

**ONGOING PROJECTS**

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*Development of a Decision-Support Tool for the Rehabilitation of Injured Workers*

Investigators: Haws C, Barnsley S and Gross DP

*Is an Interdisciplinary Return-to-Work Program an Effective Method in Helping Injured Workers Improve Function, Reduce Disability and Return-to-Work?*

Investigator: Haws C

*Exploring Sexual Disability in Workers with Musculoskeletal Injury*

Investigators: Esmail S, Knupp H, and Gross DP

*Evaluation of Post Concussion Symptoms in Minimal (not Mild) Brain Injury*

Investigator: Louw D

*Evaluation of an Expedited Consultation Initiative*

Investigator: Stephens B

*Satisfaction with Physical Therapy and Chiropractic Services*

Investigator: Stephens B

*Effectiveness of a Continuum of Care Model for Traumatic Psychological Injury*

Investigator: Rose J

## COMPLETED PROJECTS (PAST 5 YEARS)

Full manuscripts available upon request from Roger.Salus@millardhealth.com

### 2011

[\*The Roles of Social and Psychological Factors in Recovery\*](#)

Investigators: Carroll L and Phillips L

### 2010

[\*Inter-Rater Reliability of Auditing Physical Therapists Workers' Compensation Board Charts for Patients with Mechanical Low Back Pain\*](#)

Boon A, Quinn K, Schlichter M, Tam C, Young L, I Muir, DP Gross

[\*A Short-Form Functional Capacity Evaluation Predicts Time to Recovery but Not Sustained Return-to-Work\*](#)

Branton EN, Arnold KM, Appelt SR, Hodges MM, Battié MC, Gross DP

[\*Recovery Expectations Predict Recovery in Workers with Back Pain but Not Other Musculoskeletal Conditions\*](#)

Gross DP and Battié MC

[\*Do Clinicians Working Within the Same Context Make Consistent Return-To-Work Recommendations?\*](#)

Ikezawa Y, Battié MC, Beach J and Gross DP

[\*The Role of Cardiovascular Fitness in the Assessment and Management of Upper Extremity Occupational Cumulative Activity Related Disorders\*](#)

Hlushak C and Gross DP

[\*Evaluation of a Canadian Back Pain Mass Media Campaign\*](#)

Gross DP, Russell AS, Ferrari R, Battié MC, Schopflocher D, Hu R, Waddell G, Buchbinder R

### 2009

[\*Opioid Prescriptions in Canadian Workers' Compensation Claimants: Prescription Trends and Associations Between Early Prescription and Future Recovery\*](#)

Gross DP, Stephens B, Bhambhani Y, Haykowsky M, Bostick GP and Rashid S

[\*The Use of Complementary and Alternative Medicine \(CAM\) by Canadian Occupational Therapists\*](#)

Knupp HM, Esmail S, Warren S

[\*Evaluation Of A Knowledge Translation Initiative for Physical Therapists Treating Patients With Work Disability\*](#)

Gross DP and Lowe A

**2008**

*The Patient-Specific Functional Scale: Validity in Workers' Compensation Claimants*

Gross DP, Battié MC and Asante AK

**2007**

*Changing to an Outcome-Focused Program Improves Return to Work Outcomes*

Tschernetzki-Neilson PJ, Brintnell ES, Haws C and Graham K

*The Effectiveness of Implementation of a Soft Tissue Injury Continuum of Care Model on Return to Work*

Stephens B and Gross DP

*Functional Self-Efficacy Beliefs Influence Functional Capacity Evaluation*

Asante AK, Brintnell ES, and Gross DP

*Evaluation of a Short-Form Functional Capacity Evaluation: Less May Be Best*

Gross DP, Battié MC and Asante AK

*Surgical Robotics for Patient Safety in the Perioperative Environment: Realizing the Promise*

Lai F and Louw D

**2006**

*Development and Validation of a Short Form Functional Capacity Evaluation for use in Claimants with Low Back Disorders*

Gross DP, Battié MC, and Asante AK

*Material Handling Performance of Patients With Chronic Low Back Pain During Functional Capacity Evaluation: A Comparison Between Three Countries*

Reneman MF, Kool J, Oesch P, Geertzen JH, Battié MC and Gross DP

*Testing a Model of Client's Belief about Chronic Pain and Recovery*

Paul T and Truscott D

*Continuum of Care Model for Managing Mild Traumatic Brain Injury in a Workers' Compensation Context: A Description of the Model and its Development*

Rose JM

*Does Functional Capacity Evaluation Predict Recovery In Workers' Compensation Claimants With Upper Extremity Disorders?*

Gross DP and Battié MC

*Are Functional Capacity Evaluations Affected by the Patient's Pain?*

Gross DP

## **2011 Ongoing Projects**

**Title:** *Development of a Decision-Support Tool for the Rehabilitation of Injured Workers*

**Title:** Haws C, Barnsley S and Gross DP

**Project Summary:** The purpose is to develop a triage pathway model that predicts return to work and time receiving workers compensation benefits for workers who attended an interdisciplinary program. The goal of an interdisciplinary program is to: optimize the worker's safe sustainable return to work and achieve claim closure, minimize disability, optimize functional restoration, independence and/or ability to work, promote modified return to work as a transition toward full return to work, promote the worker's responsibility and self-management of his/her injury and develop behaviors that will improve the worker's ability to return to work. Such a model would put an onus of responsibility on rehabilitation providers to effectively identify which variables are predictive of success and failure in order to aid in effective treatment programming that will ensure the most positive outcome.

**Title:** *Is an Interdisciplinary RTW Program an Effective Method in Helping Injured Workers Improve Function, Reduce Disability and RTW?*

**Investigator(s):** Haws C

**Project Summary:** Interdisciplinary return work programs are designed to address the medical, functional, physical, psychosocial and vocational needs of the worker to facilitate safe and sustainable return to work and claim finality. Every year the Alberta WCB refers over 4000 workers to RTW service providers for these programs. The cost to the WCB is substantial when adding the rehabilitation and claims costs. This research study will assist in the validation of the efficacy of interdisciplinary return to work programs using data from Millard Health.

**Title:** *Exploring Sexual Disability in Workers with Musculoskeletal Injury*

**Investigator(s):** Esmail S, Knupp H, and Gross DP

**Project Summary:** Every claimant assessed or treated at Millard Health is asked to complete the Pain Disability Index (PDI) a measure of perceived disability due to pain. One of the seven items on the scale asks regarding severity of sexual behaviour. The relevance for this indicator of sexual disability is unknown. This project is an exploratory study investigating three main questions: 1) What demographic, clinical or occupational factors are associated with high ratings of perceived sexual disability on the PDI in workers' compensation claimants? 2) Are the characteristics of claimants assessed at Millard Health who do not complete the 'sexual behaviour' item in the PDI different from those who do complete this item? 3) What is the association between ratings of sexual disability on the PDI and future return to work?

**Title:** *Evaluation of Post Concussion Symptoms in Minimal (not Mild) Brain Injury*

**Investigator(s):** Louw D

**Project Summary:** Post-head injury syndromes are common, complex and costly. Clarity and consistency of assessment would help formulate guidelines and improve outcome prediction, streamlining interventions and reducing medical costs. Our objective is to enhance the understanding of the underpinnings of persistent symptoms in individuals with minimal head injury, but particularly the assessment and management of

this phenomenon. A comprehensive evaluation will be performed, and an oversight committee struck to interpret the results, create guidelines and monitor their implementation. This study will test the hypothesis that a minimal injury severity score (MISS) can be constructed, and will have early predictive value for The Wounded Worker Syndrome / Chronic Pain Syndrome. Early and aggressive interventions and recommendations could pre-empt this problem, aiding both the worker and the employer.

**Title:** *Evaluation of an Expedited Consultation Initiative*

**Investigator(s):** Stephens B

**Project Summary:** The WCB-Alberta objective of obtaining timely services led to an examination of wait times for specialist consultations and surgery. In a significant number of cases, the time from referral to initial consultation is also a period compensated for wage loss. Each day waiting incurs wage loss expenditures, delays decision-making about appropriate rehabilitation and lengthens the time for recovery and return to work. In addition, it was thought that existing wait times did not reflect optimal wait times from an injury treatment perspective. Preliminary analysis showed the potential for significant benefit for optimal recovery and hence reduced costs if waiting times were shortened. The principal hypothesis of this study is that implementation of expedited consultations resulted in shorter claim duration and lower claim costs by shortening wait times for specialist consultations.

**Title:** *Evaluation of Occupational Injury Service*

**Investigator(s):** Stephens B

**Project Summary:** In 1996, as part of its health care strategy, WCB – Alberta implemented a pilot project for occupational injury services. The purpose of the project was to determine if day of accident injury management by a medical clinic with occupational orientation would affect claim duration. The success of the pilot led to the expansion of the service to the whole province, and demonstrated the importance of employer modified work. Since then employer modified work has expanded dramatically and contributed significantly to reduction of lost time claims. The purpose of this study is to report the evaluation of this pilot project as results have previously been shared only in a limited way. The publication of the results through a formal evaluation will add to the knowledge base of disability management.

**Title:** *Satisfaction with Physical Therapy and Chiropractic Services*

**Investigator(s):** Stephens B

**Project Summary:** This study will examine the relationship between overall patient satisfaction, patient satisfaction with specific dimensions of care, and self-reported outcomes. The study will provide a descriptive time series analysis of survey responses and an analysis of the relationship between survey dimensions and patient reported outcomes of treatment. These results will permit identification of areas of potential strengths and weakness in patient satisfaction with Physical Therapy services and

examine congruence with current practice standards for Physical Therapists. The results of this study should be directly relevant to Physical Therapists who provide treatment to injured workers. To our knowledge this would be the only study that identifies in detail the patient's satisfaction with various dimensions of care received. For regulators, this study will provide insight into the public's perception of Physical Therapy practice and congruence to practice standards.

**Title:** *Effectiveness of a Continuum of Care Model for Traumatic Psychological Injury*

**Investigator(s):** Rose J

**Project Summary:** The main objective of this project is to utilize the WCB-Alberta's current databases to determine if the Traumatic Psychological Injury Continuum of Care Model (CCM) has been effective for so-called 'mental-mental' claims (based upon the Primary Nature of Injury Code). It is hoped that the existing data, along with some further survey information, can assist with both formative and summative evaluations to answer the following questions: Were the services provided in accordance with CCM? Did the CCM improve outcomes such as earlier, sustainable return to work and achieving superior customer (injured worker, employer, case manager, service provider) satisfaction? Can the model, or its supporting processes, be improved to facilitate better outcomes? Information provided by this analysis can then be provided to WCB Psychology Consulting and Health Care Services to assist in making any required adaptations to the model and improving internal WCB claim management processes and/or external service provision.

**Title:** *High Pain Ratings and Treatment/Work Outcomes*

**Investigator(s):** Mrazik M and Louw D

**Project Summary:** The management of complex injuries where claim duration is longest is of particular interest given the financial cost, need for extensive medical support, and involvement of multiple health care providers required for this population. Thus, investigating outcomes associated with chronic pain has strong implications for the Alberta workforce. The objective of this study is to retrospectively analyze treatment and work outcomes for individuals reporting both minimal and severe pain disability at the start of rehabilitation programs. For injured workers suffering chronic pain, providing the best treatment at the appropriate time is always a primary consideration for health professionals and those managing claims. This study will help provide better insight into the treatment outcomes of a select group of chronic pain sufferers. It will add to existing knowledge and research findings concern chronic pain. As identified above, there is a paucity of research in the existing scientific literature that has considered using pain disability as a predictor of rehabilitation and vocational outcome.

**Completed Projects (Limited to past 5 years, manuscripts available upon request)  
2011**

**Title:** *The Roles of Social and Psychological Factors in Recovery*

**Investigator(s):** Philips L. and Carroll L.

**Project Summary:** The goal of this project is to contribute to the growing body of work aimed at understanding long-term ‘chronic’ work related injury. We hope to assist the Millard Health treatment team in identifying modifiable prognostic factors that contribute to poor treatment response and, ultimately, to long-term disability. We aim to investigate the roles of four prognostic factors on recovery: (1) an individual’s recovery expectations; (2) depression and anxiety following the injury; (3) the individual’s coping style, and, (4) self-perceived social and occupational support. Specifically, we hypothesize that poor expectations for recovery, high levels of depression and/or anxiety, a passive coping style, and poor social and occupational support will lead to slower recovery and poorer response to intervention.

**2010**

*Inter-Rater Reliability of Auditing Physical Therapists Workers’ Compensation Board Charts for Patients with Mechanical Low Back Pain*

Boon A, Quinn K, Schlichter M, Tam C, Young L, I Muir, DP Gross

**CONCLUSION:** Reliability of extracting data from WCB-Alberta physical therapy reports approached the anticipated level of acceptable agreement (90%).

**SUMMARY:** To determine the inter-rater reliability of extracting data from Alberta Workers Compensation Board (WCB) reports into a Microsoft Excel spreadsheet. **Methods:** Manual extraction of 30 randomly selected non-specific mechanical low back pain WCB Alberta Physical Therapy reports performed by five raters. **Results:** The overall percent agreement for all three reports: assessment, status, and discharge was 86.8%. Calculated without the “Other” subcategories, the overall percent agreement increased to 90.2%. The overall percent agreement for the assessment reports was 82.6%, 87.3%, and 88.4% for the status and discharge reports, respectively. Decision rules and adjustments to the extraction spreadsheet have been developed for future research. A higher interrater reliability is anticipated with implementations of these changes.

*A Short-Form Functional Capacity Evaluation Predicts Time to Recovery but Not Sustained Return-to-Work*

Branton EN, Arnold KM, Appelt SR, Hodges MM, Battié MC, Gross DP

**CONCLUSIONS:** A short-form FCE appears to provide useful information for predicting time to recovery as measured through administrative outcomes, but not injury recurrence. The short-form FCE may be an efficient option for clinicians using FCE in the management of injured workers.

**SUMMARY:** To evaluate the ability of a short-form FCE to predict future timely and sustained return-to-work. **Methods** A prospective cohort study was conducted using data collected during a cluster RCT. Subject performance on the items in the short-form FCE was compared to administrative recovery outcomes from a workers' compensation

database. Outcomes included days to claim closure, days to time loss benefit suspension and future recurrence (defined as re-opening a closed claim, restarting benefits, or filing a new claim for injury to the same body region). Analysis included multivariable Cox and logistic regression using a risk factor modeling strategy. Potential confounders included age, sex, injury duration, and job attachment status, among others. Results The sample included 147 compensation claimants with a variety of musculoskeletal injuries. Subjects who demonstrated job demand levels on all FCE items were more likely to have their claims closed (adjusted Hazard Ratio 5.52 (95% Confidence Interval 3.42-8.89), and benefits suspended (adjusted Hazard Ratio 5.45 (95% Confidence Interval 2.73-10.85) over the follow-up year. The proportion of variance explained by the FCE ranged from 18 to 27%. FCE performance was not significantly associated with future recurrence.

*Recovery Expectations Predict Recovery in Workers with Back Pain but Not Other Musculoskeletal Conditions*

Gross DP and Battié MC

**CONCLUSIONS:** Recovery expectations provide some information for predicting future recovery in workers filing injury claims for back pain, but do not appear to predict recovery in claimants with other musculoskeletal conditions.

**SUMMARY:** Recovery expectations appear to influence recovery and return-to-work following back pain, but their role in other compensable conditions is uncertain. We examined whether recovery expectations predict future return-to-work in workers filing injury claims for a variety of musculoskeletal conditions. Workers' compensation claimants receiving time-loss benefits for a musculoskeletal condition and undergoing return-to-work assessment at Millard Health were enrolled. Claimants completed a work-related recovery expectations questionnaire. The sample consisted of 1040 claimants of whom 298 (29%) had back pain, 461 (44%) had sprains, strains or pain of other body parts besides the back, 234 (23%) had specific injuries such as fracture, dislocation, or amputation, and 47 (5%) had other compensable conditions such as carpal tunnel syndrome or knee internal derangement. Negative work-related recovery expectations were consistently associated with slower suspension of time-loss benefits (Hazard Ratio 0.83) and slower claim closure (Hazard Ratio 0.84) in claimants with back pain, but associations in other diagnostic groups were inconsistent and not statistically significant. Associations were slightly larger within the group of claimants with back pain of less than 3-month duration.

*Do Clinicians Working Within the Same Context Make Consistent Return-To-Work Recommendations?*

Ikezawa Y, Battié MC, Beach J and Gross DP

**CONCLUSIONS:** Clinicians demonstrated a high level of agreement (>94%) when making return-to-(RTW) recommendations for injuries with clear pathology. However, a lower level of agreement (56%) was observed for back pain where the etiology of pain and disability is often more complex. Clinicians most commonly recommended RTW with restrictions, underlining the importance of workplace accommodations and modified duties in facilitating resumption of work.

**SUMMARY:** We studied the inter-rater reliability of RTW determinations between clinicians in a specific workers' compensation setting. Three case scenarios were given to clinicians working at one rehabilitation facility to examine consistency between clinicians in RTW recommendations. Additionally, we examined what information clinicians relied on to make decisions. Analysis included percentage agreement and other descriptive statistics. Thirty-six clinicians (13 physiotherapists, 10 occupational therapists, 8 exercise therapists, and 5 physicians) responded to the questionnaire. Subjects showed a high percentage agreement regarding RTW readiness on fracture and dislocation scenarios (97.2% and 94.4%, respectively), while agreement on a back pain scenario was modest (55.6%). In all cases, more than 50% of clinicians relied on biomedical information, such as physical examination.

*The Role of Cardiovascular Fitness in the Assessment and Management of Upper Extremity Occupational Cumulative Activity Related Disorders*

Hlushak C and Gross DP

**CONCLUSIONS:** A cardiovascular fitness assessment may not be useful for return to work planning and may not be required for every injured worker with an upper extremity cumulative trauma disorder. Further research is necessary to clarify the role of cardiovascular fitness assessment in the rehabilitation of injured workers.

**SUMMARY:** The purpose of this study was to examine the value of cardiovascular fitness testing in predicting return to work in injured workers with upper extremity cumulative trauma disorders. Data was extracted from a prospectively collected workers' compensation database on injured workers undergoing an occupational interdisciplinary rehabilitation program for upper extremity cumulative trauma disorders. Subjects included workers' compensation claimants with upper extremity cumulative trauma disorders. Results indicate that cardiovascular fitness measured at the time of admission to an interdisciplinary rehabilitation program does not predict return to work at the time of discharge from the program.

**2009**

*Opioid Prescriptions in Canadian Workers' Compensation Claimants: Prescription Trends and Associations Between Early Prescription and Future Recovery*

Gross DP, Stephens B, Bhambhani Y, Haykowsky M, Bostick GP and Rashid S

**CONCLUSIONS:** Prescriptions for opioid analgesia appear to be decreasing within workers' compensation claimants in Alberta, Canada. As expected, claimants with more severe injuries were more likely to receive opioids. An association was observed between early opioid prescription and delayed recovery, however, this is likely explained by pain severity or other unmeasured confounders.

**SUMMARY:** Opioid analgesia is effective for reducing chronic nonmalignant pain and opioid prescriptions for musculoskeletal pain seem to have increased over the past years. However, recent evidence indicates early opioid use may be associated with delayed recovery in patients with back pain. We investigated the prescription of opioids in injured Canadian workers to determine recent trends in use and the association between early

prescription and future recovery. Data were extracted from the Alberta Workers' Compensation Board administrative database, and information was obtained on all time loss claims for sprains, strains, fractures, dislocations, amputations, or burns between January 1, 2000 and December 31, 2005. Information on all narcotic prescriptions was obtained along with demographic data and duration of time loss benefits. Injury severity was controlled for via nature of injury coding. Analysis included multivariable logistic and Cox regression. Data were obtained for 137,175 subjects. The majority were males (approximately 70%) with back sprains (approximately 35%), and a mean age of 37 years. Between the years 2000 and 2005, all opioid prescriptions within the first year of claim decreased from 11.4% of claimants to 8.3%. Older males with fractures, dislocations, or amputations were more likely to receive narcotics. Claimants receiving early opioid prescriptions experienced delayed suspension of benefits. However, this association was also seen in claimants prescribed early non-narcotic analgesics.

*The Use of Complementary and Alternative Medicine (CAM) by Canadian Occupational Therapists*

Knupp HM, Esmail S, Warren S

**CONCLUSIONS:** Further research on the use of CAM by Occupational Therapists is needed, allowing for evidence-based decisions to be made.

**SUMMARY:** The purpose of this study was to describe the proportion of occupational therapists currently using complementary and alternative medicine (CAM), or providing referrals to CAM practitioners, as well as the purposes of use/referral in one Canadian region. A questionnaire survey on CAM was sent through e-mail and post to 1123 Canadian occupational therapists. Content, construct and face validity, as well as response, desirability/social, and instrument bias were considered and controlled through study design. A response rate of 17.1% was achieved. Overall, 31.2% of respondents have used at least one form of CAM, with 5.5% using >1 form of CAM. Purposes for use focused on the treatment of symptoms. Reasons preventing CAM's use included lack of training (82.4%), interest (23%) and/or supporting evidence (22.3%). Considerations of incorporating CAM into occupational therapy focused on a client-centred and holistic approach to treatment (43–63.3%), ranking above legal/employer-related aspects (43–43.6%). Elaborations of negative responses indicated that further supporting evidence on forms of CAM and related research may result in changes of opinion.

*Evaluation of a Knowledge Translation Initiative for Physical Therapists Treating Patients with Work Disability*

Gross DP and Lowe A

**CONCLUSIONS:** Implementation of a knowledge translation and exchange (KTE) initiative appears to have had little impact on private physical therapy clinical practice or associated return-to-work outcomes. Future interventions for rehabilitation professionals should consider the organizational culture of the settings in which they practice, which may be a barrier or facilitator of research uptake.

**SUMMARY:** We evaluated a KTE initiative aimed at providing physical therapists with best practice information regarding work disability prevention. The KTE initiative involved dissemination of a best practice resource guide for work disability prevention, creation of a network of peer-selected educationally influential clinicians, province-wide

seminars for practicing clinicians, and use of the resources in an academic training curriculum. Evaluation included email surveys of clinician practice patterns and exposure to the KTE initiative. We also evaluated the impact of the KTE on community physical therapy workers' compensation outcomes. 241 and 164 clinicians responded to the baseline and follow-up email surveys, respectively. Clinicians reported a wide range of years in practice (0-30+ years) and practice settings although the majority worked in private clinics (approximately 61%). Approximately 80% of the follow-up sample reported some exposure to the KTE initiative. Few differences were observed in reported practice patterns between survey periods. Compensation outcomes improved slightly after KTE (68 versus 70% off benefits) however, this effect was confounded by proportion of claimants with sprain/strain injury.

## **2008**

### *The Patient-Specific Functional Scale: Validity in Workers' Compensation Claimants*

Gross DP, Battié MC and Asante AK

**CONCLUSIONS:** This study provides construct and predictive validity evidence for the Patient-Specific Functional Scale (PSFS) as an indicator of functional limitation in workers' compensation claimants.

**SUMMARY:** To examine the construct and predictive validity of the PSFS in workers' compensation claimants. Prospective cohort study with 1-year follow-up within a workers' compensation rehabilitation facility. Subjects included 294 claimants with a variety of musculoskeletal disorders. The sample was predominantly male (70%), with a mean age of 44 years. Subjects completed a battery of measures at baseline including the PSFS, the Pain Disability Index (PDI), and the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). Outcomes for determining predictive validity included administrative indicators of timely return to work and recovery during the 1-year follow-up. Analysis included Pearson correlation and multivariable Cox and logistic regression. At baseline, the PSFS correlated moderately ( $r$  range, 0.3-0.5) with other indicators of functional limitation (PDI, SF-36 role-physical subscale) but negligibly with the SF-36 mental health and role-emotional subscales. The PSFS was associated with timely recovery (adjusted hazard ratio, 1.16; 95% confidence interval, 1.07-1.27) with increasing functional limitation related to delayed recovery.

## **2007**

### *Changing to an Outcome-Focused Program Improves Return to Work Outcomes*

Tschernetzki-Neilson PJ, Brintnell ES, Haws C and Graham K

**CONCLUSIONS:** Changing to an outcome-focused program improved various outcomes in the Millard Health occupational rehabilitation program. Several factors predicted the outcome of RTW and these should be considered in treatment planning.

**SUMMARY:** The purposes of this study were to: (1) evaluate the effectiveness of changing a Return to Work (RTW) program's focus to one that was "outcome-focused", and (2) to determine which factors collected in the facility's database were most predictive of RTW. A total of 13,428 client files were extracted from Millard Health's database which included data on two cohorts of subjects: those in the program before and

after the change in focus had been made. This was to determine whether significant improvements in outcomes were achieved. Variables that were hypothesized to be predictive of RTW were selected based on previous published literature. Analyses included ANOVA's, logistic regression analysis and Pearson correlation. Statistically significant improvements in RTW, total temporary disability claims, client satisfaction, efficiency of services and scores on the Perceived Disability Index (PDI), Short Form-36 (SF-36) and Visual Analogue Scale (VAS) for perceived pain were found. Variables that were predictive of RTW included: more efficient services, completion of a worksite visit, having the worker participate in the visit, availability of modified duties from the employer, fewer absences from the program and better scores on the PDI, SF-36 and VAS. The most predictive variable of RTW was scores on the PDI indicating lower levels of perceived disability.

*The Effectiveness of Implementation of a Soft Tissue Injury Continuum of Care Model on Return to Work*

Stephens B and Gross DP

**CONCLUSIONS:** Implementation of a soft tissue injury continuum of care involving staged application of various types of rehabilitation services appears to have resulted in more rapid and sustained recovery.

**SUMMARY:** Musculoskeletal conditions, such as back pain, continue to be leading causes of disability and work loss. From 1996 through 1997, the WCB-Alberta implemented a continuum of care model to guide rehabilitation service delivery for claimants with soft tissue injury. The model was designed as a decision-making tool to promote a consistent, evidence-based approach to care within the jurisdiction. As continuums of care have been little studied, we evaluated the impact of the Workers' Compensation Board of Alberta (WCB-Alberta) model on sustained return to work, satisfaction with care, and cost. We used a population-based before-and-after design with concurrent control group. The model was implemented province-wide so the entire population of workers insured by the WCB-Alberta was studied. Data were extracted from the WCB-Alberta administrative database from 2 years before implementation (1994-1995) to 5 years after (1996-2000). An intervention group was created from patients filing soft tissue injury claims for the low back, ankle, knee, elbow, and shoulder. The comparison group was formed of workers experiencing fractures or other traumatic non-soft tissue injuries. Satisfaction was measured through surveys. Primary outcome was cumulative days receiving wage replacement benefits. Multivariable Cox regression was used to determine the model's effect. Over the entire study period, 70,116 claimants filed soft tissue injury claims while 101,620 claimants experienced non-soft tissue injuries. Significant improvement was observed in intervention group return-to-work outcomes after model implementation (hazard ratio = 1.54). Median duration of benefits decreased from 13 to 8 days. Little change was seen in the control group's disability duration (median duration, consistently 10 days). The majority of claimants were satisfied with care received. Cost savings over a 2-year full implementation period was \$21.5 million (Canadian).

*Functional Self-Efficacy Beliefs Influence Functional Capacity Evaluation*

Asante AK, Brintnell ES, and Gross DP

**CONCLUSIONS:** Functional self-efficacy beliefs appear to influence Functional Capacity Evaluation (FCE) lift performance. Strategies for altering functional self-efficacy beliefs and their resulting impact on patient functional performance and outcomes should be examined.

**SUMMARY:** The relationship between functional self-efficacy and FCE lift performance was examined in workers' compensation claimants' with low back pain. A cross-sectional design was used. Forty-two claimants with back pain and 38 subjects without back pain were enrolled. Subjects completed a measure of functional self-efficacy related specifically to lifting. Subjects also underwent FCE floor-to-waist, waist-to-overhead and horizontal lift testing. Potential confounders were also assessed including perceived disability, pain intensity, and self-rated health. Analysis included Pearson correlation and multivariable linear regression. Higher functional self-efficacy beliefs were highly associated with better FCE performance on each of the lift items tested ( $r = 0.50-0.73$ ). In multivariable analysis, the measure of functional self-efficacy remained independently associated with lift performance after controlling for potential confounders.

*Evaluation of a Short-Form Functional Capacity Evaluation: Less May Be Best*

Gross DP, Battié MC and Asante AK

**CONCLUSIONS:** A short-form Functional Capacity Evaluation (FCE) appears to reduce time of assessment while not affecting recovery outcomes when compared to standard FCE administration. Such a protocol may be an efficient option for therapists performing fitness-for-work assessments.

**SUMMARY:** FCE contributes to clinical decisions regarding fitness-for-work and may improve return-to-work outcomes. However, FCE is a burdensome clinical tool in terms of time and cost. We evaluated the effectiveness of a short-form FCE protocol. A cluster randomized controlled trial was conducted. Data were collected on all claimants undergoing FCE at Alberta's workers' compensation rehabilitation facility. Twenty-three clinicians who were trained and experienced with FCE were randomized to either an intervention or control group. The intervention group was trained to conduct short-form FCE and used this protocol through the trial's duration, while the control group continued standard FCE procedures. Data on subject characteristics, administrative outcomes (days to suspension of time loss benefits, days to claim closure, and future recurrence) and claimant satisfaction were extracted from the WCB-Alberta computer databases. Clinicians logged time taken to complete assessments. Analysis included examining differences between groups using independent samples t tests, Cox and logistic regression. Subjects included 372 claimants of whom 173 were tested with short-form FCE. Subjects were predominantly employed (64%) males (69%) with chronic musculoskeletal conditions (median duration 252 days). Administrative recovery outcomes were similar between groups as were claimant satisfaction ratings. No statistically significant or clinically relevant differences were observed on these outcomes between groups. A 43% reduction in functional assessment time was seen.

*Surgical Robotics for Patient Safety in the Perioperative Environment: Realizing the Promise*

Lai F and Louw D

**CONCLUSIONS:** This paper reviews the current status of surgical robotics and summarizes conclusions that can be reached to date based on existing research.  
**SUMMARY:** Surgery is at a crossroads of complexity. However, there is a potential path toward patient safety. One such course is to leverage computer and robotic assist techniques in the reduction and interception of error in the perioperative environment. This white paper attempts to facilitate the road toward realizing that promise by outlining a research agenda. It will then lay out a roadmap for future research to determine how surgical robots should be optimally designed and integrated into the perioperative workflow and process. Successful movement down this path would involve focused efforts and multiagency collaboration to address the research priorities outlined, thereby realizing the full potential of surgical robotics to augment human capabilities, enhance task performance, extend the reach of surgical care, improve health care quality, and ultimately enhance patient safety.

**2006**

*Development and Validation of a Short Form Functional Capacity Evaluation for Use in Claimants with Low Back Disorders*

Gross DP, Battié MC, and Asante AK

**CONCLUSIONS:** A short-form Functional Capacity Evaluation (FCE) for determining future work status in claimants with low back disorders was developed. A substantially abbreviated FCE may offer an efficient alternative.

**SUMMARY:** FCEs are used for making return-to-work decisions, yet FCE's modest predictive ability is currently outweighed by the administrative burden of testing. We attempted to develop a short-form FCE while maintaining comparable predictive ability. Three databases previously created for evaluating FCE predictive validity were used. Subjects were compensation claimants with low back disorders. FCE measures included items in the Isernhagen Work Systems' FCE. Days until benefit suspension served as an indicator of return-to-work. Analysis included Cox regression. Three items, floor-to-waist lift, crouching, and standing, were maintained in the short-form FCE. The short-form FCE was found to predict comparably to the entire FCE protocol in two validation cohorts (R (2) difference<3%). Subjects meeting job demands on all three items consistently experienced faster benefit suspension.

*Material Handling Performance of Patients with Chronic Low Back Pain During Functional Capacity Evaluation: A Comparison Between Three Countries*

Reneman MF, Kool J, Oesch P, Geertzen JH, Battié MC and Gross DP

**CONCLUSIONS:** Considerable differences were observed between jurisdictional settings in maximum weight handled on various Functional Capacity Evaluations (FCE) items. Future FCE research should examine the effects of a number of potentially influential factors, including variability in evaluator judgments across settings, the evaluator-patient interaction and patients' expectations of the influence of FCE results on disability compensation.

**SUMMARY:** FCEs are batteries of tests designed to measure patients' ability to perform work-related activities. Although FCEs are used worldwide, it is unknown how patients' performances compare between countries or settings. This study was performed to explore similarities and differences in FCE performance of patients with chronic low back pain (CLBP) between three international settings that utilize the same FCE protocol. Standardized FCEs were performed on three cohorts of patients with CLBP: A sample from an outpatient rehabilitation context in The Netherlands (n = 121), a Canadian sample in a Worker's Compensation context (n = 273), and a Swiss sample in an inpatient rehabilitation context (n = 170). Patients were undergoing FCE as part of their usual clinical care. Means and standard deviations of maximum performance on the FCE material handling items were calculated and differences compared using ANOVA. Multivariable linear regression was used to determine the relationship between country of origin and FCE performance while controlling for potential confounders including, age, sex, duration of back pain problems, and self-reported pain and disability ratings. Compared to the Dutch sample, the mean performance of patients in the Canadian and Swiss samples was consistently lower on all FCE items. This association remained statistically significant after controlling for potential confounders.

*Testing a Model of Client's Belief about Chronic Pain and Recovery*

Paul T and Truscott D

**CONCLUSIONS:** Two classifications of pain beliefs were found to be dually influential on personal control (not just one or the other): (1) Perception of the pain problem (the situation); (2) Perception of responsibility for treatment/pain management. Beliefs about the problem (i.e. Pain) and beliefs about treatment responsibility influence goal-pursuit beliefs.

**SUMMARY:** The purpose of this research was to bring order to the existing literature on peoples' beliefs about recovering from their chronic pain by testing a model of the progression of beliefs about chronic pain and recovery, focusing on worry beliefs, catastrophizing beliefs, organic beliefs, health locus of control beliefs, acceptance beliefs, self-efficacy beliefs, and accommodative beliefs. A structural equation model was conducted to provide a model of beliefs about chronic pain and recovery. Results suggest the following beliefs interact to attenuate or intensify the adaptive and maladaptive beliefs: personal control beliefs (regarding negative effects); goal-pursuit beliefs – assimilative (keep goals and change situation) – accommodative (change goals to meet situation). A firm distinction between adaptive and maladaptive processes is not supported. Therefore, perception of some beliefs as hindering recovery and others as facilitative does not capture the gestalt of the experience: Both reactions are functional adaptations to perceived threat, beliefs about responsibility, beliefs about personal control and goal-pursuit beliefs; In order to facilitate recovery all four areas should be addressed.

*Continuum of Care Model for Managing Mild Traumatic Brain Injury in a Workers' Compensation Context: A Description of the Model and its Development*

Rose JM

**CONCLUSIONS:** In order to improve healthcare outcomes following a mild traumatic brain injury, the Workers' Compensation Board of Alberta developed a continuum of

care model to assist its staff (e.g. claim adjudication and case management) to manage these claims.

**SUMMARY:** Mild traumatic brain injuries are a significant health problem that can result in distress and disability for people who go on to develop post-concussion syndrome or symptoms. A continuum of care model acts as a road map that illustrates typical recovery patterns and treatment best practices, and builds in checkpoints where decisions for assessment and treatment can be made. The model was developed from a review of the research literature selected to determine the best evidence-based practices for treating mild traumatic brain injury, and the most appropriate timing for assessments and treatments. Local and international experts in the field of brain injury assessment and rehabilitation also contributed to the development of the final model.

#### *Evaluation of a Canadian Back Pain Mass Media Campaign*

Gross DP, Russell AS, Ferrari R, Battié MC, Schopflocher D, Hu R, Waddell G, Buchbinder R

**CONCLUSIONS:** A Canadian media campaign appears to have had a small impact on public beliefs specifically related to campaign messaging to stay active, but no impact was observed on health utilization or work disability outcomes. Results are likely because of the modest level of awareness achieved by the campaign and future campaigns will likely require more extensive media coverage.

**SUMMARY:** Building on previous campaigns in Australia and Scotland, a back pain mass media campaign (Don't Take it Lying Down) was implemented in Alberta, Canada. A variety of media formats were used with radio ads predominating because of budget constraints. We evaluated the campaign's impact on population back pain beliefs, work disability, and health utilization outcomes using quasi-experimental before-and-after design with control group. Changes in back pain beliefs were studied using telephone surveys of random samples from intervention and control provinces before campaign onset and afterward. The Back Beliefs Questionnaire (BBQ) was used along with specific questions about the importance of staying active. For evaluating behaviors, we extracted data from governmental and workers' compensation databases between January 1999 and July 2008. Outcomes included indicators of number of visits to health care providers, use of diagnostic imaging, and compensation claim incidence and duration. Analysis included time series analysis and ANOVA testing of the interaction between province and time. Belief surveys were conducted with a total of 8566 subjects over the 4-year period. Changes on BBQ scores were not statistically significant, however, the proportion of subjects agreeing with the statement, "If you have back pain you should try to stay active" increased in Alberta from 56% to 63% ( $P = 0.008$ ) with no change in the control group (consistently approximately 60%). No meaningful or statistically significant effects were seen on the behavioral outcomes.

#### *Does Functional Capacity Evaluation Predict Recovery in Workers' Compensation Claimants With Upper Extremity Disorders?*

Gross DP and Battié MC

**CONCLUSIONS:** Better FCE performance was a weak predictor of faster benefit suspension, and was unrelated to sustained recovery. FCE was no more predictive in

claimants with specific pathology and injury than in those with more ambiguous, pain mediated conditions.

**SUMMARY:** The authors examined performance on the Isernhagen Work Systems' FCE as a predictor of timely and sustained recovery in workers' compensation claimants with upper extremity disorders. A secondary objective was to determine whether FCE is more predictive in claimants with specific injuries (that is, fracture) as compared to less specific, pain mediated disorders (that is, myofascial pain). The authors performed a longitudinal study of 336 claimants with upper extremity disorders undergoing FCE. FCE indicators were maximum performance during handgrip and lift testing, and the number of tasks where performance was rated below required job demands. Outcomes investigated were days receiving time-loss benefits (a surrogate of return to work or work readiness) in the year following FCE, days until claim closure, and future recurrence defined as whether benefits restarted, the claim reopened, or a new upper extremity claim was filed. Cox and logistic regression were used to determine the prognostic effect of FCE crudely and after controlling for potential confounders. Analysis was performed separately on claimants with specific and pain mediated disorders. Most subjects (95%) experienced time-loss benefit suspension within one year following FCE. The one year recurrence rate was 39%. Higher lifting performance was associated with faster benefit suspension and claim closure, but explained little variation in these outcomes ( $r^2 = 1.2\text{--}11\%$ ). No FCE indicators were associated with future recurrence after controlling for confounders. Results were similar between specific injury and less specific groups.

#### *Are Functional Capacity Evaluations Affected by the Patient's Pain?*

Gross DP

**CONCLUSIONS:** This paper considers the available literature related to the influence of pain on FCE, which clearly indicates FCEs are behavioral assessments influenced by pain intensity and other pain-related constructs.

**SUMMARY:** Functional capacity evaluations (FCE) are comprehensive batteries of performance-based tests used commonly to inform return-to-work decisions for injured workers. As many people undergoing FCE have painful musculoskeletal conditions limiting their work ability, pain becomes a critical factor in the assessment of function. Increasing pain levels are consistently associated with reduced FCE performance levels. As such, for purposes of claims adjudication, FCE should not be considered a purely "objective" indicator of functional impairment independent of subject or evaluator perceptions. FCE may have some value for facilitating return-to-work or re-integrating chronically disabled workers into the workforce, although pain factors must be taken into consideration when making predictions about future work status. Shorter FCEs could potentially be as effective as more lengthy protocols.