparisons of male and female home care workers; comparison of OHS issues across public, private and not-for-profit employers; issues related to space and place; and research comparing rural and urban home care workers.

Conclusions: The occupational health of Canadian home care work, like that of many female-dominated occupations is under-researched. Much of the existing research has studied urban home care workers residing in Ontario. Future research needs to incorporate systematic attention to sex and gender; compare rural and urban home care work; compare across organizational contexts and diverse contractual relationships; examine the occupational health of home care workers in rural areas and across regions.

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Occupational exposure to carcinogenic pesticides in Canadian agriculture

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Objectives: Some of the most extensively used pesticides for Canadian agriculture are suspected carcinogens, according to the International Agency for Research on Cancer (IARC). However, little is known about occupational pesticide exposure, i.e. where, to what extent, and how many agriculture workers are exposed. Our research objectives were to quantify the agricultural use of carcinogenic pesticides by sub-provincial region and provide corresponding estimates of the number of agriculture workers at risk of exposure.

Methods: A province-specific method was applied to estimate the use (tonnes per year) of 11 carcinogenic pesticides for Canadian Ecodistricts. Information was compiled from three sources: 1) Interpolated Census of Agriculture Data* (2006) for crop production information; 2) Provincial Ministries of Agriculture for registered pesticide products and their crop uses; 3) Pest Management Regulatory Agency for pesticide product application instructions. Crop-specific intensity weights (grams/hectare per year) were derived from the compiled information for each pesticide and province. Intensity weights were multiplied by corresponding crop production area and summed for all crop types to provide estimates of total pesticide use for each Ecodistrict, in tonnes per year for each pesticide type. A Geographic Information System (GIS) was used to map Ecodistrict pesticide use estimates for relative comparison within and across provinces. Next, estimates of agricultural workers at risk of exposure will be provided, using Census of Population and Agriculture data, for Ecodistrict regions.

Results: As an example of attainable results from this method, we refer to the agricultural use of herbicide 2,4-D in Alberta. There are 150 Ecodistricts, of which 110 have some level of agricultural activity. Of the 110 Ecodistricts, 19 had an estimated use of 0 tonnes per year because 2,4-D is unlikely to be used on the crops produced in these regions. Of the remaining 91 Ecodistricts, estimated 2,4-D use ranged from 2.5 to 614 tonnes/year (mean=137 tonnes/year). Estimating the corresponding number of agriculture workers exposed is the next focus of this research.

Conclusions: This research provides the much-needed pesticide exposure surveillance information on the extent of exposure and number of workers exposed to suspected carcinogenic pesticides in Canada's agricultural industry. In addition, the use of Interpolated Census of Agriculture data provides crop information and resulting pesticide estimates at a finer spatial resolution than if examined using the typical reporting of Census of Agriculture data at the Census Division (CD) level. This allows more detailed examination of regional pesticide variation within larger CDs, or provinces.

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Préparateurs de commandes : de l'utilisation du paier à l'ère numérique. Quels changements pour la santé et la sécurité?

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Objectives: Ce travail a été réalisé dans le secteur de la logistique sur les préparateurs de commandes. Cette activité a subi de profondes mutations technologiques en passant en quelques années des listings papiers aux terminaux radiofréquences et enfin, au guidage vocal en 2007. L'objectif de l'étude était de déterminer les effets de ces mutations technologiques sur la santé et la sécurité de ces salariés.

Methods: La méthode reposait sur une analyse comparative de l'activité des préparateurs de commandes selon ces différents modes de guidage. Elle s'appuyait sur : • des observations instrumentées de l'activité (vidéo, capteurs, codage comportemental), • des entretiens et des auto confrontations afin d'identifier les stratégies mises en œuvre dans leur activité, • des entretiens avec différents responsables et acteurs de la plate-forme (description du fonctionnement amont et aval des plates-formes), • des questionnaires (quantification des ressentis des préparateurs en termes de fatigue physique, nerveuse et de conditions de travail). Les résultats de l'analyse ont été confrontés et validés au sein d'un réseau de préventeurs.

Results: Les résultats montrent que la préparation de commandes est une activité où la composante de manutention manuelle est très présente. Elle génère de fortes contraintes posturales (épaules et dos) et des gestes répétitifs. Les effets de l'introduction des technologies portent sur quatre dimensions: l'accroissement de la segmentation de l'activité, l'accélération de la cadence de travail, la réduction des marges de manœuvre des opérateurs et les aspects temporels de l'utilisation des technologies.

Conclusions: Les effets de l'introduction de ces technologies sur la santé et la sécurité des préparateurs sont davantage liés au contexte d'utilisation des dispositifs qu'à ces derniers. En effet, à l'objectif de ces dispositifs qui est de suivre l'activité des préparateurs mais aussi l'augmentation de la productivité, s'ajoutent d'autres contraintes : apparition ou accroissement de l'irritabilité, sentiments de robotisation.

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Development of pictograms to support vulnerable workers in Ontario workplaces: Restaurant prep kitchen musculoskeletal (MSD) hazards

Grant K

Objectives: Our objective was to develop hazard and control pictograms for Ontario workplaces. These pictograms need to be usable by workers whose literacy skills are limited with the goal of increasing both awareness and the adoption of health and safety behaviours. We are investigating if the use of paired pictograms (without words) increase knowledge about hazard identification and control, and address the needs of vulnerable workers.

Methods: A review of Ontario's injury statistics was used to determine an area of focus. Input was also provided from ergonomics experts and client hazard assessment data to determine tasks in prep kitchens with MSD risks. Using CAN/CSA-Z321-96 Standard and Subject Matter Experts, 59 pictogram variants were developed to test with workers. We conducted four focus groups, with 8-12 employees from various sized workplaces. Participants either worked in the prep kitchen area, or supervised a prep kitchen. Each employee completed a written questionnaire and then participated in a facilitated discussion to achieve consensus on the final design. A training program to support pictogram implementation is being developed and implementation evaluation is also being planned for the next stage of the project. The evaluation design is a randomized field trial with the intent of evaluating if there is an increase in knowledge, motivation and self-efficacy within the employee population.

Results: In total, 44 workers participated in the focus group sessions. Consensus was reached on the design elements that best reflected the work environment, hazard information and control information through facilitation. Participants provided key insight into realistic controls and specific details on design. Focus group feedback was complied and themed and then provided to designers for editing or redesign. This process resulted in four hazard pictograms (chopping, handling large containers, moving prepped food, reaching for stored materials) and six control pictograms that reflected specific jobs in the prep kitchen being developed.

Conclusions: Worker input proved invaluable in the development of sector specific pictograms. Workplaces in this sector were very keen to participate in this process and recognized the importance of MSD prevention in their workplace. The associated best practice report on the development of pictograms can assist other sectors to produce similar hazard and control pictograms. Next steps on this project will include an evaluation of the effectiveness of these pictograms in the workplace. The evaluation will measure changes in behaviour, knowledge and self-reported discomfort. Further work should be done to advance our knowledge and practice regarding effectiveness of pictograms and training in injury and illness prevention for vulnerable workers.

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The influence of light at night exposure on melatonin levels among rotating shift nurses.

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Objectives: The International Agency for Research on Cancer has classified shift work involving circadian disruption as a probable carcinogen. While the exact biologic mechanism for this relationship is unclear, the main hypothesis involves melatonin, a hormone produced in a pattern following circadian rhythms, with peak levels observed at night when light is absent. The purpose of this research is to examine the influence of light at night exposure on peak melatonin levels among rotating shift nurses.

Methods: In this study, 124 nurses at Kingston General Hospital working a rotating shift schedule (2 days, 2 nights, 5 days off) were recruited. Nurses participated four times over a one-year period, on a day and night shift in both the summer and winter seasons. Each participation session took place over a 48-hour period, during which nurses were asked to wear a light data logger and provide two urine and four saliva samples. Melatonin levels were assessed over a 24-hour period that covered either the first day shift or the second night shift of the rotation pattern, with the morning urine sample in both shift groups used to assess peak urinary melatonin levels. Mean light intensity from 12a.m. – 5a.m.was assessed from light data loggers during the 24-hours of melatonin assessment. This study presents results from the first two participation periods.

Results: A total of 118 nurses completed the first two data collection periods. Mean light intensity from 12a.m. – 5a.m. was significantly higher ($p < 0.0001$) when nurses were working a night shift and mean sleep duration was significantly shorter for those on the night shift ($p = 0.005$). Pilot work in this population suggested an inverse association between light intensity and melatonin levels (1). Multivariate analyses will be presented that will allow us to characterize the relationship between light exposure and melatonin levels in this population of nurses working rotating shifts.

Conclusions: The results of this project will allow us to characterize the relationship between light and melatonin levels in a population working a 2-day, 2-night rotating shift schedule. Few studies have directly assessed the relationship between light exposure and melatonin, with most using night-shift work as a proxy for light exposure. Therefore this study will contribute evidence regarding the plausibility of the biologic mechanism linking shift work with cancer. As shift work is necessary for some occupations, understanding of the mechanism through which it influences cancer risk is important to the development of shift work patterns that are best for health.

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H

Flexible schedules and parents' health: Does gender matter?

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Objectives: Flexible scheduling is promoted as a family-friendly work arrangement that can alleviate stress caused by work-life conflict. It is also linked to improved employee attitudes, morale and productivity (Higgins, Duxbury & Lyons, 2008). Less is known about the role flexible hours play in parents' health behaviour. This study examines gender differences in time spent in health-related activities, and the relationships between flexible work schedules and parents' perceptions of stress, health, time pressure and health satisfaction.

Methods: Using weighted data from the 2005 Canadian General Social Survey, patterns of time use and self-assessed health were compared by gender and presence or absence of a flexible schedule for a sub-sample of 1,954 custodial parents with children between 5 to 17 years old. This group was selected because of temporal demands associated with caregiving, and the structured nature of children's academic and extracurricular activities. Time use was measured in minutes per day using a 24-hour time diary from which main activity categories were derived. Activities related to health included physical activity, sleep, social leisure and watching television. Measures of physical and emotional health included: self-assessed stress (range 1-5), self-assessed health (range 1-5), time pressure (index, range 8-29, $\alpha = .73$), and satisfaction with health (range 1-10). A series of ANOVAs compared differences by gender and flexible scheduling. Regression analysis revealed other factors predictive of time spent in health-related activities.

Results: Of the 44.3% of parents who had a flexible work schedule, there were significantly more fathers (n=528) than mothers (n=335). Managers, professionals and married fathers were most likely to have flexible hours. For both men and women, flexible hours were significantly associated with more time in physically active leisure, less time watching television and a longer sleep time. Flexible hours were not related to parents' feelings of stress, but time pressure was significantly higher when schedules were not flexible. Self-assessed health, and satisfaction with health were significantly higher with flexible hours. These outcomes were stronger for mothers than fathers.

Conclusions: The potential health benefits of flexible hours deserve greater attention when considering the influence of scheduling on employees' well-being. These benefits include more time for sleep and physical activity, and less sedentary leisure. For women, the reduction in time pressure may be associated with greater perceived control over time and the ability to more optimally schedule work and family responsibilities. As such, flexible hours should be made more widely available, especially to women, since mothers' self-assessed health and health satisfaction appear to gain most from flexible work arrangements. This is conducive to better health, productivity and employee satisfaction.

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I

Geographic variation in work-related repetitive strain injuries in Canada

Ibrahim S, Institute for Work & Health

Objectives: The objective of this study is to examine geographic variations in the prevalence of work–related repetitive strain injuries (WR-RSI) and individual, regional and provincial correlates of RSI using multilevel analyses techniques.

Methods: Data from the Canadian Community Health Survey (CCHS) cycles 2.1 and 3.1 were combined to maximize our sample for analysis by census division. Census division variables were derived from the 2001 Census and from the Survey of Labor and Income Dynamics (SLID) data sets and linked to the CCHS data. Multilevel analyses were performed using individuals nested in census divisions. In total 89,755 (48% male, 42% female) observations nested in 280 census divisions were used in analysis. We controlled for socio-demographic variables, work status and self-reported work stress.

Results: WR-RSI was reported by 7.22% (n =6,478) of workers. Prevalence of WR-RSI was higher in women, in non-immigrants and in whites (compared to other racial groups). There were significant variations in the prevalence of WR-RSI between census divisions. Among individual-level variables, age, gender, immigrant status, minority status, industry, occupation and perceived work stress showed significant association with WR-RSI prevalence. Census division level variables were not significantly associated with WR-RSI prevalence. There were also provincial differences in WR-RSI prevalence with British Columbia and Saskatchewan having the highest prevalence (~8.5%) and Newfoundland and Labrador the lowest (5.3%).

Conclusions: There are some regional and provincial differences in WR-RSI prevalence after adjusting for some individual level predictors. These contextual differences are important for targeting 'hot spots' for broad-based prevention campaign. For example the prevention system could engage in more focused social marketing campaigns. Future studies should hypothesize/measure/include more variables/constructs at the regional and provincial level that could explain the observed differences.

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J

The safety case for business: A multi-stakeholder examination of best practices and health and safety outcomes

Johnston D, York University

Objectives: Businesses often manage health and safety separately from other workplace operations. To assess the link between these two types of outcomes, the following research questions are posed. 1. What is the relationship between health and safety outcomes and other operational outcomes such as costs, operating revenues, innovation, quality, flexibility and delivery? 2. How do best practices in operations affect health and safety outcomes? 3. How do best practices in health and safety affect operational outcomes?

Methods: The research is being conducted in two stages. The first stage was a series of 10 case studies. At each facility a structured interview protocol was administered to a minimum of four managers. Worker representatives were also interviewed in unionized settings. In addition, a safety climate survey was administered to operational workers at each facility. The data collection for this stage is completed and analysis will be completed by April 2010. The second stage will be a survey of Ontario employers in the manufacturing and logistics industries. Data collection for this second phase is scheduled to begin in the summer of 2010.

Results: Analysis is ongoing, but the initial results suggest a series of complex relationship where some, but not all of the practices used to manage safety complement the practice used to manage the operational component of the organization. The initial analysis also suggests that safety outcomes and operational outcomes can move in tandem subject to certain contextual constraints.

Conclusions: Research has tended to separate health and safety from business operations. Our initial results show that these two areas must be examined simultaneously to truly understand and improve organizations. The forthcoming survey will test this hypothesis in a rigorous manner.

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K

Differences in primary constituents of dusts from intensive animal housing operations and relationships to respiratory outcomes

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Objectives: Working in intensive animal housing operations has been related with some of the highest rates of occupational respiratory symptoms. Exposures include gases, organic dust and related constituents. Type of animal that is housed in the operation may influence levels. Primary constituents may be important in explaining differences in worker responses. The objectives of the study were to characterize and compare the constituents within dusts from different intensive animal houses and to characterize these constituents in relation to impact on respiratory outcomes of workers.

Methods: Thirty poultry operations were sampled for stationary measurements (area) of fractionated dust and associated endotoxin utilizing Marple cascade impactors. In addition, settled dust samples were collected from a cage-housed (CH) and floor-housed (FH) poultry operation, a swine barn and a farm home and characterized for microbes, protein content, nitrogen, carbon (organic), sulphur, phosphates, ammonia and trace metals through various methods including SmartChem, total carbon analyzers, FPLC and scanning electron microscopy. Airway hyper-responsiveness (AHR) to the dusts was assessed in conscious mice by head-out, whole body plethysmography in response to methacholine challenge (MCh).

Results: There was greater dust in FH operations compared to CH poultry operations. Endotoxin in the dust mass was significantly greater in CH operations compared to FH for all size fractions greater than 1.6 µm. Endotoxin in the respirable fraction accounted for 24% of the total endotoxin in the CH operations and only 11% in FH operations. There were differences by poultry barn type for rates of pathogen detection. Swine barn dust had an endotoxin concentration of 2400 EU/mg and negligible arsenic (0.2 ng/mg) with major protein bands identified with swine feed components including soy bean, canola, and barley protein. There was a clear dose-response relationship between the concentration of swine barn dust to which the mice were exposed and AHR to MCh.

Conclusions: There were differences in the constituents of the dusts from different animal housing operations including endotoxin, pathogens, proteins and organic constituents. Respirable levels of endotoxin may be important in explaining the differential respiratory response experienced by poultry workers. Airway hyper-responsiveness in mice was related to concentration of swine barn dust.

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Determining the important factors in the retention of older workers in health care: The 45+ Survey

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Objectives: The current health-care workforce is aging, with fewer young people moving up to fill vacated positions. Keeping the older worker employed is becoming both more difficult for employers and more valuable. Seven Oaks General Hospital (SOGH) conducted a survey of hospital employees aged 45 plus within key professional categories to provide information regarding the desires of older workers surrounding the retirement process, and determine potential methods for retaining older workers within the health-care field.

Methods: The "45+ Survey" was initiated in June of 2008. The primary purpose of distributing a survey was to collect the maximum amount of information possible while minimizing the demand on participants. It was also hoped that by providing an anonymous forum for response, participants would divulge a greater amount of detail. The first surveys were published in the July edition of the Pulse (Hospital Newsletter). This method of distribution provided a lower response rate than was desired. In September and October, surveys were distributed to managers as well as being posted in elevators throughout the hospital. The final response rate was 35% (n=123) of the SOGH population 45 or older and eligible to retire by 2024 across the four target professions (nursing, technologists, applied health professionals and managers). Quantitative responses were analyzed using the statistical program SPSS. Written comments were analyzed for themes.

Results: Participants were asked to rate their top four choices in a list of 13 opportunities related to retirement in order to indicate what measures the hospital could take to extend time to retirement. Responses to this question indicated that there are two key priorities for action: “Special arrangements concerning flexible hours of work leading to retirement” and “Retire and return to work options.” Qualitative comments about factors that would keep employees in the workplace past their eligibility for retirement were mostly positive toward the study and were encouraging of programs to support older workers. Key themes were “respect” and “flexibility.”

Conclusions: This research suggests that hospital employees are indeed open to new opportunities and programs to facilitate the retirement process and are in fact willing to continue working beyond their retirement eligibility. Employees are actively looking for ways to change retirement to allow for a more flexible experience. Results from this study have been used to inform several pilot studies currently underway at SOGH including an Older Worker Leave Option, a Retirement Education Seminar Series, a Flex-Time Project, and a Mentorship and Knowledge Transfer Program.

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Knowledge transfer and exchange: Researchers, trucking companies and a safety association come together to create guidelines on MSD prevention in trucking

Kramer DM, University of Waterloo

Objectives: Six trucking companies, the Transportation Health and Safety Association, a union representative, and researchers from CRE-MSD came together to find ways to reduce MSDs. The companies formed participative ergonomic change teams to identify concerns and make changes. The goal was to develop guidelines on recommended practices. We wanted to learn more about the transportation context, to evaluate the effectiveness of the collaboratively created new knowledge, and evaluate the effectiveness of our intensive knowledge transfer interaction.

Methods: A qualitative analysis was done on focus groups, meeting notes from over 20 meetings, and 19 one-hour interviews with stakeholders involved with the research study over a two-year period. The stakeholders were asked for their feedback on their experience with being involved in the study. We wanted to know what their expectations had been and whether these, or other needs, had been met. We asked questions on their involvement and how it could have been enriched. We asked whether they felt they had the opportunity to be decision-makers or drivers of the research, and felt ownership for the study and its results. We asked whether the companies were now exchanging information among themselves and whether the project had furthered their relationship with the safety association. We asked what were the barriers to their involvement and what would have made it easier to participate.

Results: The study was set up as a collaborative, integrated research study. The safety association had initiated it in response to some pressure for the sector to develop a MSD guideline. The researchers held focus groups with multiple transportation companies to identify sector-specific MSD issues; six companies were engaged and were committed to the study throughout the two and a half years, and the companies created teams, received training, held monthly meetings, assessed and evaluated major jobs and tasks, and identified specific interventions. Yet the researchers were disappointed in the number of interventions the companies were prepared to invest in and encountered resistance to investing in major changes.

Conclusions: We learned that the companies and the safety association continued to regard the study as the researchers' project and not theirs. They found it difficult to find the time and resources they needed to dedicate to the changes that were recommended. It would have helped if the research grant had had resources to "buy" the dedicated time of stakeholders. They said they would have liked it if we had profiled and advertised the names of their companies so they could get acknowledgment for their involvement. Making large investments in changes were difficult to get agreement on.

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L

Melatonin and sex hormones among rotating shift nurses

Langley A, Queen's University

Objectives: In 2007, the International Agency for Research on Cancer classified shift work as a “probable carcinogen,” with strong evidence from breast cancer studies. One proposed pathway is from irregular nighttime light exposure which leads to decreases in melatonin, a cancer-protective hormone. Irregular melatonin levels may influence patterns of sex hormone production which influence cancer risk. Therefore, the purpose of this study is to determine the relationships between melatonin and sex hormone production in rotating shift nurses.

Methods: A longitudinal study of 85 female pre-menopausal nurses employed at one hospital whose “rotating” shift pattern was two days on, two nights on, followed by five days off was conducted. Participants provided urine and blood samples in two data collection periods approximately six months apart. Melatonin metabolite levels were measured in urine, and estradiol, estrone, progesterone and prolactin concentrations were measured in blood. Information regarding important health and personal characteristics was collected by self report via questionnaire. This data collection pattern allows the examination of both cross-sectional and longitudinal relationships between melatonin and sex hormone production. We are currently completing a detailed data analysis, and final results are pending.

Results: Based on our descriptive analysis, our sample of pre-menopausal nurses has a mean age of 35.8 (± 8.2) and BMI of 27.1 kg/m2 (± 6.7), with over 50% of nurses classified as overweight (BMI >25 kg/m2). The majority of nurses are non-smokers (85.7%) and do not use oral contraceptives (77.1%). Blood samples were provided evenly across the menstrual cycle (48% in follicular and 52% in luteal stages). We will present results from the multivariable analyses and be able to say if there are associations between melatonin and sex hormone production.

Conclusions: If results show relationships between melatonin and sex hormones, they may support the proposed biologic pathway leading to increased breast cancer risk among shift workers.

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Enhancing health-care workplace communities through CREW

Leiter M, Acadia University

Objectives: This project examined the impact of a program designed to increase workplace civility on employees' working relationships, psychological health and key workplace behaviours. The U.S.Veterans Hospital Administration developed the initial version of CREW (Civility Respect and Engagement with Work; Osatuke, 2009). The specific research hypothesis predicted significant interaction effects such that the CREW units would show a significant improvement in a variety of measures while the control groups remained constant over the study interval.

Methods: Health professionals from three district health authorities in Nova Scotia (IWK, Capital Health and Annapolis Valley Health) and two hospitals in Ontario (London Health Sciences and St. Joseph's Hospital, London) completed surveys assessing various dimensions of work-life in May 2008 (N=1,170) and May 2009 (N=895). The CREW program was implemented in two waves, on eight clinical units. Thirty-two other units served as controls. The CREW program involved a series of discussions among participating units, lead by a facilitator from within the facility. Facilitators received training through a workshop hosted by COR&D. Facilitators discussed with their group the Time 1 results of the survey and the group identified specific behaviours and problems as focus areas. The intervention continued on each unit for approximately six months followed by the Time 2 survey.

Results: A series of MANOVA analyses confirmed statistically significant impacts on key outcome clusters including the quality of collegial relationships (co-worker civility, co-worker incivility, supervisor incivility), experiences of workplace distress (exhaustion, turnover intention, cynicism), workplace attitudes (job satisfaction, organizational commitment, efficacy) and evaluations of work life (workload, control, reward, community, fairness, values). Civility for the CREW units increased significantly while the control units had only a minor, non-significant change in civility. The interaction effect that contrasted the improvement in the CREW units vs. that in the control units was statistically significant ($F(1, 1962)=7.40$, $p<.001$). Further, on CREW units, absences from work dropped by 1/3 while these measures remained constant on the control units.

Conclusions: The CREW process is a major intervention that has a dramatic impact on working relationships, workplace health, and productivity. The research team has immediately embarked upon further replications of this research in additional clinical units as well as in support units, including office environments.

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Workplace support for returning workers: Measuring sources and types of support

Lysaght R, Queen's University

Objectives: The success of return-to-work interventions is highly dependent on the supports provided to workers during the transitional process. This presentation will profile the theory, development and testing of a measure of social support for disabled workers. The study goals were to 1) refine and validate a measure of social support, and 2) explore the nature of workplace support and demographic, occupational and environmental factors that may be associated with high and low levels of support.

Methods: A 64-item instrument prototype was developed based on an earlier qualitative study. The instrument, four additional validation instruments, and a demographics form were administered to Canadian workers who had been engaged in return-to-work programs within the previous three months. Factor analytic procedures were used to determine the factor structure of the instrument and reduce the total number of questionnaire items. Criterion validation was determined by calculating correlations between sub-scale scores and measures of conceptually-related constructs, and by testing the resulting correlations against a priori predictions of convergence or divergence. Predictive validity was considered by examining the ability of the instrument sub-scales to discriminate between predictably different demographic groups. Test-retest reliability and internal consistency were also examined.

Results: The number of questionnaire items was reduced through factor analysis and inspection of item properties. A multi-factor structure was identified for each of four primary sources of support within which items were organized in the instrument: supervisors, coworkers, the work organization as a whole and external supports. Preliminary testing of the predictive validity of the tool revealed that the instrument may be able to distinguish between levels of support provided to individuals based on their unique disability characteristics. Highest overall levels of support were reported from family and friends, followed by co-workers, supervisors and organizations respectively.

Conclusions: Results supported the notion that several types of support are important, and that the relative value of these may differ based on the source of support. This measurement tool provides a means for organizations to identify occupational groups and work units where support is challenged, and suggests avenues for direct intervention. Education concerning support and challenges associated with accommodation of certain positions and disability types could be explored as means of addressing support inequities, as could issues related to worker disclosure.

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M

Office ergonomics training may reduce musculoskeletal discomfort in administrative workers in a Malaysian public university

Mahmud N, University of Sydney, Australia

Objectives: The objective of this study was to evaluate the effect of office ergonomics training on musculoskeletal discomfort and mental health of administrative workers.

Methods: This study was designed as a two-armed cluster randomized controlled trial. Three units were randomly assigned to the experimental groups and the three others to the control group using a random number table. The inclusion criteria for this study were respondents who used visual display terminals (VDTs) and the exclusion criteria were those who had any illness and/or injury that may have contributed to musculoskeletal disorders. One day in-house office ergonomic training was conducted in each of the three units by trainers from the National Institute of Safety and Health (NIOSH). Training consisted of lectures on office ergonomics and workstation adjustments. In addition to training, the experimental group received a leaflet similar to the control groups. The leaflet consisted of an office ergonomic diagram, tips on how to take a break, how to reduce their workload and stretching exercises. Follow-ups were conducted at six and 12 months.

Results: The intervention group scored consistently lower for all musculoskeletal complaints at six-month follow-up, although the differences were not always statistically significant. The largest beneficial effects were for neck, right shoulder, left upper arm, left wrist, lower back, hips and right knee. The results for left shoulder and left lower arm are marginally significant, but the difference between the groups was clinically important as the differences were greater than 14%. There was no difference between groups in the number and episodes of sick day's outcome or Depression, Anxiety and Stress (DASS) scores between respondents who attended training and those who did not.

Conclusions: The intervention group was consistently lower for all outcomes at follow-up and consistently had reduced rates for all symptoms, although the differences were not always statistically significant. Although there were improvements in musculoskeletal discomfort, this did not translate into fewer days from work or better mental health.

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Wash with Care: Developing community-based videos to promote pesticide awareness for farmers and farm families

Murphy D, Simon Fraser University

Objectives: The aim of this project was to develop videos to communicate and promote the safe handling guidelines for pesticide-contaminated clothing to farm family members. The intervention needed to be culturally appropriate and created in Punjabi, the most common language spoken by the farmers and farm workers in B.C.'s Fraser Valley.

Methods: In-home interviews with members of the target population (farmers, farm workers and farm family members) were conducted to determine laundry practices and media use patterns. From these interviews it was determined that although distribution channels of media consumption varied, the ubiquity of preference for "Bollywood" films was consistent. Therefore, it was concluded that a Public Service announcement, web-embedded shorts and an instructional video would be designed using a "Bollywood-style" approach. The videos were developed and produced using a Community Engagement model that brought together local crew and talent from the community to make the videos culturally relevant. The actors and a team of Bhangra Dancers interpreted the laundry guidelines and created choreography to enhance the spoken messages. The content for the video was reviewed by the B.C. Ministry of Agriculture as well as researchers at the University of British Columbia prior to shooting.

Results: The videos, which vary in length from 30 seconds to 4 minutes, were shot on location in the Fraser Valley and were produced at Simon Fraser University's Media Analysis Lab. The videos will be shown at Sikh temples in the Fraser Valley and will be aired on local Punjabi TV during the Spring of 2010. An evaluation project is planned for April to determine the effectiveness of the video series for promoting pesticide safety and awareness in the Fraser Valley of British Columbia. (note: videos will be shown during presentation)

Conclusions: Communicating health and safety information across cultures can be difficult, particularly when literacy and language issues occur. Using videos as a vehicle for health and safety promotion may be one approach for managing these issues. Community involvement in the creation of these types of communication products is a key ingredient to making interesting and relevant programming.

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Avoidable mortality for causes amenable to medical care, by occupation in Canada, 1991-2001

Mustard CA, Institute for Work & Health

Objectives: To describe the incidence of avoidable mortality for causes amenable to medical care among occupational groups in Canada.

Methods: A cohort study over an 11-year period among a representative 15% sample of the non-institutionalized population of Canada aged 30-69 at cohort inception. Age-standardized mortality rates for causes amenable to medical care and all other causes of death were calculated for occupationally-active men and women in five categories of skill level, and 80 specific occupational groups as well as for persons not occupationally active.

Results: Age-standardized mortality rates per 100,00 person-years at risk for causes amenable to medical care and for all other causes were 132.3 and 218.6, respectively, for occupationally-active women, and 216.6 and 449.3 for occupationally-active men. For causes amenable to medical care and for all other causes, for both sexes, there was a gradient in mortality relative to the five-level ranking by occupational skill level, but the gradient was less strong for women than for men. Across the 80 occupational minor groups, for both men and women, there was a linear relationship between the rates for causes amenable to medical care and the rates for all other causes.

Conclusions: For occupationally-active adults, this study found similar gradients in mortality for causes amenable to medical care and for all other causes of mortality over the period 1991-2001. Avoidable mortality is a valuable indicator of population health, providing information on outcomes pertinent to the organization and delivery of health-care services.

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N

Behind the mask: Determinants of nurses' adherence to recommended use of facial protective equipment

Nichol K, Centre for Research Expertise in Occupational Disease

Objectives: Communicable respiratory illness (CRI) is a serious occupational threat to the health of health-care workers. A key reason for occupational transmission of CRI is failure to implement appropriate barrier precautions. Facial protective equipment (FPE) is the least adhered to type of personal protective equipment, yet it is an important barrier precaution. This study aimed to describe nurse's adherence to recommended use of FPE and to identify the factors that influence adherence.

Methods: As part of a larger study, a cross-sectional survey of registered and registered practical nurses in 45 units (medical, intensive care and emergency) of six acute care hospitals in Toronto, Canada was conducted. Ethics approval was obtained from the University of Toronto, the administering hospital and all six participating hospitals. A slightly revised version of a previously tested survey tool was utilized. Statistical analysis was performed using SAS V9.1. Chi-square tests for categorical variables and Wilcoxon Rank Sum tests for non-normally distributed continuous variables were conducted to determine relationships between organizational, environmental and individual determinants and adherence to recommended use of FPE. Variables with a bivariate P value < 0.1 and variables of theoretical importance were selected for inclusion in stepwise logistic regression modeling.

Results: A total of 1,074 surveys were completed and returned yielding an 82% response rate. Adherence was defined as answering always or mostly to at least seven of eight items in a previously tested adherence scale. Using this definition, 44% of nurses reported adherence to recommended use of facial protective equipment to prevent occupational transmission of CRI. Of 18 variables that were included in multivariate modeling, five predictors of adherence were revealed: working on a medical unit, perception of ready availability of facial protective equipment, being trained and fit tested within the previous two years, perception of organizational support for health and safety, and perception of good communication regarding health and safety issues.

Conclusions: Despite the SARS experience and the resulting investment in our public health system, nurses' adherence to recommended use of FPE remains suboptimal. To improve adherence, organizational leaders should focus on the organizational and environmental level factors that impact safe work behaviours such as ready availability of equipment, regular training and fit testing, organizational support for health and safety including policies and procedures that are audited and enforced, and good communication regarding health and safety issues. These efforts should result in a reduction in occupational transmission of CRI and a healthier and safer working environment for nurses.

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Estimating occupational pesticide exposure on Canadian golf courses

Nicol A-M, University of British Columbia

Objectives: Pesticides classified as probable or suspected carcinogens are routinely used on golf courses across Canada. While studies have examined the ecological fate of golf course pesticides in the environment, less attention has been paid to occupational exposures that occur on golf courses during and post application. This research estimates the number of golf course employees, including superintendents, maintenance workers, technicians and horticulturalists, who are potentially exposed to carcinogenic pesticides across Canada, reporting by province.

Methods: Estimates of the number of employees applying pesticides to golf turf in Canada were obtained by multiplying the total number of golf courses by the average number of pesticide applicators on a typical golf course staff. A database of Canadian golf courses was compiled in a Geographic Information System (GIS) based on data from various sources, including: 1) DMTI Spatial Enhanced Points of Interest (2006), 2) Dun & Bradstreet business directory (2009), and 3) an online listing of golf courses from Canadagolfguide.com (2009). GoogleEarth was used to confirm the existence of golf courses and to obtain missing geographical coordinates. Employee information was obtained from a sample of 149 Canadian golf courses surveyed for best management practices by the Canadian Golf Superintendents Association (CGSA) (2003). Pesticide application by ecological zones (watersheds) is also mapped and estimates of exposure levels are provided, where data permits, for Chlorothalonil, Mecoprop and 2,4D.

Results: This study identified 2,339 golf courses Canada-wide, with the majority located in populated areas. Most golf courses were in Ontario (831), Quebec (361), B.C. (352) and Alberta (333). Based on employee information from the CGSA, this research identifies a preliminary estimate of 7,017 workers with a potential to be exposed to carcinogenic pesticides. Future efforts of this research will assess total application amounts by watershed areas of Canada, and estimate occupational exposure levels if data permits. Estimates of populations living in very close proximity to golf courses (i.e. less than 500m) will also be explored and evaluated for potential exposure.

Conclusions: Traditionally, management of golf course turf has required intensive use of chemicals (pesticides and fertilizers) to maintain landscapes which are functional, as well as aesthetically pleasing. Regulations and programs that aim to reduce pesticide application are being enacted in many Canadian jurisdictions, but golf courses are often exempt from such initiatives. Rather, restrictions to pesticide type and amounts are central to better management practices being adopted as part of integrated pest management (IPM) programs. Total amounts of pesticides applied and occupational exposure levels will be reduced as these programs become more widely adopted in Canada.

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Health status among injured workers with permanent impairments: Pre-post injury comparisons

O'Hagan F, Trent University, Institute for Work & Health

Objectives: We describe the health status and change in health from pre- to post-injury in a sample of injured workers with medically-determined permanent impairments in the Ontario workers' compensation system. We also describe the associations between health conditions and worker reports of stress.

Methods: We used the RAACWI injured worker health and health-care utilization survey to complete the analysis. The survey includes a sample of 494 Ontario injured workers with first-time WSIB claims and with permanent impairments, drawn from a population provided by the Ontario compensation board. The survey includes information relating to sample demographics, physical and mental health, stress, health care utilization, employment and income.

Results: The prevalence of symptoms of compromised mental health and depression was markedly higher in the sample post-injury compared to pre-injury – i.e. symptoms of anxiety (29% vs. 8%) and depression (42% vs. 7%), irritability/agitation (43% vs. 6%) and diagnosis of depression (32% vs. 7 %). Almost 60% of the sample had scores above the suggested cutoff value for clinical depression (irrespective of formal diagnosis). Physical conditions apart from injuries were likewise elevated compared with pre-injury – e.g., hypertension was 17% vs. 9%. Number of post-injury medical diagnoses were correlated with level of self-reported stress ($r=.28$, $p<.000$) and number of stressors ($r=.37$, $p<.000$).

Conclusions: The pattern of stress-related symptoms and health problems in this sample of injured workers is disconcerting, particularly considering the prevalence of mental health issues. Mental health problems, in particular, may suggest that the compound stress of injury and other life changes associated with being an injured worker creates health issues beyond that of the initial injury, and that these problems are related to the stress experience of injured workers. The moderating role of social support will be discussed in relation to these findings.

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Comparison between ISO 2631-1 comfort prediction equations and self-reported comfort values during occupational exposure to whole-body vehicular vibration

Plewa K, University of Western Ontario

Objectives: Exposure to whole-body vibration is strongly associated with health and comfort problems. Understanding how workplace vibration exposure affects comfort is an important factor in worker health and performance. International standards (ISO 2631-1) predict comfort based on vibration magnitudes, frequencies and durations. The objective of this study was to determine whether the ISO 2631-1 prediction method produces similar results to self-reported field comfort levels during occupational exposure to whole-body vehicular vibration.

Methods: Six degree of freedom seatpan acceleration data was recorded in various industrial machines in forestry (Cation et al, 2008), mining (Eger et al, 2008) and construction (Cann et al, 2003) industries. Following an audio tone at 5-minute intervals, operators reported their comfort level on a 10-point scale (Dickey et al, 2007) based on the preceding minute of vibration exposure. The minute profiles of raw acceleration data were processed using the appropriate filtering and multiplying factors (ISO 2631-1, 1997). Frequency weighted RMS accelerations and point vibration total values were then calculated for each axis and combined as a vector sum. Comfort was predicted from the overall vibration total value for each acceleration profile.

Results: We collected 45 matched sets of comfort and vibration data from 10 mining LHD vehicles, 18 sets of data from 6 forestry skidders and 60 sets of data from 15 construction scrapers. Each industry showed consistent trends for each predicted value; however, there were different relationships between the industries. The data from the construction industry showed weak positive relationships between predicted and self-reported comfort values, whereas the data for both the forestry and mining industries showed no relationship between predicted and self-reported comfort.

Conclusions: It is difficult to predict comfort through a series of mathematical equations because comfort is entirely subjective. The predicted comfort levels did not accurately represent self-reported comfort. This may be due to discrepancies with the prediction equations or perhaps that the operators were incorporating additional factors such as temperature, noise and fatigue into their self-reported comfort ratings. In order to improve our understanding of the relationship between multi-axis vibration and comfort, a more controlled study should be done in the laboratory where workplace vibrations are simulated and subjects rate their comfort given a certain acceleration profile.

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S

Exposure assessment of the alky operator in an oil refinery: A focus on sulphur dioxide and sulphuric acid

Shum J, University of British Columbia

Objectives: The alkylation operator is responsible for controlling and monitoring an acid truck loading process as part of their job. This process has been associated with irritating odours downwind, likely due to sulphuric acid and/or sulphur dioxide emission. Hence the objectives are to determine the alkylation operator's exposure to sulphuric acid and sulphur dioxide, identify/quantify the level of odours downwind during the truck loading process, and recommend controls to reduce exposures to these odours, if needed.

Methods: Personal sulphuric acid and sulphur dioxide samples (8-hour measurements) were collected as part of the preliminary monitoring. Area sampling involved first taking sulphuric acid and sulphur dioxide samples (15-minute measurements) directly downwind/adjacent to the Alkylation Unit to determine the cause and extent of the odour. Once it was identified that sulphur dioxide was the only cause, a series of additional sulphur dioxide samples were taken in the adjacent unit and areas farther downwind to determine the levels and travel distance of the vapour. Air monitoring was conducted using NIOSH Method 7903 and NIOSH Method 6004. Additional side-by-side sulphur dioxide area samples were collected using the NIOSH Method 6004 and the Industrial Scientific GasBadge®Pro (whose detection limit of 0.1ppm is lower than the recently amended sulphur dioxide ACGIH STEL of 0.25 ppm); results were compared to see if GasBadge®Pro is a valid means to measure sulphur dioxide at low levels.

Results: The alkylation operators' personal exposures to sulphuric acid and sulphur dioxide were below the limit of detection: <0.075 mg/m3 (n=3) and <0.014ppm (n=3), respectively. Sulphur dioxide area samples collected in the unit adjacent to the Alkylation Unit averaged 1.96ppm (n=9) for 15-minute STEL measurements; levels farther downwind were 0.13 to 0.56ppm (n=6). These levels only occurred during spent acid loading. The limited side-by-side samples (3) did not allow for statistical comparisons to further comment on associations between results but suggested that the GasBadge®Pro may be a useful method for sampling low levels of sulphur dioxide at around 0.25ppm.

Conclusions: Recommendations should be considered to reduce the operators' potential exposure to sulphur dioxide, particularly to protect asthmatics and those with respiratory disease whose health may be affected in the presence of sulphur dioxide as low as 0.25ppm. In an engineering control perspective, bottom loading of acid (rather than top loading) could be a way to control the problem at source; however the potential effectiveness has not been evaluated. Administrative controls such as taping off the area and posting signage would be most effective at this time as these remove the operators from potential exposures.

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A pilot study into the effectiveness of an alternative mouse for the prevention of MSDs in office workers

Steenstra I, Institute for Work & Health

Objectives: A pilot study was conducted to examine the feasibility of a randomized controlled trial into the effectiveness of an alternative mouse for the reduction of upper extremity complaints in office workers. The mouse provided feedback to workers to rest their arm in front of them by gently vibrating if the worker's hand had been on the mouse for over 12 seconds without actively using it.

Methods: Sixty office workers were invited to participate and provide informed consent. After baseline measurements, workers were randomized into 2 groups; one group received the new mouse with the vibration turned off and a second received the mouse with the vibration on. Follow-up measurements took place after 12 and 26 weeks. Outcomes used were: Daily Symptom Survey administered daily for one week at each time point; and satisfaction with the mouse in the intervention group. Computer- based monitoring software provided information on keyboard and mouse use. In order to increase response rates, each returned questionnaire was rewarded with a $5 donation to a charity of choice. Participants were reminded several times if they had forgotten to fill out the online questionnaire.

Results: In total, 23 people participated (response rate= 38%). Due to ethical considerations, we could not collect data on the representativeness of our final sample. One participant stopped working right after baseline and therefore was not included in the analysis. The retention rate of the remaining 22 subjects was 100%. Results show 50% of the mouse users were very satisfied with the mouse, 50% were not. Intention to treat analysis showed statistically significant less upper extremity and shoulder pain in the intervention group compared to controls. Regression analyses (adjusted for baseline and T1) and T-tests of difference scores gave similar results. A sensitivity analysis showed that one outlier influenced the results substantially. Removing this outlier resulted in a non-significant difference in upper extremity and shoulder pain in the intervention group compared to controls. However, effects were still in favour of the intervention. The ratio of mouse use to total computer use did not change significantly over time between groups.

Conclusions: Taking the possibly more representative results from our sensitivity analysis, a sample size calculation shows we will need a sample size of 60 office workers to have sufficient power in a larger study. With a response rate of 38%, we will need a source population of 158 workers. If we want to look at subgroups, we would need to increase that size. This pilot shows that it is feasible to perform a randomized controlled trial on the effectiveness of this promising intervention.

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Safety and other sharp devices used in B.C. hospitals: Rates of use and are safety features being activated?

Stringer B, Occupational Health and Safety Agency for Healthcare in BC

Objectives: Approximately one year after B.C. legislation was passed requiring that re-engineered sharp safety medical devices (SESMDs) be substituted for conventional devices, a two-phase study was begun to assess if they were being used, if they were used properly and if not, why not. Semi-structured interviews of clinical and management personnel will be used in phase 2. Results from the phase 1 study, reported below, provide information on the proportion of SESMDs in use and activated prior to disposal.

Methods: Paired auditors assessed the contents of a convenience sample of labeled sharp item disposal containers, ranging from 1-23 liters in size, from various adult and pediatric wards (ORs were excluded), in six B.C. hospitals from December 6, 2009-January 17, 2010. Two hospitals were in Victoria, two in Vancouver, one in Burnaby and one in Surrey. To prevent a change in practice, hospital personnel were told that the quality of the containers was being tested. Assessments consisted of counting and evaluating the activation status of eight types of safety syringes, four and three types, respectively, of safety phlebotomy and IV devices, three types of safety Huber needles, and one type of safety scalpel. The number of conventional devices in each category was also recorded.

Results: Of the 411 audited containers, 41% were from Victoria hospitals, 17% from Vancouver, 23% from Surrey and 20% from Burnaby hospitals. About 29% were from specialty units such as ICU and emergency, 27% from surgery, 19% from medicine, 18% from pediatric wards and 7% from phlebotomists. Most sharp devices used were SESMDs except for scalpels — twice the conventional scalpels were used compared to safety scalpels. Activation rates for SESMDs were 95% (1,939/2,037) for IV catheters, 94% (3,398/3,625) for phlebotomy devices, 83% (34/41) for scalpels, 45% (14/31) for Huber needles and 82% (7298/8923) for syringes.

Conclusions: Activation rates of phlebotomy and IV administration devices, both considered to pose a higher risk of pathogen transmission, were 94% and 95%, respectively (because of frequent use, this nevertheless meant that 227 phlebotomy and 98 IV devices weren't activated). Huber needles and safety scalpels, also higher risk devices, were activated 45% and 83% of the time, respectively (because of less frequent use, 17 huber needles and seven scalpels weren't activated). Syringes, which are usually used to administer medication and therefore are lower risk, had an 82% activation rate (1,625 syringes weren't activated).

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Hand dermatitis: What are the associated UE impairments and what is the impact on quality of life, UE Function, and ability to work?

Switzer-McIntyre S, University of Toronto, St. Michael's Hospital, Li Ka Shing Knowledge Institute at St Michael's Hospital

Objectives: There has been little research assessing impairments of the upper extremity in patients with hand dermatitis, and assessing the impact of hand dermatitis on quality of life, upper extremity function, and ability to work. The objective of this study is to describe the upper extremity impairments associated with hand dermatitis and the impact of hand dermatitis on quality of life, upper extremity function, and ability to work.

Methods: Subjects were recruited from the St. Michael's Hospital Occupational Health Clinic. Patients were eligible to participate if they had a history of hand dermatitis, were undergoing patch testing, and could complete the questionnaire in English. In total, 63 consecutive patients were recruited between November 2008 and June 2009. Subjects were assessed by completing a patient-reported survey and a physical examination of the upper extremity. The patient-reported survey included demographics, work history, and a number of standardized questionnaires including Dermatology Life Quality Index (DLQI), SF-36, Quick Disabilities of the Arm, Shoulder, and Hand (DASH), Work Instability Scale (WIS) and Work Limitations Questionnaire (WLQ-25). The physical examination of the upper extremity included tests for impingement, lateral epicondylitis, De Quervain's tenosynovitis, and carpal tunnel syndrome plus assessment of range of motion in the hand, dolorimetry, grip strength and sensation.

Results: In total, 44.4% were female. Mean age was 42.4 years. Mean dermatitis duration was 4.1 years. Mean DLQI score was 10.9; 47.3% > 10 (very to extremely large effect). Mean SF-36 PCS and MCS scores were 45.9 and 42.9, respectively. Mean QuickDASH score was 30.2. Mean WIS score was 9.8; 47.5% ≥ 10 (moderate to high instability). Mean WLQ-25 Index was 7.7; 31.4% > 10. 34.6% had time off in the past year; 9.8% > 12 weeks. A total of 19.3% were doing a different job and 8.8% were not working due to dermatitis. Tuck Restriction and Numbness were common (50.0% and 48.2%, respectively).

Conclusions: Hand dermatitis is associated with significant impairments of the upper extremity, especially Tuck Restriction and Numbness. Quality of life, upper extremity function, and ability to work are affected. Mental health seems more affected then physical health. Hand dermatitis causes work instability and reduced productivity. Job change/loss due to dermatitis is common (28%). Almost a third of individuals indicated that their productivity at work was reduced by over 10% and just over a third of individuals indicated they took time off in the past year due to hand dermatitis with almost 10% taking over 12 weeks.

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Validation of the 11-item Organizational Policies and Practices scale (OPPs) for injured workers recovering from work-related upper-limb disorders

Tang K, St. Michael's Hospital

Objectives: Supportive organizational practices toward workplace safety and disability management are believed to promote injury prevention and better work disability outcomes for injured workers (IWs). However, validation of instruments aimed at quantifying this construct has not been widely demonstrated to date. Our objective is to evaluate the psychometric properties of the Organizational Policies & Practices scale (OPPs) for IWs attending a Shoulder & Elbow specialty clinic operated by the Workplace Safety and Insurance Board (WSIB) of Ontario.

Methods: IWs (n=614) consenting to participate in a one-year prospective study were invited to complete the OPPs upon initial clinic visit (working=58%). Typically, clinic attendees are characterized by a persisting upper-limb injury (duration >6 months), and therefore, applicability of the OPPs to this population is of interest and is believed to be highly relevant. The OPPs is scored by taking the mean score from 11 items (5 response options, 1-5, 5=most supportive workplace policies/environment). Subscale scoring (People-oriented culture, Safety climate, Disability management, Ergonomic practice) is also available as recommended by the developers. Score distributions (normality, floor/ceiling effects) were examined at the scale, subscale and item levels using descriptive statistics (n, mean, SD). Internal consistency reliability (Cronbach's alpha, item-total correlations) and construct validity (Spearman r, t-tests between known-groups) were also assessed.

Results: A OPPs mean of 2.9 (SD=0.8) was observed, with no evidence of floor or ceiling effects in score distributions at the scale or subscale levels. Item mean ranged from 2.1-3.2, and acceptable item-total correlations (r=0.5-0.7) were observed. Cronbach's alpha for the 11-item OPPs was 0.90, with subscales achieving slightly lower alphas (0.78-0.85). The instrument demonstrated the expected level of correlation with moderately-related constructs, including perceived supervisor support (r=0.55) and perceived job satisfaction (r=0.48). In addition, OPPs scores were able to discriminate between IWs who were offered work accommodations and those who were not (mean=3.0 vs. 2.6, t-test between known-groups: t=5.76, p<.0001).

Conclusions: Current results provided preliminary evidence for the internal consistency and validity of the 11-item OPPs measure for use in IWs with upper-limb disorders. Future application of this tool in its current form is supported from a psychometric perspective. Additional work to validate the subscale structure of the OPPs (e.g. factor analysis) could further inform the ideal application of this scale for future objectives.

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Variable one-year recovery course on work disability outcomes for injured workers attending a WSIB specialty clinic for an upper-limb injury

Tang K, St. Michael's Hospital

Objectives: In Ontario, injured workers (IWs) with a persisting upper-limb disorder (duration >6 months) are often referred to a Workplace Safety Insurance Board (WSIB) Specialty Clinic (1) for specialized clinical consultations. The extent to which IWs are able to return to a productive work role is unknown. Our aim is to describe the one-year course of work disability outcomes (extent of work absenteeism and presenteeism) of IWs after specialty clinic attendance.

Methods: IWs (n=614, 58% working at baseline) were followed for a one-year period after initial clinic visit (baseline). Data were collected at baseline and follow-up time points at 3, 6 and 12 months. Outcomes assessed included work status (working: Y/N, regular/modified duties/reduced hours) and extent of at-work productivity loss measured by the Work Limitations Questionnaire Index (WLQ, range: 0–28.6, 28.6=highest productivity loss). Descriptive statistics and latent-class growth modeling techniques were used to assess longitudinal change in both work outcomes and to identify subgroups with distinct recovery trajectories. Resultant subgroups were described and tested for statistical significance and model fit (lowest BIC).

Results: For IWs not working at baseline (42% of sample), a return-to-work rate of 16.7% was observed after 1 year. It was also observed that fewer IWs required work accommodations (baseline=56%, 1-year follow-up=28%) and that they experienced less at-work productivity loss over time (WLQ median: baseline=10.0, 1-year follow-up=6.8; Wilcoxon sign-ranked test p=0.004). The 1-year course for work status was best described by four subgroups: "sustained working" (34.7% of sample), "usually at work" (13.5%), "working then off" (14.7%), "sustained absenteeism" (37.1%). Longitudinal changes in WLQ were also best described by four subgroups: "sustained low" (41.3%), "sustained high" (13.2%), "increasing" (29.1%) and "decreasing" (16.4%).

Conclusions: Highly variable work disability outcomes and distinctive recovery trajectories were observed for IWs after WSIB specialty clinic attendance. Future research may consider the use of such methods to examine inter-individual variability in work outcomes assessed over time. Since work absenteeism and presenteeism are often considered as inter-related constructs within existing work disability conceptual frameworks, sensible approaches to combine work absenteeism and presenteeism outcomes should be explored in future studies aimed at describing longitudinal changes in work disability experienced by IWs.

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More for the money: Cost efficiency in trunk posture observation

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Objectives: In a climate of scarce research funds, cost-effective exposure assessment becomes more critical. There is a long-acknowledged trade-off between precision and cost of exposure assessment methods (Winkel and Mathiassen, 1994) that is seldom quantified. The purpose of this study was to compare different sampling strategies for observed trunk posture and determine which is the most cost-effective. Knowing the price-performance trade-offs of observational exposure assessment can help researchers make the most of limited funds.

Methods: Trunk posture data was observed by trained experts during full work shifts on 126 workers in heavy industry, with repeated measures on 76% of workers. The observed percentage of time spent with trunk flexed more than 60 degrees was recorded and summarized for each workday using the Back-EST sampling method (Village et al, 2009). A cost model was developed using previously published cost data (Trask et al, 2007) to account for the costs of recruiting companies, workers, and making a full-shift observation of trunk posture. Precision was described in terms of the standard error of the group mean (SEM), using equations from Samuels (1985) that account for multiple measures within companies and workers. Changes in cost efficiency were calculated for sampling strategies employing different combinations of the following: 1-4 companies, 1-12 workers, and 1-4 measures per worker. The case of one recruited company is highlighted here as an example.

Results: The SEM declines steeply for the first few additional subjects, while further subjects increase costs considerably with no substantial improvements in precision. Adding repeated measures generally increased costs with smaller gains in precision. In a single-company example, measuring 6 subjects twice (12 measurements total) yields SEM = 0.76 and costs $3,929. The same number of measurements can cost up to $4,505 with 12 subjects and no repeats, improving the SEM to 0.75. However, increased cost does not always deliver gains in precision; an SEM of 0.76 can cost up to $5,545 when 5 subjects are measured 4 times.

Conclusions: The total number of measurements has been used as a metric for cost optimization in previous investigations (Lemasters et al, 1996). However, an equal number of measurements can have different costs depending on how they are allocated due to recruitment costs. Such cost-efficiency information allows researchers to make informed decisions on the use of limited resources when designing ergonomic studies; either determining the maximum precision level that can be achieved for a given cost, or the minimum cost for a given level of precision.

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Job strain and masked hypertension

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Objectives: To determine whether psychosocial work characteristics are associated with the prevalence of masked hypertension in a population of white-collar workers.

Methods: White-collar workers were recruited from three public organizations. Blood pressure (BP) was measured at the workplace using Spacelabs 90207 for manual measurements (mean of the first three readings taken by a trained assistant) followed by ambulatory measurements (mean of every other reading obtained during the working day). Masked hypertension (MH) was defined as manual BP ≤ 140/90 mmHg and ambulatory BP ≥ 135/85 mmHg. Job strain was evaluated using the quadrant method for exposure assessment, as well as alternative formulations.

Results: BP measurements were obtained from 2,357 workers, (80% participation, 61% women; mean age, 44 years). For men, being in the active group (high psychological demands and high decision latitude) was associated with masked hypertension (adjusted OR: 2.07, 95% CI 1.30-3.31). No significant association with a higher prevalence of masked hypertension was observed in women.

Conclusions: Masked hypertension is associated with job strain, in men. Workers in 'active' job situations may be more likely to have the condition.

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W

Thriving, not just surviving, in complex and stressful work environments

Walinga J, Royal Roads University

Objectives: The aims of the project were to: a) develop an empirically-grounded definition of work stress thriving; b) articulate a conceptual framework that describes the key individual and organizational factors contributing to a thriving response; and c) provide the foundation for further empirical research into what ways and to what degree stress thriving is associated with workplace engagement and workplace productivity, and the development of measures, training interventions, organizational structures, and work processes to enhance stress thriving at work.

Methods: The research followed a qualitative, phenomenological design. Participants were asked to rate two sample scenarios of stressful, but typical, work situations scenarios using the Job-Related Tension Index (Kahn, et al., 1964). In this way, the personal narratives of each participant were anchored to standardized situations of work that have been rated as moderately to highly stressful. A total of 10 interviews were then conducted to explore factors contributing to a thriving response. Qualitative analysis involved deriving and coding the data according to categories stemming from the literature on coping and thriving, then identifying key themes emerging within each category. The analysis involved separate analyses of positive and negative narratives utilizing an a priori framework involving the following domains: a) initial emotional reactions; b) primary cognitive appraisal; c) secondary cognitive appraisal; d) communication patterns; e) social supports ; f) organizational supports; g) coping actions and strategies; h) psychological and physical effects; i) learning and growth outcomes; j) collateral affects on others and organization.

Results: Based on the results of this study, thriving responses depend upon: communication training in processes of communication planning, frameworks, mechanisms and systems; personal health initiatives; cognitive appraisal training; and organizational factors which support a culture of open communication, psychological safety and the capacity to drill down to the core challenge. Training in these areas is necessary to support the problem-solving, communication and reflection necessary to thrive amidst stress.

Conclusions: One study participant describes thriving well when he states: ‘even though it is a negative experience it affects you in a positive way and you see that you have the ability to do it.’ Ensuring that workers thrive rather than just survive stressful encounters or environments may become more crucial in an increasingly fast-paced, constantly changing corporate landscape. Sustainability has moved to the forefront of corporate thinking as the implications of human, environmental, and economic strain and depletion become frighteningly apparent. Adversity and change can also fuel performance. More than ever it is crucial to create a ‘thriving’ culture as opposed to a culture of simply surviving.

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See the workplace with new eyes: Helping joint committees get a handle on principles and processes

Wigmore D, Occupational Health And Safety Consultant

Objectives: What helps joint health and safety committees play an effective role in preventing workers getting sick or hurt because of their job? How can they see their workplaces with "new eyes" and advocate for the changes needed? What tools, materials and processes help them do this?

Methods: Consultants worked with several Manitoba joint health and safety committees, and the unions representing the workers, for about two years. We attended committee meetings, assisted in planning activities and prepared and delivered participatory workshops. Topics covered were general health and safety principles and approaches, ergonomics, stress and committee process. Visual tools and clear language materials were key ingredients of each session. We encouraged the committees to use the materials and visual tools in their activities, and got feedback about what worked and the changes needed. We evaluated the committees' activities and reported our observations to them. We prepared the final "product" - a self-help guide for joint health and safety committees - using revised workshop materials and visual tools, with additions based on observations and feedback. A number of committees and committee members around the province evaluated the guide before it was revised and distributed.

Results: The participants did see their workplaces and committee activities with "new eyes" but they needed "outside eyes" to guide them in making changes. They liked the participatory methods, visual tools (e.g. body and workplace maps, hazard categories, prevention triangle) and practical hand-outs (e.g. healthy solutions chart, ergonomic assessment sheets). They were grateful for guidance about effective processes (e.g. agendas, healthy conflict, priority setting). Their committees are more effective and likely to focus on "messy" health issues (e.g. stress and ergonomics). The guide is reported to be one of the most popular items the Manitoba Workers Compensation Board distributes to employers.

Conclusions: Joint health and safety committees can help prevent work-related sickness and injuries. The self-help guide is a good start for many, but it is not sufficient. Committees need to be supported and nurtured with commitment from upper management, participatory training and paid time to do the things for which they are responsible. Knowledge translates into "new eyes" and action when workshops and committee activities use visual tools and practical clear language documents for the tasks required. Training must go past the traditional legally-framed content to principles and processes, including how to advocate for changes and deal with conflict.

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Réflexions sur une méthode pour mieux comprendre les déterminants à l'origine de TMS : « Association de la métrologie biomécanique et l'autoconfrontation »

Wioland L, Institut National de Recherche et de Sécurité, France

Objectives: La prévention des troubles musculo-squelettiques (TMS) passe par l'analyse et la compréhension du geste des opérateurs qui résulte de facteurs liés à la situation de travail, et à ses déterminants organisationnels et psychosociaux. Afin de mettre en lien la dimension physiologique du geste avec les intentions de l'opérateur et d'enrichir la connaissance des déterminants à l'origine des TMS, une méthodologie d'analyse de l'activité de travail fondée sur l'association de la biomécanique et de l'autoconfrontation a été expérimentée.

Methods: L'étude s'est déroulée dans une entreprise de reliure de livres, au poste de plastification, qui comporte un travail manuel complexe. Plusieurs étapes d'analyses se sont succédées. La première a consisté à analyser l'activité de plastification, durant laquelle une première session d'autoconfrontation a été effectuée auprès des quatre opératrices réalisant habituellement cette activité. Chacune d'entre elles a été amenée à réagir au film de sa propre activité en présence d'un chercheur. La synthèse de cette première étape a permis de définir le protocole expérimental de la métrologie biomécanique. L'activité des opératrices a été filmée de façon synchrone à l'acquisition de données biomécaniques. La synthèse des résultats de la première autoconfrontation et de la métrologie biomécanique a conduit à définir le protocole de la deuxième autoconfrontation mise en œuvre par la suite. Les données acquises par ces deux méthodes ont été analysées séparément, puis combinées.

Results: L'analyse biomécanique point les actions les plus sollicitantes. Pour un tiers des actions les résultats issus des deux méthodes sont en adéquation. Les actions, dont la pénibilité physique a été explicitée lors des autoconfontations, sont celles identifiées par la biomécanique. En revanche, pour plus de la moitié des actions sollicitantes, le ressenti n'est pas exprimé. Ceci pourrait être lié aux difficultés à verbaliser dans le cas d'activités routinières. De plus, l'autoconfrontation apporte des informations de nature globale prenant en compte l'ensemble de la tâche et de l'individu, alors que la biomécanique permet d'obtenir des informations plus ciblées sur la tâche et l'individu. Néanmoins, les verbalisations permettent d'enrichir la compréhension des stratégies gestuelles et d'identifier des déterminants. Les résultats montrent également que certaines actions n'auraient pas été identifiées, ni explorées sans l'association des deux méthodes.

Conclusions: Cette étude confirme l'intérêt de concilier ces deux approches et ouvre des perspectives de prévention. Une meilleure connaissance de la gestuelle permet de mieux connaître les actions à risques, de reconnaître les savoirs élaborés par les opérateurs, de les discuter et d'en faciliter la transmission. Ces connaissances peuvent aider le préventeur à identifier des leviers d'action pour réduire le risque de TMS.

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We wish to thank our sponsors for their generous financial support

Nous aimerions remercier nos commanditaires pour leur généreux soutien financier

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