POSTER PROGRAM
PROGRAMME DES AFFICHES

7th ANNUAL CONFERENCE ON HEALTH RESEARCH
7e CONGRÈS ANNUEL SUR LA RECHERCHE EN SANTÉ
New – Nouveau Brunswick
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Title of the research project - Titre du projet de recherche
What happens to Alternate Level of Care patients in hospital? Is Dementia a factor?

Poster presenter - Nom de la personne qui présentera l'affiche
Pamela Jarrett

First author - Premier auteur
Yes

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Jarrett, Pamela ; Moorhouse, Paige; McCloskey, Rose; McCollum, Alexander ; Stewart, Connie; Oakley, Heather; Christie, Timothy; McMillan, Miranda; Fay, Sherri; Godin, Judith.

Abstract - Résumé
Background: As we age disease, functional decline, and dementia are more common and may translate into the need for assistance in the home or a move to a more supportive care environment, such as a Nursing Home (NH). Patients waiting in hospital for community services (such as a NH) are referred to as alternate level of care (ALC) patients. Methods: A chart review of a stratified random sample of all ALC patients in Horizon Health Network. Results: One quarter (25.8%) of hospital beds were occupied by ALC patients. The median number of days in hospital was 141.7 days. The majority were female (59.3%), with an average age of 78.4 years. Dementia was a known diagnosis in 49.3%. The most common reason for admission to hospital was dementia related (17.3%). The majority (57.5 %) were waiting for a NH. Six months later, 36.7% remained in hospital and only 29.4% had been discharged to a NH. Those discharged to NH were significantly older and less functionally impaired compared to those who remained in hospital. The Frailty Index did not differ between these two groups. 14.5% of the sample died in hospital. Conclusion: ALC patients occupy a significant number of hospital beds, most waiting for a NH bed. Dementia is common and a leading reason for admission to hospital. The Frailty Index was unable to predict who was successfully discharged and who remained in hospital. Many ALC patients die in hospital waiting for alternative living arrangements.
Title of the research project - Titre du projet de recherche
Paliperidone Palmitate versus Risperidone Long-Acting Injection in Hospitalized Patients: a Retrospective Study

Poster presenter - Nom de la personne qui présentera l'affiche
Michael Kemp

First author - Premier auteur
Yes

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Kemp, Michael; Allard, Jacques; LeBreton, Karine.

Abstract - Résumé
Background: The second generation long-acting injectable antipsychotics on the NB hospital formulary, paliperidone palmitate (PLAI) and Risperidone Consta® (RLAI), have different pharmacokinetic profiles. In particular, differences in time for onset of action and in dosage frequency can influence, respectively, the time until hospital discharge and the time to relapse and re-hospitalisation. Purpose: To determine if PLAI decreases the time to hospital discharge following treatment initiation, compared to RLAI. A secondary objective will determine if PLAI decreases the time to re-hospitalisation for psychiatric reasons or symptom exacerbation, compared to RLAI. Methods: This is a retrospective chart review at the Dr George-L-Dumont University Hospital Center. A waiver of consent was obtained from the local ethics board. Patients initiated with PLAI (N=43) or RLAI (N=56) during their hospitalisation were considered eligible. Data collected include gender, age, diagnoses, antipsychotic treatment history, number of hospitalisations and ER room visits 3 years prior and following treatment initiation, commitment status at initiation, number of injections received, treatment adherence and causes of discontinuation. Results: Patients will be stratified by diagnosis (schizophrenia and other psychotic disorders vs. bipolar disorders). Descriptive statistics for the patient population will be presented. Times until hospital discharge will be compared using a two-sample t-test or Wilcoxon rank sum test. Times to relapse and re-hospitalisation will be compared using survival analysis. Discussion: Findings will provide information regarding the use of long-acting antipsychotic injections and their effect on health care resource utilisation.
A Case Study of Functional Electrical Stimulation for Improvements in Gait and Hand Function in an Individual Post Chronic Stroke

Poster presenter: Shane McCullum

First author: Yes

Education Level: Health Professionals

Researchers involved in this project: McCullum, Shane; Banks, Allison; Leroux, Meghan.

Abstract: Functional Electrical Stimulation (FES) is a common clinical rehabilitation technique used to contract paretic muscles in persons post-stroke. The Bioness FES system can be used to contract ankle muscles to help improve foot clearance while walking (Bioness L300), and also to contract muscles used to help in opening and closing the hand (Bioness H200). The participant in this case study was a 66 year old woman who suffered a ruptured aneurysm in 2002 followed by a right middle cerebral artery stroke in 2008. The Bioness H200 was first trialed in January 2015 with a goal to improve hand function and to decrease muscle spasticity. The H200 was used twice weekly for 8 months, with improvements being shown using the Graded Redefined Assessment of Strength, Sensibility and Prehension (GRASSP) from 71/116 to 93/116. The Bioness L300 was trialed for 4 consecutive days in July 2015, with improvements being made in distance walked in 2 minutes (98 metres to 105 metres) and in walking speed (0.80m/s to 0.94m/s). These results have led the participant to purchase both units for home use, and demonstrate the types of changes that can be realized up to several years post-injury.
Next-generation cloud-based blood pressure devices in chronic disease management: A direct intra-arterial pressure calibration of an oscillometric wrist cuff device for clinically reliable and accurate blood pressure measurements

Poster presenter - Nom de la personne qui présentera l'affiche
Sarah Melville

First author - Premier auteur
Yes

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Melville, Sarah; Lutchmedial, Sohrab; Brunt, Keith.

Abstract - Résumé
Background: Home blood pressure (BP) monitoring is recommended by health organizations for the diagnosis of hypertension to improve clinical outcomes. Rigorous assessments of medical devices are necessary for establishing clinical utility. We measured indirect BP with a cloud-based oscillometric wrist cuff device (WC) simultaneously with direct arterial BP measurements during routine cardiovascular catheterization. Methods: Patients scheduled for cardiac catheterization were screened for bilateral BP equality (±10 mmHg, systolic; ±5 mmHg, diastolic). Baseline BP measurements were made for the WC, auscultatory, and an automatic upper arm device. During the catheterization procedure (Day 2), simultaneous pressure measurements were made with the WC and intra-arterial catheter at both the right radial artery (RRA) and at the ascending aorta (AA). The cloud-based algorithms were subsequently adjusted against absolute BP measures. Results: Indirect BP readings of the WC were highly correlated to direct BP readings at the RRA and the AA. Yet, paired measures revealed that diastolic pressures were significantly different between WC measurements compared to the RRA and the AA (N=20; P<0.0001). Systolic BP readings were comparatively different between WC and AA (P<0.0001), but not versus the RRA (P=0.6967). Following the adjustment of the device against the gold-standard of BP measurement, no significant differences were determined in either systolic or diastolic pressures at the RRA or AA comparatively. Conclusions: Secure cloud-based home vital sign monitoring provides new tools for physician management of chronic diseases. Thus, clinically validated vital sign devices support the diagnosis of hypertension and patient management, particularly for distance care.
Title of the research project - Titre du projet de recherche
Transformation of mutant Saccharomyces cerevisiae strains and establishing a disease model for ALG12-CDG

Poster presenter - Nom de la personne qui présentera l'affiche
Nadaradjan, Rattina Dasse

First author - Premier auteur
Yes

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Nadaradjan, Rattina Dasse; Umar, Jabran; Breen, Jillian; Webster, Duncan.

Abstract - Résumé
Background: Congenital disorders of glycosylation (CDG) are a group of rare multisystem disorders characterized by inherited defects in the glycosylation pathway resulting in significant cognitive and physical developmental delay. Eight cases of ALG12-CDG have been diagnosed. This CDG subtype is differentiated by deficiency in the mannosyltransferase 8 enzyme. Currently, there is no treatment for the disorder. Disease models are needed to investigate potential therapeutics. In this study a yeast model was constructed. Methods: Mutant yeast strains were transformed with four different plasmids in separate experiments. Uracil auxotrophic Saccharomyces cerevisiae strains YG840 and YG843 were employed. All plasmids contained uracil synthesis pathways. Plasmid pALG12 contained yeast genomic DNA encompassing the ALG9 ORF. Plasmid HsALG12 contained human genomic DNA incorporating the human ALG12 gene, while HsALG9 T67M and HsALG9 R146Q plasmids contained the human ALG12 gene with single nucleotide polymorphism mutations correlating with reported clinical ALG12-CDG cases. Results: Prior to transformation, uracil auxotrophic yeast strains did not grow on uracil-deficient media. Following transformation, strains grew on uracil-deficient media with heavy growth of budding yeast identified at 72 hours. Conclusion and Discussion: Successful growth in the absence of uracil provides phenotypic evidence of successful transformation with uptake of plasmids and subsequent uracil prototrophy. Further research will strive to characterize the role of ALG12 in organism development and function through comparison of mutant strains, transformed strains and wild type strains. Identification of biomarkers may assist in the development of rescue experiments with the future goal of identifying therapeutics for this rare disorder.
Title of the research project - Titre du projet de recherche
Confrontation naming abilities among French-speaking New Brunswickers

Poster presenter - Nom de la personne qui présentera l'affiche
JoAnne Savoie

First author - Premier auteur
Yes

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Savoie, JoAnne; Villers, Julie; Short, Matthew.

Abstract - Résumé
Assessment of language difficulties in francophones is limited by the availability of standardized assessment tools and appropriate norms, especially for French-speakers outside of Quebec and France. The purpose of this study was to examine name agreement in francophone New Brunswickers on two measures of confrontation naming: the Boston Naming Test (BNT: Kaplan, Goodglass & Weintraub, 2001) and the Test de Dénomination Orale - 80 (DO80: Deloche, & Hannequin, 1997). Second, the study examined differences in performance based on age and education levels to provide normative data for future use by clinicians. Participants (n=119) completed a French-Canadian version of the Language Experience and Proficiency Questionnaire (LEAP-Q; Marian, Blumenfeld & Kaushanskaya, 2007) followed by counterbalanced administration of the BNT and the DO80. Item analysis on both the BNT and DO80 revealed certain regionalisms that involved common usage of words not accepted in the standardized scoring. Interactions between age and education levels were not significant for total DO80 scores (F(3, 110)= .17,p.=.91) or total BNT scores (F(3, 110)=.10 , p.=.96). Further analysis revealed significant main effects for education level (F(1, 117)=8.93, p.=.003.) and age (F(3,117)=2.48, p.<.10) for total DO80 scores. In contrast, significant main effects were noted for education levels only (F(1, 117)=9.32, p.=0.003) and not for age (F(3, 117)=1.87, p.=.14) on total BNT scores. Results of the current assessment highlight the importance of appropriate norms when assessing language skills of francophones in New Brunswick. The implications for diagnosis and assessment of language impairments levels are discussed.

L'évaluation des difficultés linguistiques chez les francophones est limitée par le manque de disponibilité des outils d'évaluation et des normes appropriées, en particulier pour les francophones hors Québec et hors France. Le premier but de cette étude est d'examiner la fréquence d'accord des noms pour des Néo-Brunswickois francophones sur deux mesures de dénomination orale: le Boston Naming Test (BNT: Kaplan, Goodglass & Weintraub, 2001) et le Test de Dénomination Orale - 80 (DO80: Deloche, et Hannequin, 1997). Deuxièmement, l'étude a pour but d'évaluer les différences en dénomination orale selon l'âge et le niveau d'éducation. Les participants (n = 119) ont rempli la version canadienne-française du Language Experience and Proficiency Questionnaire (LEAP-Q; Marian, Blumenfeld & Kaushanskaya, 2007) suivie par l'administration contrebalancée du BNT et du DO80. L'analyse des données révèle un manque d'accord de certains noms, indiquant la présence de régionalismes chez les Néo-Brunswickois francophones qui ne sont pas acceptés dans la notation standardisée. Les interactions entre l'âge et le niveau d'éducation ne sont pas significatives pour les scores totaux du DO80 (F (3, 110) = 0,17, p. = .91) ou des scores totaux du
BNT (F (3, 110) = 10, p. = 96). Néanmoins, des analyses ultérieures indiquent des effets principaux significatifs pour le niveau d'éducation (F (1, 117) = 8,93, p. = 0,003.) et l'âge (F (3, 117) = 2,48, p. < 0,10) pour le DO80. En revanche, les facteurs principaux sont significatifs uniquement pour le niveau d'éducation (F (1, 117) = 9,32, p. = 0,003) et non l'âge (F (3, 117) = 1,87, p. = 0,14) sur le BNT. Les résultats de cette étude mettent en évidence l'importance des normes appropriées pour le diagnostic et l'évaluation des compétences linguistiques des Néo-Brunswickois francophones.
Title of the research project - Titre du projet de recherche
Physician utilization prior to thoracolumbar spine surgery may predict postoperative patient reported outcomes.

Poster presenter - Nom de la personne qui présentera l'affiche
Kate Wagg

First author - Premier auteur
No

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Manson, NA; Wagg, K; Bigney, E; Daly, E; Abraham, EP.

Abstract - Résumé

Background: Healthcare utilization is costly and increasing drastically in North-America. Wait times for spine surgery are upwards of 42.2 weeks on average in Canada and 37.5 weeks in New Brunswick.

Purpose: Our study aims to examine national utilization trends and determine if there are differences in post-operative outcomes between groups of utilizers.

Method: The Canadian Spine Society’s national database, including 15 sites, was used for this study. Baseline data for physician and allied health utilization and postoperative outcomes were analyzed retrospectively. Patients were grouped by frequency of physician visits. Postoperative measures of interest were Oswestry Disability Index (ODI) and Numeric Rating Scale (NRS) scores for back and leg pain 6 months postoperatively.

Results: A conservative minimum estimate of visits to physicians in a Canadian Spine-Patient database resulted in approximately 3000 patient reported visits. NRS-leg scores were significantly higher (p=0.018) for moderately-high physician-utilizers than for low physician-utilizers. ODI scores were significantly higher (p=0.014) for super-high physician-utilizers than low physician-utilizers. Allied-health utilization was not significant in any measures.

Conclusions: Evidence suggests those who are low physician-utilizers preoperatively do better postoperatively. Allied-health utilization was not shown to be significant between groups. Spine pathology impacted these outcomes; patients with degenerative disc disease having higher ODI scores and higher reported pain levels. Physician overutilization can be associated with lower patient reported outcomes. Future research could focus on resource allocation toward those most likely to succeed or those needing greater care to achieve success.
Title of the research project - Titre du projet de recherche
Computer Use

Poster presenter - Nom de la personne qui présentera l'affiche
Yvonne Anisimowicz

First author - Premier auteur
Yes

Education Level
Undergraduate Students

Researchers involved in this project - Chercheurs participant au projet
Anisimowicz, Yvonne; Bowes, Andrea; Miedema, Baukje.

Abstract - Résumé
Computer use has increased in physicians' offices. Studies indicate it may improve efficiency and patient-physician communication. An international survey examining the Quality and Cost of Primary Care (QUALICOPC) was adapted in 2013 to collect Canadian data. This data was used to investigate the relationship between the use of computers in medical practices and the extent of coordination of care with service organizations in the community to plan and provide care for patients with complex needs. Additionally, we examined the maintenance and use of Electronic Health Records (EHRs) across Canada. The sample included 759 primary care providers and 7,172 patients from 736 practices across 10 provinces. The results indicate that in Canada, computer use in primary care practices is high (97.2%). The particular purpose for the use of computers varies greatly across provinces and ranges from simple appointment keeping, to billing information, storing diagnostics tests and EHRs. To analyze this data, we created a 'total computer-use scale' by combining all self-reported uses of computers. We find that increased overall computer use, as measured by our scale, positively correlates with greater degrees of coordination of care with other service organizations in the community. Use of EHRs is lowest in Atlantic Canada. Again, high use of computers for EHRs is positively correlated to higher levels of coordinating with community-based services. Regardless of why computers are used in primary care practices, higher use of computers is related to more planning in providing care for patients with complex needs with service organizations in the community.
Title of the research project - Titre du projet de recherche
Towards an effective school-based intervention for obese Canadian adolescents

Poster presenter - Nom de la personne qui présentera l'affiche
Maxwell Luke Armstrong

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Lutchmedial, Sohrab.

Abstract - Résumé
Background: Childhood and adolescent obesity among New Brunswickers is now more prevalent than ever before, posing a real threat to the healthcare system. Obesity is one of the only visible cardiovascular risk factors and is associated with increases in blood pressure, cholesterol, risk for developing Type II diabetes, depression, low self-esteem, and obesity in adulthood. Although results in the literature have been inconsistent, school-based weight loss strategies, including physical activity and education, nutritional guidance, and motivational interviewing, remain a key target for research. The purpose of this study was to evaluate the effect of a school based intervention program on high risk Grade 10 students. Methods: This interventional cohort study evaluated the effects of a 20-week program of weekday physical activity with adjunct healthy living education. The school-based program was delivered to participating students aged 14-16 in Charlotte County, New Brunswick. Outcomes of interest included blood pressure, heart rate, blood glucose, blood lipids, anthropomorphic measurements, and self-esteem. Results: In the pilot group (n = 15), the intervention was found to have no significant effect (α= 0.05) on mean systolic and diastolic blood pressure, resting heart rate, blood glucose, total cholesterol, LDL, HDL, serum triglycerides, waist circumference, or Rosenberg self-esteem score (Table 1). However, BMI increased significantly during the study period (+1.1 kg/m², p = 0.004). Conclusion: These findings highlight the complexity of weight loss in adolescents and the challenges in design and implementation of an effective program. Possible future directions for this ongoing study include including a control group, expanding study variables, for example to include HbA1c, as well as interventions of longer duration, greater intensity, and with more nutritional guidance.
Title of the research project - Titre du projet de recherche
Promoting mental health: The experiences of youth in residential care

Poster presenter - Nom de la personne qui présentera l'affiche
Chelsea Arsenault

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Arsenault, Chelsea ; Domene, José.

Abstract - Résumé
This research explored the experiences of youth who are living in residential child-care facilities and key influences on their mental health during the transition into adult life. Previous research has shown that youth in care face a high prevalence of mental health related issues, which can impede their transitional success and lead to various poor outcomes. The present research builds on these findings to explore factors that promote and impede the mental health of youth in residential care. Using the Enhanced Critical Incident Technique (ECIT) approach to qualitative research, this study addressed the question: What do youth living in residential child-care centres perceive as helping, hindering, or missing in promoting their mental health as they transition into adult life? Participants consisted of 8 youth between the ages of 16-18 who were living in a residential child-care centre in New Brunswick. Data was collected through the use of individual semi-structured interviews. Interviews were transcribed verbatim and have undergone a thematic analysis. Preliminary findings suggest that helping incidents include the use of music as an emotional outlet, having close personal relationships that provide support and allow youth to feel understood, and establishing long-term connections with others that will remain available once time in care has ended. Hindering incidents include strained family relationships, experiencing a turbulent living environment, and feeling disconnected from life outside of care. Lastly, wish list items include experiencing a greater sense of autonomy, improved connections with family, and feeling increasingly understood by residential staff.
Title of the research project - Titre du projet de recherche
Doxorubicin-Induced Cardiomyocyte injury Involves Activation of Macroautophagy with Concomitant Inhibition of Chaperone-Mediated Autophagy

Poster presenter - Nom de la personne qui présentera l'affiche
Jordan Bartlett

First author - Premier auteur
Yes

Education Level
Undergraduate Students

Researchers involved in this project - Chercheurs participant au projet
Bartlett, Jordan; Trivedi, Purvi; Ihionu, Francis; Kienesberger, Petra; Pulinilkunnil, Thomas.

Abstract - Résumé
Introduction: Doxorubicin (DOX) is an effective cancer treatment. DOX use is limited due to dose- and time-dependent induction of irreversible cardiotoxicity. DOX induces cardiomyocyte death by causing endoplasmic reticulum (ER) stress, mitochondrial dysfunction and aberrations of protein degradation. Autophagy involves lysosomal degradation by macroautophagy, utilizing cargo-receptor P62 and autophagosomal (microtubule-protein 1 light chain-3) LC3, or chaperone-mediated autophagy (CMA), requiring lysosome-associated membrane protein-2A (LAMP-2A) to direct targeted proteins into lysosomes for degradation. Lysosomal integrity and content is maintained by transcription factor EB (TFEB), which induces autophagy gene expression. However, it is unknown whether DOX-induced cardiomyocyte injury involves lysosomal dysfunction and autophagic maladaptation. Hypothesis: Doxorubicin-induced remodeling of lysosomal autophagy renders cardiomyocyte susceptible to cellular injury and death. Methods and Results: H9C2 rat cardiomyoblast was used to assess DOX-induced autophagic alterations. DOX dose-dependently augmented cleaved caspase-3 expression, executor of cell death, and reduced P62 content, signifying augmented autophagy. DOX's temporal effects on autophagy were assessed by treating H9C2 cells with 2µM DOX for 2, 6, 12 or 24h. DOX treatment increased caspase-3 expression by 6h, paralleling decreases in expression of P62 and autophagosomal marker LC3-B2, which signifies increased autophagosome-lysosome fusion or decreased LC3-B2 synthesis. DOX treatment decreased TFEB and LAMP-2A expression by 6h and 24h, respectively. Interestingly, cells co-incubated with DOX and macroautophagy inhibitor 3-methyl-adenine displayed significantly decreased caspase-3 expression, signifying macroautophagy's detrimental role in DOX cardiotoxicity. Significance: These findings suggest DOX-induced cardiomyocyte death is associated with rapid macroautophagy activation followed by sustained CMA inhibition, rendering heart susceptible to proteotoxicity and heart failure.
Title of the research project - Titre du projet de recherche
Automating the Timed Up and Go Test (TUG test) with wearable sensors.

Poster presenter - Nom de la personne qui présentera l'affiche
James Beyea

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Beyea, James; Sexton, Andrew; McGibbon, Christopher.

Abstract - Résumé
Background: The Timed-Up-and-Go (TUG) is a widely used test for evaluating fall risk in older adults. The test is simple: the patient starts seated, walks a distance, turns and walks back to the chair and sits, while an observer times the test with a stop watch. Research shows that the total TUG time is a predictor of fall risk, but the clinical test cannot quantify the TUG phases (rising, walking, turning, etc.), which could better inform the clinician in managing their patient's therapy.

Methods: The objective was to validate a wearable sensor system for quantifying duration of the various phases of the TUG activity. Ten adults performed the TUG three times each under normal and slow conditions, and 3m and 5m walking distances. A commercial inertial measurement unit (IMU) with tri-axial accelerometers and gyroscopes was worn on the back, and signals analyzed to identify the TUG phases. An optoelectronic motion analysis system (Vicon) was used to validate the IMU-based TUG phase duration (PD) times. Results: Repeated measures ANOVA was used to compare Vicon- and IMU-based PD measurements for normal and slow walking speeds for 3m and 5m tests. There were no significant differences (p>.05) between Vicon- and IMU-based PD measurements for normal and slow walking speeds for 3m and 5m tests. The average error was +/- 0.762585 s. Conclusions: We conclude that a commercial IMU can be used to accurately quantify the TUG's phases. The automated TUG we propose could be useful for routine falls risk assessment, multi-site clinical trials and also for quantifying motor ADL deficits in different patient populations.
Title of the research project - Titre du projet de recherche
A comprehensive and modular assessment tool for upper-limb prostheses

Poster presenter - Nom de la personne qui présentera l'affiche
Dan Blustein

First author - Premier auteur
Yes

Education Level
Post-Doctoral Fellows

Researchers involved in this project - Chercheurs participant au projet
Blustein, Dan; Wilson, Adam; Sensinger, Jon.

Abstract - Résumé
Although technological advances in upper limb prostheses continue at a fast pace, tools to assess these new technologies have not kept up. Currently clinicians assess a patient's upper limb prosthesis with a variety of tests that all provide a numerical representation of performance. However, many of these quantitative metrics are only relative to themselves and provide little information about how an individual device can be improved. We are developing a new prosthesis assessment tool that aims to be versatile, comprehensive, and modular. Three system sub-scores will be provided that assess the following: controller performance, sensory feedback quality, and how well the patient has incorporated the device into his/her own body. The assessment tool relies on a theoretical framework called computational motor control that uses mathematics to describe the operation of a person's nervous system at a functional level. This new tool will allow device engineers to target improvements to the weakest link in the prosthetic systems they design and will also provide assessment that is transferable beyond just one particular task. This work, leveraging advances in our understanding of how people plan and execute movements, will provide biomedical engineers with an advanced assessment tool to match the advances in the devices they are developing.
Stable Isotope Labeling by Amino Acids in Cell Culture (SILAC) to study the mechanism of action of a small molecule targeting renal cell carcinomas

Poster presenter - Nom de la personne qui présentera l'affiche
Nadia Bouhamdani

First author - Premier auteur
Yes

Education Level
PhD Students

Researchers involved in this project - Chercheurs participant au projet
Bouhamdani, Nadia; Joy, Andrew; Barnett, David; Cormier, Kevin; Reyjal, Julie; Lamarre, Simon; Ouellette, Rodney; Turcotte, Sandra.

Abstract - Résumé
Renal cell carcinomas (RCCs) are the most commonly diagnosed type of kidney cancer and are the most lethal of urological cancers. Unfortunately, patients are too often diagnosed at late stages due to the lack of symptoms associated with these tumours. A common and early event in the development of RCCs is the inactivation of the tumour suppressor gene Von Hippel-Lindau (VHL) that occurs in about 85% of cases. The treatment of metastatic RCCs is difficult, and these cancers are usually unresponsive to conventional therapies targeting HIF pathways. We have previously identified a small molecule compound, STF-62247 that selectively targets cancerous VHL-deficient cells through synthetic lethality. We used Staple Isotope Labeling by Amino acids in Cell Culture (SILAC) combined with mass spectrometry to study the proteome of VHL-deficient cells in response to STF-62247 as well as to understand its mechanisms of action. We have identified 711 deregulated proteins in VHL-deficient cells after treatment. Ingenuity Pathway Analysis (IPA), by Qiagen was used to analyse as well as generate interacting networks of significantly deregulated signalling pathways after STF-62247 treatment. We have validated the effect of the small compound on several pathways; Unfolded protein Response (PERK, IRE1a and ATF6 signalling pathways), EEF2, protein synthesis, mTOR, p70S6K and AMPK. The understanding of the mechanisms of action of the STF-62247 will lead to the development of novel therapeutic options by targeting new HIF-independent pathways that could eventually lead to better clinical response.
Title of the research project - Titre du projet de recherche
Assessing the Validity and Reliability of an Isometric Strength Measurement Device

Poster presenter - Nom de la personne qui présentera l'affiche
Marcus Brookshaw

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Brookshaw, Marcus; McGibbon, Chris; Sexton, Andrew; Landry, John; Glen, Hughes.

Abstract - Résumé
The reliability and validity of a novel isometric strength measurement device was found to be comparable to accepted commercial devices for elbow flexion and extension. Developed at UNB to test isometric elbow strength, the Limb Strength Measurement Device (LSMD), is a compact, self-stabilizing alternative to hand-held dynamometry (HHD) and isokinetic dynamometry (IKD). While not portable or affordable, the IKD represents the most accurate means of measuring strength. Highly portable and inexpensive, the HHD is reasonably accurate but is limited by the strength and expertise of the operator. These respective devices represent the upper and lower bounds of competition for the LSMD in terms of price point and quality of measurements. Analysis was based on a split-session, multiple-factors statistical design performed with 20 healthy adults. Reliability was assessed in flexion and extension using ICC statistics as the outcome measures. Inter-session and intra-rater reliability were comparable for each device in both orientations. While comparable in flexion, the inter-rater reliability of the LSMD was found to be superior in extension. Validity of the LSMD was assessed relative to the IKD using least products regression and limits of agreement plots. Validity of the LSMD measurements in flexion was confirmed, while the LSMD compared poorly to the IKD in extension for persons with high strength scores. The calculated regression coefficients will be used to calibrate the LSMD to account for the detected proportional bias, after which the LSMD should provide a compact, lower cost alternative to the IKD with superior performance characteristics to the HHD.
Title of the research project - Titre du projet de recherche
The Pax5 interactome: PARP-1 interacts with Pax5 and can influence B-cell-specific gene expression

Poster presenter - Nom de la personne qui présentera l'affiche
Charles E. Bullerwell

First author - Premier auteur
Yes

Education Level
Post-Doctoral Fellows

Researchers involved in this project - Chercheurs participant au projet
Bullerwell, Charles; Crapoulet, Nicolas; Richard, Rémi; Barnett, David; Joy, Andrew; Deprez, Pierre; Raniszewska, Klaudia; Fournier, Sébastien; Daigle, Mélissa; Ouellette, Rodney.

Abstract - Résumé
Pax5 is a transcription factor which plays pivotal roles in B lymphocyte differentiation through regulation of the expression of diagnostic markers of the B cell lineage such as CD19. Here we demonstrate that Pax5 also interacts with the DNA repair protein Poly (ADP-Ribose) Polymerase 1 (PARP-1). This interaction is detected following immunoprecipitation of Pax5 expressed either exogenously in HEK293T cells or endogenously in human B cell lines. A GST pulldown assay supports a direct interaction between the two proteins. In addition to its well-characterized roles in DNA repair, PARP-1 is known to influence transcription regulation in several contexts. We demonstrate that Parp-1 and Pax5 synergistically increases transcription in a reporter gene assay and that silencing of PARP-1 significantly affects mRNA and protein levels of Pax5 and Pax5-regulated genes including CD19 in B cell lines. Furthermore, CRISPR-CAS9-mediated disruption of the PARP-1 gene results in increased expression of Pax5 and Pax5-regulated genes in a B cell line. Mass spectrometry analysis of proteins that co-immunoprecipitate with Pax5 in transfected HEK293T cells identifies proteins previously reported to interact with Pax5 (including CHD4) as well many novel interactors such as Smarca5 and DNA-PK. Several of the Pax5 interactors identified in this study (including PARP-1, CHD4, Smarca5 and DNA-PK) also have known roles in DNA repair. Our results not only demonstrate roles for PARP-1 in the regulation of Pax5 and its target genes but also suggest unappreciated roles for Pax5 in DNA repair.
Cibler les cellules cancéreuses rénales via les lysosomes et une modulation des niveaux de sphingosine / Lysosomal agents and modulation of sphingosine to target kidney cancer cells

Poster presenter - Nom de la personne qui présentera l'affiche
Maxime Cahuzac

First author - Premier auteur
Oui

Niveau de formation
Étudiants à la maîtrise

Researchers involved in this project - Chercheurs participant au projet
Cahuzac, Maxime; Turcotte, Sandra.

Abstract - Résumé
Introduction. Le cancer du rein est le 8ème cancer le plus diagnostiqué au Canada. Les carcinomes à cellules clairs (RCC) représentent près de 80% de ces derniers. Il a été observé que dans la majorité de ceux-ci, le gène de suppression tumoral, von Hippel-Lindau (VHL), est inactivé. Le laboratoire a dernièrement identifié une petite molécule, le STF-62247, capable d'induire spécifiquement une mort des cellules déficientes VHL sans affecter celles où le gène est actif. Celle-ci passe par une modulation de l'autophagie et une perméabilisation des membranes lysosomales (LMP), régulée par le métabolisme des sphingolipides. Objectifs. Notre recherche a pour but de déterminer si une dérégulation de ce métabolisme serait à l'origine de la LMP observée dans les cellules déficientes VHL en réponse au STF-62247. Méthodes. Des analyses par RT-qPCR ont été réalisées afin de déterminer l'expression des gènes codant pour diverses enzymes de ce métabolisme : la sphingomyélinase acide et neutre (ASM/NSM), l'acide céramidase (ASAH1) ainsi que les sphingosines kinases 1/2 (SPHK1/2). Des mesures d'expression protéique ainsi que d'activités enzymatiques ont été effectuées pour ces dernières. Les niveaux de sphingosine ont aussi été déterminés par LC/MS. Résultats. Les données obtenues démontrent que l'expression de SMPD1 et d'ASAH1 augmente significativement chez les cellules déficientes VHL. Les activités enzymatiques mesurées ont mis en avant une variation en réponse au STF-62247 tout comme les niveaux de sphingosine. Conclusion. Les résultats suggèrent qu'une modulation des niveaux de sphingosine dans nos cellules serait à l'origine de la LMP observée après traitement au STF-62247.

Background. Kidney cancer is currently the 8th most common cancer in Canada and almost 80% are of renal cell carcinomas (RCCs). The von Hippel-Lindau (VHL) tumor suppressor gene is inactivated in the majority of RCCs. The laboratory previously identified a small molecule, STF-62247, which is selectively toxic towards VHL-deficient cells without affecting the viability of VHL-positive cells. This cytotoxicity is associated with a modulation of autophagy and lysosomal membrane permeabilization (LMP) which can be regulated by the sphingolipids metabolism.

Objective. In this study, we investigate if LMP observed in response to STF-62247 in VHL-deficient cells is linked with the sphingolipids metabolism. Methods. Analyzes by qRT-PCR and Western blot have been used to measure the mRNA, protein expression of acid and neutral sphingomyelinase (ASM/NSM), acid ceramidase (ASAH1) and sphingosine kinase 1 and 2 (SPHK1/2). Measure of enzymatic activity was also performed. RCC survival has been evaluated in presence of SPHK1/2 inhibitors and sphingosine by clonogenic assays. Finally, levels of sphingosine have been evaluated by mass spectrometry. Results. Our results demonstrate that mRNA expression of ASM and ASAH1...
increase significantly in VHL-deficient cells in response to STF-62247. The activity of ASM and SPHK1/2 showed a variation after treatment with our molecule. Interestingly, inhibition of SPHK2 and accumulation of sphingosine demonstrated a toxic specificity for VHL-deficient cells.

Conclusion. Altogether, our data suggest that a modulation of sphingosine may be implicated in selective toxicity of VHL-deficient cells and LMP in response to STF-62247.
Title of the research project - Titre du projet de recherche
Nanosecond Laser processing of Crystalline Silicon for bio-MEMS and Bionic Devices Fabrication

Poster presenter - Nom de la personne qui présentera l'affiche
Candace Colpitts

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Kiani, Amirkianoosh.

Abstract - Résumé
Today in the field of tissue engineering, there is a challenge with retrieving biocompatible materials to fit the needs of bio-MEMS devices. Silicon is a fitting candidate due to its affordability and electrical properties. However, silicon in its pure form is not biocompatible and must be modified before it is implanted in the human body. This objective of this study is to use simple laser techniques to improve the biocompatibility of silicon so it can be used in biomedical applications. A nanosecond Nd:YAG pulsed laser with a wavelength of 1064nm was used to draw patterns with different parameters on the surface of untreated silicon wafers. Each sample had a different line spacing of 0.10mm, 0.05mm, or 0.025mm and a number of overlaps that the laser would carry out (1, 2, or 3 overlaps). The samples were then submerged in simulated body fluid (SBF) for a period of 4 weeks. The temperature of the incubator was kept constant at 37.5°C (body temperature). These samples were then analyzed with FESEM, EDS, Raman and 3D Microscopy. The results showed that bone-like apatite elements such as calcium, and potassium were deposited on the surface after 4 weeks in SBF. The most apatite was found on the sample with 3 overlaps and a line spacing of 0.025mm. This is due to the fact that this sample had the highest roughness, therefore the best bonding ability. With this new research, silicon can potentially used for the production of biomedical devices such as sensors, and nano-biomaterial fabrications.
Title of the research project - Titre du projet de recherche
A role of autophagy in Renal Cell Cacrinoma through the von Hippel-Lindau tumor suppressor gene

Poster presenter - Nom de la personne qui présentera l’affiche
Dominique Comeau

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Comeau, Dominique; Turcotte, Sandra.

Abstract - Résumé

Introduction. Kidney cancer affects 300,000 individuals worldwide and its incidence is rising. Renal Cell Carcinoma represents the most common and malignant form of kidney cancer. At metastatic stages, these tumors are highly vascular and resistant to standard therapies. Additional targets are needed to treat this disease. We previously demonstrated that targeting the loss of VHL could lead to a promising therapeutic strategy by identifying a small molecule, STF-62247, that kills specifically VHL-deficient cells. The cytotoxicity of this compound is associated with a default in autophagy. Objectives. This research project aims to recognize the pVHL structural domains to autophagic function. Goals. i) Localize the VHL domain protecting cells from death induced by STF-62247, ii) Correlate the VHL protein domain triggering the STF-62247 response with the late-stage of autophagy and lysosomal degradation and iii) Determine proteins interacting with the VHL protein domain implicated in autophagy. Methods. Different deletions covering VHL cDNA have been prepared using lentiviral vector system (Gateway technology), which were stably expressed in RCC4 cells. The mutant constructs were validated by western blots. Cell viability of these mutants was tested after STF-62247 treatment by XTT. Results. XTT assays revealed that the deletion spanning amino acids 91-123 were the most sensitive to the treatment. Interestingly, this deletion, when treated with STF-62247 also forms large intracytoplasmic vacuoles visualized with acridine orange staining. Outcomes. Gaining a better understanding of pVHL’s undefined functions in autophagy will undoubtedly lead to a better understanding of the protein’s function and new therapeutic strategies to treat this disease.
Title of the research project - Titre du projet de recherche
Can TAVI make you smarter? Exploring the effects of Transcatheter Aortic Valve Implantation on cognitive function

Poster presenter - Nom de la personne qui présentera l'affiche
Claudia Cote

First author - Premier auteur
Not specified

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Cote, Claudia; LeBlanc, Heather; Yip, Alexandra; Paddock, Vernon; Archer, Brian; Ferguson, Darren; Hassan, Ansar.

Abstract - Résumé
Background: Aortic valve stenosis is a significant cause of morbidity and mortality in frail, elderly patients. Transcatheter aortic valve implantation (TAVI) is an alternative to surgical aortic valve replacement in high-risk patients with aortic valve stenosis. While early cognitive decline is commonly seen in patients undergoing cardiac surgery, the effect of TAVI on cognitive function is less well understood. The purpose of this study was to evaluated the effect of TAVI on cognitive function

Methods and Results: A prospective evaluation of 127 patients undergoing TAVI between September 2010 and September 2014 was performed. Cognitive function was assessed using the Montreal Cognitive Assessment (MoCA) prior to and at 6 months follow-up. The MoCA is a comprehensive cognitive test that assesses a variety of cognitive domains. Following inclusion and exclusion criteria, 91 patients formed the final population. Mean age was 79.2 years (SD ± 8.8). Overall cognitive function, expressed as a median MoCA score [IQR], prior to TAVI did not differ compared to 6 months following the procedure (24 [22, 26] vs. 25, [22, 27]) (p=0.13). In a subanalysis of patients who were cognitively impaired at baseline, as defined by MoCA < 26, a significant increase in overall MoCA score was noted (22, [20, 24] vs. 23, [21, 25]) (p= 0.03).

Conclusions: In a high-risk surgical cohort, overall cognitive function remained unchanged 6 months following TAVI. However, among patients with cognitive impairment at baseline, an improvement in overall cognitive function was noted following TAVI.
Title of the research project - Titre du projet de recherche
Occupational Trends after Upper Limb Amputation

Poster presenter - Nom de la personne qui présentera l'affiche
Mike Craig

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Craig, Mike; Hill, Wendy; Adisesh, Anil; Englehart, Kevin.

Abstract - Résumé
Objective: Determine the extent, nature, and predictors of return to work in adults with acquired upper limb amputation. Significance: The current literature indicates varied rates of return to work (50-90%) among persons with upper limb amputation. Many of these patients change careers or perform limited duties. However, both labour force trends and rehabilitation technology are fluidly changing. An updated picture of work ability in this population could inform both the rehabilitation process, and insurers. Methods: A chart review was performed at a local Workers’ Compensation Rehabilitation Centre. Possible predictive factors for return to work were analyzed, and included: occupational class, age, anatomic level of amputation, type of prosthesis use, and promptness of prosthesis fitting. Outcome measures included a documented return to work, time taken to return to work, and occupational class after amputation. Results: Mean age at amputation was 35 years. 79% of patients used a prosthesis. 81% of patients had some type of return to work, for which the median time away from work was 172 days. Younger age was statistically significantly associated with a return to work, and with a shorter time to return to work. Occupational class before and after amputation were statistically significantly correlated. The higher success of younger patients in returning to work is likely multifactorial. Career retraining does not appear to explain this result, as people tended to remain in the same type of job. Alternatively, age may reflect physical & psychological resiliency in adapting to the functional & identity changes inherent in amputation.
Introduction. Kidney cancer is the 8th most diagnosed cancer in Canada. Renal Cell Carcinomas (RCCs) represents 80% of adult kidney cancers and are particularly challenging since they are resistant to conventional therapies. The survival rate after 5 years is less than 10%. Thus, better understanding of RCC pathogenesis is crucial to the development of new targeted therapies and the identification of new biomarkers. The Von Hippel-Lindau (VHL) gene is inactivated in up to 85% of RCC. We've previously demonstrated that targeting the loss of VHL could be a promising therapeutic strategy. MicroRNAs (miRNA) are small noncoding RNAs that negatively regulates gene expression and their deregulation has been associated with cancer. Objectives. Our study aims to identify miRNA that are VHL-dependent, their potential targets as well as their roles in RCC carcinogenesis. Methods. TCGA microRNA data and microRNA profiling by next-generation sequencing were combined to identify clinically relevant deregulated microRNAs. Taqman probes and qRT-PCR were used to validate the expression of candidate microRNA in different RCC cell lines. Transcriptomic data and bioinformatics analysis were used to predict potential targets of selected microRNAs. Results. We identified 154 microRNAs that were differentially expressed in VHL-deficient cells compared to cells with the functional gene. Among these, 19 were validated in three different RCC cell lines. miR-2355, miR-197, miR-155 and miR-1271 have been selected for further analysis and target prediction. Conclusion. VHL-dependant microRNA signature in RCC could provide significant insight into the identification of effective cancer biomarkers for personalized medicine and potential therapeutic targets.
Title of the research project - Titre du projet de recherche
Synthetic Lethality Screen of Non-Small Cell Lung Cancer for Therapeutic Compound Development

Poster presenter - Nom de la personne qui présentera l'affiche
Pierre ML Deprez

First author - Premier auteur
Oui

Niveau de formation
Boursiers postdocoraux

Researchers involved in this project - Chercheurs participant au projet
Deprez, Pierre.

Abstract – Résumé
Cancer is the leading cause of premature death in Canada as well as in Atlantic Canada. There is a great need for improved cancer treatments, especially in the case of lung cancer, which has the highest mortality rate worldwide. Most chemotherapy approaches still target multiplying cells in general and are not selective for cancer cells. Such non-selectivity leads to the toxic side-effects experienced by cancer patients, since rapidly dividing normal cells in the hematopoietic and digestive systems are also targeted. One way to avoid the problems with non-selectivity is to target specific vulnerabilities in cancer cells. We aim to identify therapeutics that target specific vulnerabilities in cancer cells. To do so we performed large scale genomic deletions using the CRISPR-Cas9 system that result in cancer cell death leaving normal lung cells alive. We hereby show NGS results that feature 11 genes of interest which induced synthetic lethality in NSCLC cells. Those potential therapeutic targets may be used to design compounds for the treatment of certain cancers.

Title of the research project - Titre du projet de recherche
Regulation of the Adipokine Autotaxin by Glucose and Insulin

Poster presenter - Nom de la personne qui présentera l'affiche
Kenneth D'Souza

First author - Premier auteur
Yes

Education Level
PhD Students

Researchers involved in this project - Chercheurs participant au projet
D'Souza, Kenneth; Trivedi, Purvi; Touaibia, Mohamed; Kershaw, Erin; Pulinilkunnil, Thomas; Kienesberger, Petra.

Abstract - Résumé
Background: Insulin resistance and disruption of glucose homeostasis are major complications of obesity. Bioactive adipokines secreted from adipocytes are believed to play a major role in obesity-induced insulin resistance. Autotaxin (ATX) is a novel adipokine that produces the signaling messenger, lysophosphatidic acid. Previous data from our group have shown that serum ATX levels correlate with fasting glucose and insulin, and insulin resistance in obese humans. However, it remains unclear how ATX is regulated in adipocytes and which factors contribute to the upregulation of ATX expression under obese-insulin resistant conditions. Aims: The goal of this study was to examine whether glucose and insulin and the induction of insulin resistance alter ATX expression in adipocytes. Methods and Results: Obese-insulin resistant C57Bl6 mice fed a high fat-high sucrose diet showed a 1.5-2-fold increase in serum ATX activity when compared to the chow-fed controls, suggesting that ATX secretion from adipocytes is upregulated following insulin resistance in vivo. Indeed, induction of insulin resistance in cultured 3T3-L1 adipocytes by exposing them to high glucose (25 mM) and high insulin (100 nM) concentrations for 24 h resulted in significantly increased ATX secretion. Moreover, incubation of 3T3-L1 adipocytes with high glucose only, mimicking diabetic conditions, was sufficient to augment ATX mRNA, protein expression and activity in the media. Interestingly, exposure to high insulin concentrations decreased ATX mRNA expression in 3T3-L1 adipocytes. Significance: Our data suggest that insulin resistance leads to upregulation of ATX in adipocytes and that chronic exposure to high glucose and insulin differentially regulate ATX expression/secretion.
Heme Metabolism is Differentially Influenced by Comorbidity in Heart Failure

Poster presenter - Nom de la personne qui présentera l'affiche
Ashley L. Eadie

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Eadie, Ashley; Allwood, Melissa; Huber, Jason; Platt, Mathew; Romanova, Nadya; Braun, Jordan; Hassan, Ansar; Pelletier, Marc; Simpson, Jeremy; Brunt, Keith.

Abstract - Résumé
Heart failure is the inability to supply sufficient oxygenated blood to meet the body’s metabolic needs. Heme oxygenase-1 (HMOX1), the stress-inducible and cytoprotective enzyme responsible for heme catabolism, has been extensively investigated for its therapeutic potential in models of acute cardiovascular stress, such as in heart attacks. In acute models, its pre-emptive upregulation confers cellular protection. However, little is understood about heme regulation in chronic cardiovascular diseases or heart failure. Pre-clinical studies often overlook the influence of comorbidity (the simultaneous presence of multiple diseases or conditions) and regional differences in the heart (ex. right/left ventricle, septum, atria) on the cellular mechanisms underlying heart failure. It is therefore unclear how heme metabolism is regulated across comorbidities and sub-anatomical localizations in heart failure.
We hypothesized that differences in therapeutic efficacies are explained in part due to differences in heme regulation across disease models of heart failure. Our study investigated the expression of heme regulatory enzymes in microarray analyses of cardiac biopsies obtained from patients with diabetic, dilated cardiomyopathy, and idiopathic dilated heart failure. Further, we examined these same regulatory enzymes in mouse models of right and left ventricular heart failure by Western Blot analyses. Our results indicate a non-canonical expression profile of hypoxia factors and heme metabolism proteins in heart failure, both clinically and pre-clinically. To support the translation of a novel therapeutic approach to heart failure that targets the cytoprotective heme-regulatory network, more analyses of the underlying mechanisms and consideration to anatomical sites and patient subgroups in heart failure are required.
Title of the research project - Titre du projet de recherche
Canadian Team to Improve Community-Based Cancer Care along the Continuum (CanIMPACT)

Poster presenter - Nom de la personne qui présentera l'affiche
CanIMPACT: The Coordination of Cancer Care and the Importance of Communication

First author - Premier auteur
Yes

Education Level
PhD Students

Researchers involved in this project - Chercheurs participant au projet
Easley, Julie; Miedema, Baukje (Bo).

Abstract - Résumé
Background: Multiple health care providers are often involved in the care of cancer patients, from diagnosis to survivorship. With so many involved, the care of these patients can often become fragmented and uncoordinated, potentially jeopardizing patient safety and the quality of the care. Research Objective: The Canadian Team to Improve Community-based Cancer Care along the Continuum (CanIMPACT) is interested in finding ways to improve the coordination and continuity of cancer care between primary care providers and cancer specialists. The goal of the qualitative component of this study was to explore stakeholder perspectives and contextual factors related to the coordination of cancer care across Canada. Methods: Using a Constructive Grounded Theory approach, we conducted telephone interviews with 58 health care providers from across Canada (21 family physicians; 15 surgeons; 6 radiation oncologists; 12 medical oncologists; and 4 general practitioners in oncology) Results: Communication issues emerged as the most prominent theme relating to the coordination of cancer care. These issues included 1) outdated or incompatible communication technology; 2) delays in medical transcription; 3) idiosyncratic health systems/policies; and 4) the need for more face-to-face interactions between family physicians and specialists in order to foster stronger networks and collegial relationships. Conclusion: Effective and timely communication is essential to good coordination of care along the cancer care trajectory particularly during transitions of care between specialist care and family physician care. Despite advances in technology, substantial challenges around communication still exist, which in turn can lead to serious consequences that impact clinical decision making about patient care.
Title of the research project - Titre du projet de recherche
Does Acute Aerobic Exercise Increase Attention In Adults With ADHD Indicated By A Change In CPT Scores?

Poster presenter - Nom de la personne qui présentera l'affiche
Kate Ehrhardt

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Ehrhardt, Kate; McGibbon, Chris; Landine, Jeff.

Abstract - Résumé

**Background:** Attention deficit hyperactivity disorder is the world’s leading child neurobehavioral disorder (Zimmerman, 2003; Wigal, Emmerson, Gehricke & Galassetti, 2012), and it is increasingly being recognized that adults also suffer from the disorder. For years the preferred management option for the disorder has been medication, but the proposed research will help support the promotion of exercise as a management intervention for adults with ADHD. **Methods:** 10 self-reported ADHD participants (M=24.2) and 10 matched participants (M=24) completed the Conners’ CPT-II pre and post a 20 min sub-maximal aerobic exercise on the stationary cycle ergometer. **Results:** Exercise had a significant effect on the self-reported ADHD participants with a change in commissions scores (CPT-II) from pre to post exercise. **Conclusion:** The results of this study supports the promotion of exercise as a management intervention for self-reported adults with ADHD.
The impact of varying chest tube placement strategy on clinical outcomes following cardiac surgery: a retrospective cohort study

Poster presenter - Nom de la personne qui présentera l'affiche
Keir Forgie

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Forgie, Keir; MacLeod, Jeffrey B; Yip, Alexandra M; Lutchmedial, Sohrab; Brown, Craig D; Forgie, Rand; Pelletier, Marc P; Hassan, Ansar.

Abstract - Résumé
Background: This study aimed to retrospectively compare the varying chest tube placement strategies of four surgeons at a single institution and their impact on 30-day rates of pleural effusion.

Methods: The sample consisted of all patients undergoing first-time, isolated, non-emergent, on-pump coronary artery bypass grafting from 2009 to 2013, in whom the left internal mammary artery was used with or without a saphenous vein graft. Baseline characteristics, intra-operative variables and post-operative outcomes were compared across the four surgeons' patients. The risk-adjusted impact of surgeon on 30-day rates of pleural effusion was determined using multivariable logistic regression modeling.

Results: 1787 patients were included in the final analysis (Surgeon A: 21.2%; Surgeon B: 20.3%; Surgeon C: 33.2%; Surgeon D: 25.2%). Across the four surgeons, few differences existed in patients' baseline characteristics. Intra-operatively, significant differences were noted in mean number of distal anastomoses (range 3.2-3.5, p<0.0001) and mean total bypass times (range 85min-100min, p<0.0001). Among the 90.7% of patients for whom 30-day follow-up was available, 30-day rates of in-hospital mortality did not differ between surgeons (p=0.18), but 30-day rates of pleural effusion did (Surgeon A: 3.6%; Surgeon B: 3.5%; Surgeon C: 3.2%; Surgeon D: 6.7%; p=0.04). Following risk-adjustment, Surgeon D emerged as an independent predictor of 30-day rates of pleural effusion (Odd Ratio 2.15, 95% Confidence Interval 1.15-4.03).

Conclusion: Significant differences in 30-day rates of pleural effusion were noted between surgeons following risk adjustment. Further study is required to determine the role that varying chest tube placement strategies played in creating these differences.
Title of the research project - Titre du projet de recherche
Mechatronic Design of a Modular Lower Limbs Exoskeleton

Poster presenter - Nom de la personne qui présentera l'affiche
Christian Grandmaison

First author - Premier auteur
Yes

Education Level
Undergraduate Students

Researchers involved in this project - Chercheurs participant au projet
Grandmaison, Christian; Quinn, Nathan; Sensinger, Jonathan.

Abstract - Résumé
Every year, more than 7800 people are victim of a spinal cord injury in North America. While around 44% will end up with complete loss of locomotion, the fortunate ones can benefit from clinical rehabilitation to help recover motor control. Current therapy methods make use of a powered exoskeleton to support the impaired limbs, and guide them through the human gait numerous times. Such systems, like the Locomat, are bound to clinics, and come at a hefty price. Exoskeletons offer the promise of a lower cost and mobile alternative to achieve rehabilitation. Although present commercially available portable exoskeleton provides decent mobility to their users, their passive ankle design prohibits them from emulating seamless human gait. This research effort consists of the mechatronic design of a powered lower limb exoskeleton with six active degrees of freedom. It features a novel modular actuator design where the same mechanism is used for the hip, knee, and ankle. The design utilises state-of-the-art actuators combined with a linear ball screw drive; providing enough speed and torque to replicate the human gait of a 100 kilogram adult. Individuals between five and six foot eight inches will be able to fit the exoskeleton. The device will serve as a development platform for the Institute of Biomedical Engineering at UNB, allowing for the implementation of different innovative control strategies.
Title of the research project - Titre du projet de recherche
Functional characterization of Mammaglobin-1 in breast cancer aggressiveness

Poster presenter - Nom de la personne qui présentera l'affiche
Roxann Guerrette

First author - Premier auteur
Oui

Niveau de formation
Étudiants au doctorat

Researchers involved in this project - Chercheurs participant au projet
Guerrette, Roxann.

Abstract - Résumé
Metastasis is the major cause of death in women suffering from breast cancer. To provide a better understand breast cancer progression, we have studied the role of mammaglobine-1 (MGB1) gene in breast cancer pathogenesis. MGB1 has been extensively studied as a diagnostic biomarker due to its abundant expression in mammary cancer cells. Yet, MGB1's role in disease progression is still unknown. Our experimental results demonstrate for the first time that MGB1 in a pivotal regulator on breast cancer malignancy. More precisely, loss of MGB1 expression by shRNA correlates with a decrease in proliferation (cell titer blue), spheroid formation (spheroid assay), migration (trans well assay), and invasion (soft agar) capacities of breast cancer cells. Concomitantly, we also observe by westernblot and luciferase assay that MGB1 expression activates pro-malignant signaling cascades such as MAPKs, focal adhesion kinase (FAK) and NF-κB pathways. Our Results show that MGB1 promote epithelial to mesenchymal (EMT) features. Our study provides the first evidence for MGB1 as regulator of breast cancer malignancy and disease progression.

Les métastases sont la cause majeure du décès relié au cancer du sein chez les femmes. Pour mieux comprendre la progression du cancer du sein, nous avons étudié le rôle du gène mammaglobine-1 (MGB1) dans la pathogénèse du cancer du sein. À cause de sa spécificité aux tissues mammaire et surexprimé dans la majorité des cancers du sein, MGB1 a été exhaustivement étudié pour ses caractéristiques d'un bon biomarqueur. Par contre, le rôle de MGB1 chez le cancer du sein est encore inconnu. Nos résultats préliminaires montrent pour la première fois que MGB1 est un régulateur important de la malignité du cancer du sein. Plus précisément, l'inhibition de l'expression du gène MGB1 par shRNA corrèle avec la prolifération (cell titer blue), la formation de sphéroïdes (essai sphéroïde), la migration (essai trans well) et l'invasion (agar souple) des cellules du cancer du sein. Nous avons aussi observé par immunobuvardage et essai luciférase que MGB1 favorise l'expression des gènes impliqué dans la malignité cellulaire dont la cascade des MAPKs, des kinases d'adhésion focale (FAK) et de NF-κB. Nos résultats montrent que MGB1 promeut la transition épithéliale à mesenchymal (EMT). Notre étude observe pour la première fois le rôle primordiale de MGB1 dans la progression et la malignité du cancer du sein.
Title of the research project - Titre du projet de recherche
Electronic Prescribing in New Brunswick: Progress & Barriers to Implementation in Comparison to Saskatchewan

Poster presenter - Nom de la personne qui présentera l'affiche
Casey Losier

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Losier, Casey; Brunt, Keith; Melville, Sarah.

Abstract - Résumé
Background: Research into ePrescribing practices show that it can significantly reduce the rate of prescribing errors in ambulatory care settings and hospitals. It also increases the availability of information to both physicians and pharmacists, and increased efficiency for physicians and staff. Compelling evidence for implementing electronic prescribing (ePrescribing) in Canada have been made and national and provincial health organizations are committed to action on these recommendations. Despite potential system wide benefits, New Brunswick does not yet have a provincial ePrescribing system. Many barriers can preclude implementation of ePrescribing, however, it is not yet known which of these are currently faced by New Brunswick. Aim: This qualitative study examined the challenges and progress made to date toward the planning and implementing of an integrated ePrescribing system in New Brunswick. A comparable province, Saskatchewan, has already begun implementation of ePrescribing. Examining the barriers faced by another province, will provide valuable insight into their past, current and future issues This provides a strategic advantage for New Brunswick to adopt best practices and avoid inefficiencies and delays in modernizing medical prescribing. Approach: This study is conducting interviews with professionals in ePrescribing stakeholder organizations, such as: government, policy makers, pharmacists and physicians in New Brunswick and Saskatchewan. Results will integrated for comparison of barriers and their past or prospective solutions in both provinces. These finding could provide a comprehensive understanding the mechanisms required to implement ePrescribing. This will study will inform recommendations for implementation and identify solutions.
Title of the research project - Titre du projet de recherche
Fall mechanisms explored through a case study example.

Poster presenter - Nom de la personne qui présentera l'affiche
Mathieu Mallet

First author - Premier auteur
Oui

Niveau de formation
Étudiants à la maîtrise

Researchers involved in this project - Chercheurs participant au projet
Mallet, Mathieu; Cyr, Jean-Philippe; Handrigan, Grant.

Abstract - Résumé
Introduction : Anecdotal accounts exist of individuals falling during posturography evaluations in a laboratory setting. Little information exists in the literature describing these events as they do not commonly occur in young healthy individuals. There are several possible mechanisms responsible for a sudden loss of balance, these are generally characterised as either physiological or psychosomatic. Some examples are postural hypotension, vasovagal syncope (in response to a physiological or a psychological stimulus), vestibular deficits and vertigo. Methodology : This single subject study design is based on a posturography evaluation of a 22 year old female individual (height: 173cm mass: 75kg). During a standard data collection of 60 seconds in a double stance position on a force plate the individual fell and was not seriously injured. The fall kinematic data were compared with a control trial in which the subject successfully completed the task. Results : In the immediate one second interval prior to the fall there was an increase in centre of pressure range for the anterior-posterior (5.33 cm•s−1 vs. 2.07 cm•s−1) and medio-lateral (2.33 cm•s−1 vs. 1.32 cm•s−1) directions as well as an increase in the centre of pressure speed (10.36 cm•s−1 vs. 1.69 cm•s−1) when compared to the control trial. Conclusion : Possible falls mechanisms will be explored in order to develop best practices to prevent their future occurrence during posturography evaluations in a laboratory context.

Introduction : Les cas de chutes des sujets durant un examen de posture dans un environnement clinique existent. Peu d'information existe dans la littérature au sujet des chutes chez les jeunes sujets en santé. Il existe plusieurs mécanismes responsables d'une perte soudaine d'équilibre. Ceux-ci sont généralement caractérisés comme étant de nature physiologique ou psychosomatique. Quelques exemples sont l'hypotension orthostatique, le malaise vagal (en réponse à un stimulus physiologique et psychosomatique), le syndrome vestibulaire ainsi que le vertige. Méthodologie : Cette étude de cas est basée sur l'évaluation posturale d'un sujet de sexe féminin (taille : 173cm poids : 75kg). Durant une collecte de donnée de 60 secondes en position debout sur une plateforme de forces, le sujet est tombé, mais ne s'est pas blessé gravement. Les données cinématiques de la chute furent comparées avec les données contrôles où le sujet a réussi la tâche. Résultats : Pendant la seconde avant la chute, il y a eu augmentation dans l'étendue du centre de pression dans l'axe antéro-postérieur (5.33 cm•s−1 c. 2.07 cm•s−1) et dans celui de l'axe médio-latéral (2.33 cm•s−1 c. 1.32 cm•s−1). De plus, il y a eu une augmentation de la vitesse du centre de pression (10.36 cm•s−1 c. 1.69 cm•s−1) comparé à l'essai contrôle. Conclusion : Plusieurs mécanismes vont être explorés afin de développer de meilleures pratiques et prévenir les chutes durant les évaluations posturales dans un contexte de laboratoire.
Abstract - Résumé
Contemporary prosthetic solutions vary widely, from purely passive devices to micro-controlled powered devices. However, controlling the prosthesis require extensive training sessions for the user, and still relies on some manual operations by the user to ensure proper mode transitions. A potential solution to this problem is to develop a model-based platform that inputs subject-specific anatomy, biomechanics, and muscle electrophysiology to simulate human movement and movement transitions of the user, which could then be used to control the prosthesis. To test this solution, our specific aims are: Aim 1: Adapt a currently existing OpenSim Gait_2392 neuromuscular model (23-degree-of-freedom, 92 muscle model) of the human upper and lower body to include an amputee’s leg with a prosthesis. Aim 2: (a) Develop an efficient methodology for generating muscle-actuated simulation of human walking that closely reproduce experimental measures of kinematic and ground reaction forces. (b) Acquire 3D motion analysis data and EMG from 15 limbed individuals and 2 transfemoral amputees during a variety of locomotor activities to validate the modified model. Simulated joint kinematics closely tracked experimental quantities (mean-root-squared error generally less than 2mm), and the time histories of muscle activations was similar to electromyography recording. The results also showed that Forward Dynamic simulation successfully tracked the set of desired kinematic and reproduced the same motion tracked by Computed Muscle Control. The accuracy of the Forward Dynamic and Computed Muscle Control results make it practical to generate subject-specific simulations of gait.
Title of the research project - Titre du projet de recherche
The Metabolic Effects of a Lower Limb Robotic Exoskeleton

Poster presenter - Nom de la personne qui présentera l'affiche
Jennifer Muggah

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Muggah, Jennifer; McGibbon, Chris.

Abstract - Résumé
PURPOSE: To examine the effects of a lower limb robotic exoskeleton on whole body energy expenditure during locomotion activities. BACKGROUND: Previous research has focused on the mechanical aspect of robotic exoskeletons; however, the physiological aspects are also need to help further the design of these exoskeletons. Through physiological assessments research will be able to ensure these exoskeletons are energetically beneficial for the user. METHODS: Six participants (4 male and 2 female) took part in this study. A VO2 Max session was conducted followed by three randomized sessions. During the three sessions the participant walked and then jogged around a 140m indoor track for 20 minutes (10 minutes each) while unencumbered, with the exoskeleton passive and exoskeleton active. VO2 (ml/kg/min), Heart Rate (HR) and the Respiratory Exchange Ratio (RER) were collected and analyzed using MATLAB. RESULTS: Data collection is ongoing, but preliminary results suggest that there is little to no change in the energetic demand when using the lower limb robotic exoskeleton versus not using the lower limb robotic exoskeleton.
Title of the research project - Titre du projet de recherche
TRPV6 Calcium Channel Peptide Antagonists as Novel Anti-myeloma and Anti-resorptive Agents

Poster presenter - Nom de la personne qui présentera l'affiche
Murugesan, Alli

First author - Premier auteur
Yes

Education Level
Post-Doctoral Fellows

Researchers involved in this project - Chercheurs participant au projet
Murugesan, Alli; Tremblay, Philippe; Han, Ming; Ray, Bithika; Lutes, Tyler; Reiman, Tony.

Abstract - Résumé
Background: Multiple myeloma, the bone marrow cancer and its associated bone disease are incurable. Better therapies are needed, targeting biomolecules implicated in the aberrant biology of the disease. Overexpression of transient receptor potential calcium channel, TRPV6 has been observed in several epithelial cancers. TRPV6 expression has also been seen in osteoclasts. The reciprocal interaction between osteoclasts and myeloma cells is pivotal to the generation of bone lesions that characterize myeloma. We have investigated the expression, and potential therapeutic significance of TRPV6 in myeloma. Methods: TRPV6 peptide antagonists SOR-C13 and SOR-C27 (Soricimed Biopharma Inc.), derived from shrew venom were used. Primary osteoclasts were generated in vitro from human bone marrow aspirates; characterized by Hoechst-phalloidin staining, Tartrate resistant acid phosphatase (TRAP) staining, TRAP enzyme activity and Cathepsin K expression. TRPV6 expression in primary human osteoclasts, myeloma cell lines and myeloma patient bone marrow microarray was checked by qPCR, immunohistochemistry or immunoblotting. Anti-resorptive potential of SOR peptides using human osteoclasts was evaluated in Osteoassay plates that mimic bone, and myeloma cell growth inhibition by prestoblue cell viability assays. Results and Conclusion: We found strong TRPV6 expression in primary osteoclasts, myeloma cells and osteoclasts of myeloma patients. We observed dose-dependent inhibition of osteoclast activity in vitro by SOR peptides, including markedly reduced osteoclast formation, TRAP activity and resorption. SOR peptides also inhibited the growth of human myeloma cell lines U266 and KMM-1. Taken together, our pre-clinical findings suggest a novel therapeutic approach for myeloma involving TRPV6 inhibition to target both myeloma cells and osteoclasts.
Title of the research project - Titre du projet de recherche
Angiotensin II acutely increases lysosomal autophagy in the murine myocardium

Poster presenter - Nom de la personne qui présentera l'affiche
Carine Nzirorera

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Nzirorera, Carine; Trivedi, Purvi; Bartlett, Jordan; Kienesberger, Petra; Légaré, Jean-François; Pulinilkunnil, Thomas.

Abstract - Résumé
Background: Protein quality-control plays an important role in maintaining cellular homeostasis within the cardiomyocyte and ensures cardiac performance. Indeed, during stress/starvation cellular homeostasis is regulated by lysosomal autophagy. Autophagy, a self-digestion mechanism wherein cytosolic proteins are degraded within lysosome either by macroautophagy or chaperone-mediated autophagy. Angiotensin II (Ang II) promotes cellular hypertrophy through increased protein synthesis and cell growth within the myocardium leading to heart failure. However, it remains to be delineated whether cardiac effects of Ang II involve alterations in lysosomal autophagy. Aim: We examined the effects of Ang II on lysosomal autophagy in the healthy mouse myocardium. Methods and Results: 8 week old C57BL6J mice were administered Ang II (2.0 μg/kg/min) for three days using osmotic minipumps. Ang II treatment augmented mean arterial blood pressure and heart weight. Increased mRNA expression of collagen1A1 and transforming growth factor -β confirmed fibrotic remodeling following acute Ang II exposure. Furthermore, Ang II caused increase in protein expression of S6 kinase and ribosomal S6, suggesting hyper-activation of mTOR signaling with increased protein synthesis. Since mTOR inhibits autophagy, we expected suppression of autophagy after Ang II treatment. Surprisingly, immunoblot analysis revealed significant increases in autophagy marker LC3-II, signifying either increased macroautophagy or decreased lysosomal clearance of proteins. However, an increase in cardiac expression of LAMP-2A, hsc70 and hsp90, suggested activation of lysosomal protein degradation following acute Ang II treatment. Significance: Acute Angiotensin II exposure upregulates lysosomal autophagy in the myocardium, as an adaptive response to compensate for the increased protein synthesis.
Importance: As the ‘baby boomer’ generation progressively ages, so do chronic diseases like diabetes and heart disease increase at alarming rate. Health care delivery must evolve quickly to respond to the needs of the population. Primary care remains focused on acute disease management. A shift of focus to risk factor management and prevention of chronic conditions at a community level, not an institutional level (i.e. Hospital/Nursing Home) could be required to avoid depreciation in our health care system.

Objectives: Several models of collaborative, interdisciplinary care exist. Using diabetes and depression as representative conditions, this study aimed to demonstrate that interprofessional primary care (IPC) is the most appropriate model for managing chronic conditions. The Family Health Team (FHT) model, which has been fully deployed in Ontario since 2005, should therefore be deployed in New Brunswick. Here we outline the evidentiary case for such action as both beneficial to patient outcomes and cost effective in delivery; requiring action be taken by government, medical education providers and medical associations.

Methods: An exhaustive literature search was performed to determine whether or not IPC (specifically the FHT model) is viable option as a future model of primary care delivery in New Brunswick.

Results: Evidence suggests that IPC is a superior model of primary care delivery in regards to the management of chronic diseases like diabetes and depression. Benefits in both patient and economic outcomes have been identified.
Title of the research project - Titre du projet de recherche
Qualitative Assessment of a Non-Invasive Vital Sign Monitor with Secure Home-Based Video Conferencing Patient Engagement Platform: The e-Clinic Pilot Study

Poster presenter - Nom de la personne qui présentera l'affiche
Natalie Ouellette

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Ouellette, Natalie; Melville, Sarah; Lutchmedial, Sohrab; Brunt, Keith.

Abstract - Résumé
Background: The health care system must adapt as the senior population increases. Health care provider-patient engagement via confidential, virtual information communication technologies (ICT) could reduce hospital/office visits. Health Canada has licensed secure ICT systems for physician-patient e-Visits. We investigated the feasibility of patients connecting with a physician via e-Visit, and evaluated the users' satisfaction. Methods: Healthy participants (N=10; 67±6 yrs.) consented to a 6-month qualitative assessment of the Pulsewave® vital sign device with Physician-PortalTM and the MedeoTM video conferencing (VC) platform. Participants received a device, software orientation, and instructional handouts. The student-physician (S-P) engaged with participants in e-Visits bi-weekly. To assess the integrated systems, participants were given tasks and experiences queried. Results: ~30% of potential participants were not consented due to inadequate or incompatible computer/internet access. Only minor challenges related to installation and registration of the device and VC software were encountered. The participants and researchers accessed excellent technical support from both ICT providers at no cost. All participants readily connected with the S-P despite citing concern over a lack of computer experience; all stated the vital sign device was easy-to-use. The S-P valued the Physician-Portal? as a feature to prioritize cases for follow-up. Conclusions: Telemonitoring is a paradigm shift in health care delivery that remains to be developed fully. Community-based support for seniors' internet access may be required; however, the Pulsewave® device and the MedeoTM software are implementable technologies. Further analysis and additional studies to assess the feasibility, health economics and quantitative outcomes involving patients and physicians are required.
Title of the research project - Titre du projet de recherche
Design and Synthesis of Nano-Hemin for the Treatment of Acute Myocardial Infarction

Poster presenter - Nom de la personne qui présentera l'affiche
Nagaprasad Puvvada

First author - Premier auteur
Yes

Education Level
Post-Doctoral Fellows

Researchers involved in this project - Chercheurs participant au projet
Puvvada, Nagaprasad; Rasul, Amna; Eadie, Ashley; Melville, Sarah; Madhu, Malav; Simpson, Jeremy; Brunt, Keith.

Abstract - Résumé
Background: Following acute myocardial infarction (AMI), cardiac tissue is repaired by monocytes and their subsequent differentiation into macrophages. Cardiac macrophage polarization is important for novel therapeutics to treat inflammatory diseases. Heme oxygenase-1 (HO-1) is a stress-induced cytoprotective enzyme known for its therapeutic potential in AMI. Pharmaceutical hemin, similar to heme, also has therapeutic potential in AMI and induces HO-1. Nanocarriers (NC) increase the specificity of hemin to improve targeted drug delivery and reduce toxicity. Methods: Nanocarriers (NC) were synthesized, hemin-loaded, and confirmed by UV absorption. Size and morphology were measured by TEM. Surface charge and hydrodynamic radius were measured by nanozeta sizer at various pH levels. Cell viability and JC-1 dye FACS analyses showed biocompatibility of NC. Time-dependent cellular uptake was assessed by Raman and Fluorescent microscopy. Drug release of NC was assessed in macrophages (THP-1 cells) by liquid chromatography over 48 hours. Polarization of macrophages were differentiated to M1, M2, and Mᶲ by defined media conditioning. Polarization was analyzed via FACS and Western Blots for sub-type specific markers. The NC were injected into mice after AMI. Results: Surface charge of NC changed depending on pH. Niohemin and hemin induce HO-1 expression in THP-1 cells for the polarization of macrophages. After 14 days post-injection, the niohemin group showed improved cardiac function via echocardiography compared with NC and sham groups. NC were detected by MRI. Conclusions: Our study suggests a novel therapeutic for treatment of AMI. Further studies are required to investigate these NC and their efficacy in targeted drug delivery.
Lower-limb robotic exoskeletons are an emerging technology that can allow patients with paraplegia caused by spinal cord injury, stroke, or traumatic brain injury etc. to stand and walk again. Although this technology is impressive and becoming more noticeable in the public eye, there are two major areas in which exoskeletons require improvement. These two areas are the mechanical actuators for joints and the underlying control systems implemented on exoskeletons. With the proper formulation and tuning, improved control systems could allow exoskeletons to have a more natural gait and potentially adapt to their surroundings by allowing walking on sloped surfaces and/or stairs.

Our research focuses on applying a control strategy that enforces able-bodied stance and swing phases, which combined have the benefit of significantly reducing, or even eliminating, patient- and speed-specific tuning. The control system was inspired by our previous work in lower limb prosthetics. The stance controller works by observing the joint angle and walking speed in order to determine the required torque at each joint. This allows the controller to respond to environmental changes such as slopes or obstructions because it no longer has time dependency such as percentage of gait cycle. The swing controller is able to respond to changes in trajectory in a physiological fashion (minimum jerk) allowing for a more natural swing during gait. These features should allow the control system to recreate able-bodied gait more accurately, respond to environment and trajectory changes, and reduce clinician time required for patient tuning compared to previous exoskeletons.
Title of the research project - Titre du projet de recherche
Ultrasound spectroscopy of biofluid properties for rapid health assessment

Poster presenter - Nom de la personne qui présentera l'affiche
Andrien Rackov

First author - Premier auteur
Yes

Education Level
Post-Doctoral Fellows

Researchers involved in this project - Chercheurs participant au projet
Rackov, Andrien; Wren, Hilary; Odiere, Maurice; Koski, Kristine; Scott, Marilyn; Burns, David.

Abstract - Résumé
The development of portable diagnostic platforms for rapid measurement of complex biological samples has become a target of great interest in biomedical research. Dilution, separation, and the addition of reagents are usually necessary to reduce the complexity of the sample matrix prior to analysis. Ultrasound is known as a non-invasive imaging modality capable of propagating through highly scattering media such as tissue, blood, and other biological fluids, yet currently provides little chemical information. We have developed a straightforward and rapid methodology for estimating composition of biofluids based on analysis of ultrasonic frequencies. Nonlinear distortion and attenuation of ultrasound showed a strong dependence on the chemical properties of biofluids (e.g. pH, protein concentration, total cell count). Multivariate analysis of ultrasound frequency spectra allowed for estimation of pH in human serum, total cell counts in breast milk, and classification of serum samples in a mouse model for human parasite infection. Additionally, a heterodyned detection system is presented as a cost-effective alternative to high-speed oscilloscopes and opens up the possibility of using soundcards in smartphones and tablets as ultrasound detectors. Ultrasound analysis was done with minimal or no sample preparation and can provide a rapid approach for health assessment in remote settings. Moreover, ultrasound offers the potential for non-invasive measurements which makes this an exciting avenue for in-vivo diagnostics.
Title of the research project - Titre du projet de recherche
Biocompatibility Enhancement of Titanium by High Frequency Laser Pulses for Osseointegration and Implant Fabrication

Poster presenter - Nom de la personne qui présentera l'affiche
Mitra Radmanesh

First author - Premier auteur
Yes

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Kiani, Amirkianoosh.

Abstract - Résumé
Annually, fields of biomedical and tissue engineering immensely affect the health and life quality of numerous individuals across the globe. More specifically, bone and tissue implant and osseointegration have become some of the most demanding applications where health and feasibility is concerned. A critical challenge faced in these fields is biocompatibility of the materials used in production of implant devices. Generally, materials with high biocompatibility are more appropriate for implant applications, since they provide a higher effectiveness in the healing process and infection problems. Biocompatibility issues are notably improved through the fast, precise, and reliable operation of a new developing technology, laser surface texturing. In this study, the effects of laser surface texturing on the surface topography properties, roughness, and wettability of thin titanium sheets is thoroughly examined. Experiments conducted in this research present the effects of frequency and pulse number on creation of various scaled roughness across the surface of titanium, and investigate the effects of new structures on biocompatibility of the material through the use of simulated body fluid. The obtained results of this study display that the apatite inducing ability of titanium increases by an increase in surface roughness of the material. Conducted experiments also revealed that at various frequencies, nano porous structures are created outside the irradiation zone across the surface, which in return increase the surface roughness additionally. Overall, by accurately controlling the pulse number and frequency of the laser system, the biocompatibility of titanium can be enhanced in an optimal and efficient manner.
Title of the research project - Titre du projet de recherche
SOR-C13, a novel cancer peptide therapeutic targeting the TRPV6 oncochannel, shows efficacy in breast and ovarian cancer xenografts in a murine model.

Poster presenter - Nom de la personne qui présentera l'affiche
Christopher Rice

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Rice, Christopher; Stewart, J.M.; Dugourd, Dominique; Lutes, Tyler; Lloyd, Vett.

Abstract - Résumé
Validation of new therapeutic targets in oncology has taken on a new urgency in an era of tumour-targeted drugs. TRPV6 has been suggested as a drugable target for 15 years but suitable inhibitors of this calcium channel have not been available. A peptide therapeutic drug antagonistic to TRPV6 is currently under development in a Phase I clinical trial. Pre-clinical data presented here show that targeting TRPV6 with SOR-C13 results in reduced growth in breast (T-47D) and ovarian (SKOV-3) xenografts in mice. These cell lines and the xenografts produced from them over-express TRPV6. Treatment (i.p.) with the peptide SOR-C13 derived from soricidin inhibits tumour growth compared to controls and with similar efficacy as positive controls of paclitaxel (breast) and carboplatin plus paclitaxel (CAT; ovarian). Combinations of peptide plus paclitaxel (for breast) and peptide plus CAT (for ovarian) showed improved efficacy over standard drug alone. These results support the clinical development of SOR-C13 as an anti-cancer therapeutic. We conclude that TRPV6 is a viable oncology target in epithelial tumours since its inhibition results in tumour growth suppression in these two models.
Abstract - Résumé

Myoelectric control of prostheses - the use of electromyographic (EMG) signals to control an artificial limb - has been under investigation for several decades. A major active area of research is in pattern recognition (PR), in which EMG signals are classified based on sample contractions representing common hand and wrist motions. While PR carries tremendous promise for more intuitive and realistic control of prostheses, it remains underutilized outside of laboratory settings due to a lack of robustness. To address this, our group has developed a measure of statistical likelihood reflecting the confidence of the classifier in its decision: if the classifier is not sufficiently confident, the movement is rejected, presuming that no motion is preferable to the wrong motion. More recently, it has been found that the support vector machine (SVM) classifier produces a more granular confidence metric than the current standard for PR, linear discriminant analysis (LDA). This more granular confidence metric could then be used to examine the effect of other factors which currently impede pattern recognition, such as limb position and electrode shift. Thus, the objective of this study was to determine the usability and characteristics of an SVM classifier with rejection as compared to the previously proposed LDA.
Contribution of the glutamine/glutamate cycle in response to STF-62247 revealed by metabolic profiling

Renal cell carcinomas (RCCs) pose significant therapeutic challenges due to the absence of symptoms until the late stages of this disease. In addition, metastatic RCC tumors are resistant to standard chemotherapies, resulting in poor long-term survival rates for these patients. The inactivation of the von Hippel-Lindau (VHL) tumor suppressor gene occurs in up to 85% of RCC cases. We have identified a small molecule, known as STF-62247, which is selectively cytotoxic in VHL-deficient cells. Recent studies have indicated that RCC cells preferentially use glutamine to produce citrate and lipids in the absence of VHL, making them sensitive to glutamine deprivation. Using mass spectrometry, we have previously shown a decrease in both glutamate and glutamine levels in VHL-deficient cells in response to treatment with our small molecule. In this project, we aim to investigate glutamate/glutamine metabolism and the implication of amino acid transporters in STF-62247 cytotoxicity and autophagy induction. To do so, the expression of key glutamine and glutamate transporters was determined by qRT-PCR. Preliminary results indicate a decrease in
SLC1A5 and SLC7A5 in VHL-deficient cells in response to treatment. Altogether, these results could help in the understanding of the small molecule’s mechanism of action, which in turn could lead to the development of targeted therapies for RCCs. Sarah Robichaud is supported by a trainee award from the Beatrice Hunter Cancer Research Institute with funds provided by the Cancer Research Training Program and New Brunswick Health Research Foundation as part of The Terry Fox Strategic Health Research Training Program in Cancer Research at CIHR.
Title of the research project - Titre du projet de recherche
Impact of obesity on intensive care unit resource utilization in patients post cardiac surgery

Poster presenter - Nom de la personne qui présentera l'affiche
Brandon Rosvall

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Rosvall, Brandon R; MacLeod, Jeffrey B; Yip, Alexandra M; Lutchmedial, Sohrab; Brown, Craig D; Forgie, Rand; Pelletier, Marc P; Hassan, Ansar.

Abstract - Résumé
BACKGROUND: The purpose of this study is to examine the impact of obesity on ICU resource utilization following cardiac surgery at a single institution. METHODS: All patients who underwent non-emergent cardiac surgery between January 2006 and December 2013 were considered. Those with a BMI < 18.5 or who experienced an intra-operative death were excluded. Patients were stratified into one of the following weight categories as defined by the World Health Organization - A: Normal (BMI 18.5-24.99); B: Pre-Obese (BMI 25-29.99); C: Obese Class I (BMI 30-34.99); D: Obese Class II (BMI 35-39.99); E: Obese Class III (BMI ≥ 40). Comparisons between weight categories were carried out on the basis of baseline and intra-operative characteristics as well as in-hospital outcomes. The risk-adjusted effect of weight category on ICU LOS > 48 hours was determined using multivariable logistic regression modeling. RESULTS: 5365 patients were included in the final analysis. Following surgery, patients with greater obesity were more likely to experience in-hospital mortality and greater initial ventilation times, initial and overall ICU hours and rates of readmission to ICU. Following adjustment for differences in baseline characteristics and surgery type, increasing obesity was associated with greater likelihood of ICU LOS > 48 hours. [A: OR 1.00 (ref); B: OR 1.00 (95% CI 0.73-1.35); C: OR 1.10 (95% CI 0.77-1.56); D: OR 2.45 (95% CI 1.58-3.78); E: OR 4.40 (95% CI 2.53-7.66)]. CONCLUSION: In patients undergoing cardiac surgery, increased obesity was associated with a significant increase in ICU resource utilization.
Title of the research project - Titre du projet de recherche
Localisation of the expressions of SoxD/E/H members within the mouse testis

Poster presenter - Nom de la personne qui présentera l'affiche
Pauline Roumaud

First author - Premier auteur
Oui

Niveau de formation
Étudiants au doctorat

Researchers involved in this project - Chercheurs participant au projet
Roumaud, Pauline; Haché, Josée; Martin, Luc J..

Abstract - Résumé
Twenty members of the Sox family of transcription factors have been identified, some of them play a key role in the testis. For example, SRY and Sox9 are necessary for sexual male differentiation in mammals or Sox8 which is indispensable to the spermatogenesis maintenance. Some of the Sox family members are expressed in the testis where their roles need to be specified. To know Sox functions, the first step is to characterise their expression in the different cell types of the testis. This project aims to identify the cells where 5 Sox (Sox5, Sox8, Sox9, Sox13 and Sox30) are expressed. Two complementary methods were used, immunofluorescence and in situ hybridization. First results show an expression of Sox5, Sox13 and Sox30 in germinal cells and in Sertoli cells for Sox13 and Sox30 by in situ hybridization. Sox9, which is frequently used as a Sertoli cells marker seems to be expressed at the mRNA level but not translated in germinal cells. Interestingly, in situ hybridization for Sox8 show an expression in Sertoli cells but also in Leydig cells, meaning that Sox8 may be involved in steroidogenesis regulation. To confirm these results, colocalizations will be performed with Leydig and Sertoli cells' specific markers.

La famille des facteurs de transcription Sox comprend vingt membres dont certains ont un rôle important dans le testicule. Notamment, SRY et Sox9 qui sont impliqués dans la différenciation sexuelle mâle chez les mammifères et Sox8 qui est indispensable au maintien de la spermatogénèse. Certains facteurs Sox sont exprimés dans le testicule adulte sans qu'un rôle précis ne leur soit attribué et ce, en raison de l'absence de caractérisation complète de leur expression dans le testicule. Connaître les types cellulaires dans lesquels les facteurs Sox s'expriment est la première étape vers l'identification de leur rôle. Ce projet vise donc à identifier les types cellulaires dans lesquels 5 facteurs Sox (Sox5, Sox13, Sox8, Sox9 et Sox30), sont exprimés. Pour cela deux techniques complémentaires ont été utilisées, l'immunofluorescence et l'hybridation in situ. Les premiers résultats montrent une expression de Sox5, Sox13 et Sox30 dans les cellules germinales et également dans les cellules de Sertoli pour Sox13 et Sox30 en hybridation in situ. Sox9 qui est souvent utilisé comme marqueur des cellules de Sertoli en immunohistochimie semble également être exprimé mais non traduit dans les cellules germinales. Il est intéressant de noter que les hybridations in situ réalisées pour Sox8 montrent son expression dans les cellules de Sertoli mais également dans les cellules de Leydig, suggérant ainsi un rôle potentiel de Sox8 dans la régulation de la stéroïdogenèse. Des colocalisations avec des marqueurs spécifiques des cellules de Sertoli et des cellules de Leydig seront ensuite réalisées.
Engineered nanomaterials (ENMs) are capable of adsorbing onto each other, organic, and inorganic substrates, including protein. The dynamics of this interaction are related to the properties of the ENM, protein, and media in which it takes place. It has been shown that ENMs can influence critical membrane proteins in vivo; however, it is unclear if this is due to protein damage or impacts on the membrane itself. This project will develop an understanding of how ENMs interact with membranes and membrane proteins as a critical step in predicting ENMs toxicity, and improving the targeting/delivery of therapeutic ENMs for drug delivery or other applications. This interdisciplinary study has begun by using an advanced, in vitro synthetic monolayer system created via a Langmuir trough film. The subjects of this model system focus upon the effect of gold nanoparticles (AuNPs) of varying hydrophobicity on peripheral membrane protein glucose 6-phosphatase. Membranes are created upon the Langmuir apparatus by co-spreading their constituents (lipid/protein/AuNPs) on the surface of buffered subphase, and compressing the monolayer to physiological pressure. The bioactivity or toxicity of the ENM is assessed by an enzymatic activity assay performed upon the subphase. Significant changes in levels of phosphate produced are further investigated as potential AuNP effects. Thus far, the membrane has been successfully created, and baseline enzyme activity established. Preliminary results for hydroxyl-terminated AuNPs have shown associations with the protein (AFM imaging), and a two-fold enzyme activity increase. Further investigation of this effect and two other AuNP variations have yet to be explored.
Title of the research project - Titre du projet de recherche
Zebrafish as a Model System in Natural Product Screening of Angiogenic Compounds

Poster presenter - Nom de la personne qui présentera l'affiche
Kathleena I. Sarty

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Martyniuk, Christopher; Gray, Christopher.

Abstract - Résumé
Angiogenesis plays a key role in tumor growth and metastasis and has stimulated a great deal of interest in the discovery of anti-angiogenic compounds for cancer drug development. However, many of the current drugs approved for human use have not fulfilled the potential that they showed in pre-clinical animal trials. To address this, a better predictive model is required for the discovery and development of anti-angiogenic drug candidates. As zebrafish show marked similarities to humans with respect to molecular signaling, genetics, and physiology, they may provide a viable in vivo model for identifying and studying molecules that can modulate angiogenic processes. This study aims to use transgenic zebrafish with a green fluorescent protein marker in their vasculature to develop a high-throughput screening assay for the detection of angiogenic-modulating compounds from a library of extracts derived from medicinal plants. Results indicate that vasculature fluorescence can be detected using a fluorescence plate reader and increases linearly with increasing numbers of embryos. Results also indicate that homogenizing embryos prior to measuring fluorescence results in less variability in the bioassay data. Future work will focus on verifying our bioassay procedure using microscopy to directly observe the vasculature of the zebrafish embryos and using the assay to guide the fractionation of anti-angiogenic natural products from medicinal plant extracts.
Title of the research project - Titre du projet de recherche
Transcription factor EB is necessary for cytoprotective autophagy as a response to genotoxic stress in breast cancer cells

Poster presenter - Nom de la personne qui présentera l’affiche
Logan Slade

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Slade, Logan ; Ihionu, Francis; Kienesberger, Petra ; Pulinkunnil, Thomas.

Abstract - Résumé
Background: Over recent decades, an increase in breast cancer survival rates has corresponded with the development of newer, targeted, therapies, with concomitant usage of nonspecific cytotoxic agents, such as the standard-of-care chemotherapeutic, Doxorubicin. Despite these advances, unresponsiveness to therapy remains a significant obstacle for many patients. There can be many causes for therapy resistance, including dysregulation of the DNA damage response and cytoprotective lysosomal autophagy. Lysosomal function is regulated by transcription factor EB (TFEB), which has thus far remained unstudied for a role in breast cancer chemoresistance. Aim: To determine if TFEB through its control on lysosome autophagy regulates breast cancer sensitivity to chemotherapeutic agent doxorubicin (DOX). Methods and Results: Breast cancer cell lines MCF-7 and MDA-MB-231 were treated with 1 uM doxorubicin in the presence or absence of adenoviral modification of TFEB and subsequently examined for markers of cell death and autophagy by immunoblot analysis. Our results show that in MCF-7 cells, DOX treatment significantly reduces protein synthesis and growth pathways such as reducing S6K phosphorylation, while inducing endoplasmic reticulum stress as characterized by XBP1 upregulation. However, the more aggressive MDA-MB-231 cells do not show a similar effect in response to DOX treatment. Interestingly, knockdown of TFEB in MDA-MB-231 unmasks the intrinsic apoptotic pathway, as shown by a significant increase in caspase-3 cleavage, and is associated with reduced autophagy as determined by the LC3 II/I ratio. Significance: These data indicate that TFEB may be an important characteristic of aggressive breast cancer and can be targeted for sensitization to genotoxic agents.
Title of the research project - Titre du projet de recherche
Development of a Novel Device for Dynamic Balance Assessment and Training

Poster presenter - Nom de la personne qui présentera l'affiche
Rob Smith

First author - Premier auteur
Yes

Education Level
PhD Students

Researchers involved in this project - Chercheurs participant au projet
Smith, Rob; Dillman, Luke; McGibbon, Chris; Scheme, Erik.

Abstract - Résumé
Balance assessment is a key component of monitoring recovery and preventing future injuries when rehabilitating patients with lower-limb injuries or chronic mobility impairment. Traditional methods of balance assessment typically lack the sensitivity to inform therapeutic strategy, depend on subjective measurement techniques, or require equipment that is prohibitively expensive. This work represents the initial design, as part of a larger study, to develop a novel balance assessment and training tool that is cost-effective and offers clinically relevant data that can be used to personalize a patient’s rehabilitation for their specific needs. A working prototype has been produced which combines a popular low-cost, portable, easy-to-use, and commonly prescribed rehabilitation tool with wireless sensor technology. Furthermore, corresponding software has been developed which leverages methods borrowed from models of human movement and human machine interface theory to quantify the information throughput when performing dynamic balance tasks. This toolkit will provide objective and repeatable balance metrics to inform diagnoses and track patient progress, while also describing the individual characteristics of the patient’s balance dysfunction in detail. Finally, balance assessment tasks are presented in a “gameified” format, which enhances patient motivation and engagement. Preliminary testing of the device is complete, with 21 able-bodied participants having successfully performed dynamic balance tasks using the device. Statistical analyses indicated significant correlations ($r = 0.65$ to 0.95) between measures of dynamic balance collected with the device, suggesting that novel balance metrics might be developed with the potential to enhance the diagnosis of balance disorders, increase treatment efficiency, and shorten recovery times.
Title of the research project - Titre du projet de recherche
Application of metabolomic and bioactivity profiling to the discovery of novel bioactive natural products

Poster presenter - Nom de la personne qui présentera l'affiche
Morgan M Sproul

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Sproul, Morgan ; Gray, Christopher ; Johnson, John.

Abstract - Résumé
The emergence of drug resistant pathogenic microbes is an increasing threat to human health. Natural products from fungal sources have historically been a rich source of antibiotics, although the repeated isolation of known compounds is a significant challenge that is limiting drug discovery from fungi. As it is important that we focus our efforts on extracts that have the greatest potential to contain novel bioactive compounds, the selection of appropriate extracts from a large library becomes a critical step in the drug discovery process. This research project has employed two prioritization methods in an attempt to increase the efficiency and reliability of discovering novel natural products from a library of endophytic fungal extracts. The first prioritization method employed NMR metabolomic profiling to identify unique chemistry amongst fungal extracts. The second method employed bioactivity profiling to identify unique extracts based on their biological activity in comparison to other extracts and antibiotic standards. Our data suggests that prioritization of an extract library using both chemical and biological methods can be a more efficient means of discovering drug leads. Extracts from a library derived from marine macroalgal endophytes that have been identified as outliers possessing unique chemical and biological properties are currently being subjected to bioassay guided fractionation in an effort to isolate novel therapeutically relevant natural products.
Title of the research project - Titre du projet de recherche
Glucolipotoxicity reduces lysosomal protein expression and impairs autophagy in the myocardium

Poster presenter - Nom de la personne qui présentera l'affiche
Trivedi Purvi

First author - Premier auteur
Yes

Education Level
Master's Students

Researchers involved in this project - Chercheurs participant au projet
Bartlett, Jordan; Kienesberger, Petra; Pulinilkunnil, Thomas.

Abstract - Résumé
Background: Impaired energy metabolism in the obese-diabetic heart leads to glucolipotoxicity and cardiomyopathy. Glucolipotoxicity augments endoplasmic reticulum (ER) stress, apoptosis and impairing protein degradation in the heart. Protein degradation occurs via autophagy in the lysosome. Limited studies have examined the impact of glucolipotoxicity on lysosomal proteins governing autophagy. Lysosomal function is regulated by transcription factor EB (TFEB). Hence, it is plausible that glucolipotoxicity induces lysosomal-stress by negatively targeting TFEB to inhibit autophagy, causing cardiac injury. Hypothesis: In the obese-diabetic myocardium, glucolipotoxicity remodels TFEB action and its effectors impairing lysosome autophagy, exacerbating ER stress and rendering heart susceptible to cardiomyopathy. Methods/Results: We utilized mouse model of diet-induced obesity, type-1 diabetes (Akita) and ex-vivo model of glucolipotoxicity (H9C2 cells and NRCMs, neonatal rat cardiomyocytes). At baseline, protein expression of LC3-II was decreased in obese and increased in diabetic heart. Despite differential effect of obesity and diabetes on LC3-II, markers of chaperone mediated autophagy, LAMP-2A and hsp90 were decreased in both obese-diabetic heart, signifying impaired autophagosome clearance. To examine the direct effect of glucolipotoxicity, we incubated H9C2 and NRCMs with high glucose and fatty acid (Glu/FA) in the presence or absence of chloroquine (CQ). CQ elicited LC3-II accumulation was decreased in cells treated with high Glu/FA suggesting that ex-vivo glucolipotoxicity impairs autophagic-flux. Notably, in-vivo and ex-vivo states of glucolipotoxicity were associated with increased phosphorylation of TFEB, signifying inhibitory post-translational modification of TFEB. Significance: Collectively, glucolipotoxicity in the obese-diabetic heart augments inhibitory phosphorylation of TFEB which likely prevents TFEB nuclear translocation, impairing autophagy, exacerbating cardiac injury.
Title of the research project - Titre du projet de recherche
How do door to EKG (D2EKG) and door to needle (D2N) times for New Brunswick STEMI patients compare to current guidelines?

Poster presenter - Nom de la personne qui présentera l'affiche
Abigail White

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
White, Abigail; Hassan, Ansar; Yip, Alexandra; Teskey, Robert; Paddock, Vernon; Lutchmedial, Sohrab.

Abstract - Résumé
Background: Prognosis of patients presenting with STEMI is improved by decreasing the time from symptom onset to treatment. Door to EKG (D2EKG) ≤ 10 minutes and door to needle (D2N) ≤ 30 minutes are accepted benchmarks for patients undergoing thrombolysis. This study addressed two questions: (1) What are D2EKG and D2N times for patients presenting with STEMI and (2) Is there a difference in D2EKG and D2N times during On- and Off-hours. Methods: All patients diagnosed with STEMI and receiving thrombolysis between December 31, 2010 and June 29, 2013 were considered. D2EKG was time of admission to Emergency Department (ED) to time of diagnostic EKG. D2N was time of admission to ED to time that thrombolytics were given. “On-hours” was 8:00am-5:00pm Monday-Sunday, while all other times were considered ‘Off-Hours’. Data were obtained from the New Brunswick Heart Centre STEMI database Results: A total of 843 patients were included. Mean D2EKG time was 20.3 minutes and mean D2N time was 47.4 minutes. The percentage of patients who had a D2EKG time and D2N time within guidelines was 51.7% and 47.7% respectively. There were no significant differences in D2EKG and D2N times between patients presenting during On- and Off-hours. Conclusion: These results suggest that significant limitations in access to care are found across the province for patients presenting with STEMI regardless of the time of presentation, and that improvements in processes of care are needed to reduce times to intervention to thereby improve patient outcomes.
Title of the research project - Titre du projet de recherche
Can I really return to work? Dealing with difficult topics through plays

Poster presenter - Nom de la personne qui présentera l'affiche
Anil Adisesh

First author - Premier auteur
Not specified

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Adisesh, Anil; Kek, Boon; Stewart, Wendy; Fisher, Robert.

Abstract - Résumé
Objective Studies in occupational rehabilitation show that there are economic costs in a delay (temporary or permanent) in returning to work. Furthermore, occupation is an important part of an individual's psychosocial identity and it is helpful for the individual to return to work as soon as medically able, even to modified work responsibilities. The main objective of this project is to provide physicians with accessible educational information to learn how to approach clients who are having difficulty in returning to work. Methods This project aims to utilize theatre techniques to address scenarios where clients who have work related health issues are having difficulty in their return to work. The project centres on, but is not limited to, the circumstances where the patient is medically able to return to some work duties, but is averse to the suggestion. In depth semi-structured interviews with physicians and patients were conducted to understand the challenges each party faces. Results 19 physicians and 15 patients have participated to date. The interviews have been transcribed and are undergoing thematic analysis which we will present. These themes will form the basis of dialogue to be written by a playwright. Conclusions Deciding return to work is a complex process with influences that are non-medical. The approach for this project is a non-traditional methodology of using theatre techniques to convey the content. The use of theatre techniques in education is relatively established and have been shown to be effective if employed correctly.
Title of the research project - Titre du projet de recherche
Development of a collocated multi-sensor armband for prosthetic controls research

Poster presenter - Nom de la personne qui présentera l'affiche
Alex Belyea

First author - Premier auteur
Yes

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Belyea, Alex; Scheme, Erik; Englehart, Kevin.

Abstract - Résumé
Surface pressure exerted by muscle contractions has been evaluated as a control input for human-machine interfaces and as an estimate of muscle activity. This has been achieved through the use of a variety of pressure sensing techniques and has been referred to as either Force Myography (FMG), Residual Kinetic Imaging (RKI), or Myokinetic Imaging (MKI). This approach for measuring muscle activity has recently been compared with the prevalent method of observing muscle activity using surface electromyography (sEMG) electrodes. While previous work with FMG has focused on monitoring the magnitude of muscle activity either in grip strength or finger activation, our recent research has used forearm pressure information to discriminate between grasp types with promising results. In order to assess the viability of any human-control interface, it is important to consider both the accuracy and the real-time usability. In this work, we designed a two part rigid cuff platform capable of simultaneously measuring collocated EMG and FMG signals through the use of 16 sets of dome electrodes mounted over force sensitive resistors. The body of the device was developed using 3D modeling techniques and constructed using rapid prototyping. Once assembled, it was fitted with both force sensitive resistors and EMG sensors. This device, which is adaptable to different limb sizes, will allow further study of the relative merits of an FMG based control system with greater precision and comparability than ever before and provide a platform for the comparison of FMG, EMG, and combination control systems.
Patients with congenitally absent arms are usually treated from childhood and have a different pattern of prosthetic usage than those with acquired amputations. Differences in treatment practice disappear over time. Our clinic has 34 years experience fitting upper limb prostheses to all age groups across Atlantic Canada. The active caseload is over 120 amputees with 47% congenital and 53% acquired. Males represent 46% of the current patients and 70% of the males have acquired amputations mostly as working age adults. Among those with congenital loss, 80% are at a trans-radial level or more distal. For the acquired group, 63% have losses at the trans-radial or more distal level. Median age at first fitting is 1 y.o. for congenital amputees and 32 y.o. for acquired. The pattern of fittings reflects these age differences. At first fitting 71% of acquired amputees use powered prostheses and 29% have either a body powered, passive or other sort of work prosthesis. Over time, many of these individuals will try externally powered devices with that number reaching 83%. For current fittings, 71% have powered devices with about 25% also having non-powered devices. The pattern for congenital limb loss is different. Initially about 38% use a powered device, rising to 90% over time. At the most recent visit, 78% of those with congenital limb loss had an externally powered prosthesis with half of these patients using passive or leisure devices too. Over time the choices of the people with congenital limb loss begin to converge with those with acquired limb loss.
Abstract - Résumé
Background: In Canada, the wait times for spine surgeons are long. During this time patients often utilize healthcare that can be costly, and that may not comply with best evidence. Purpose: To assess national frequencies of imaging, tests and injections in spine surgery candidates in the six months prior to surgical consultation for patients who had degenerative spinal pathology or deformity of the thoracolumbar region. Methods: We conducted a retrospective analysis (N=527) of prospectively collected data from the Canadian Spine Outcomes and Research Network (CSORN; 12 sites from across Canada). Participants completed the Initial Thoraco-Lumbar Patient Assessment prior to surgery. The current study used patient information on principle pathology and imaging utilization: "In the past 6 months I have had...", and listed X-ray, CT Scan, MRI, Bone Scan, EMG/Nerve Conduction, Spinal Injections with x-ray Control, and Spine Injections without X-ray control. Patients were then asked to check "Never, 1 time, 2 times, 3 times, or >3 times" for each answer. Results: Patients reported overall uses were: one use 836, 2 uses 274, 3 uses 126 and >3 uses 236. This equals a conservative estimate (if >3=4) of 1471. MRI had the highest prevalence of use, followed by x-rays. There was no statistically significant difference in the frequency of imaging utilization based on principle pathology. Conclusions: Patients requiring spine surgery demonstrate a high utilization of diagnostic imaging on their pathway to the surgeon. Defining a Canadian strategy to manage and optimize the care and resource utilization for these patients is recommended.
Title of the research project - Titre du projet de recherche
Pre-operative amber flags psychological measure scores and patient expectations: A nation-wide analysis form the CSORN database.

Poster presenter - Nom de la personne qui présentera l'affiche
Kate Wagg

First author - Premier auteur
No

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Manson, Neil; Green, Alana; McIntosh, Greg; Wagg, Kate; Bigney, Erin; Abraham, Edward.

Abstract - Résumé
Background: A disconnect exists between patient and surgeon expectations for post-operative outcomes. Spine surgeon's primary objective of elective thoracolumbar surgery is to correct radicular symptoms, yet patients report back pain to be the primary indication for surgery. Patient expectations could have a significant impact on patient satisfaction and lasting disability. Methods: A retrospective analysis of prospectively collected Canadian Spine Outcomes and Research Network data; which has 12 sites across Canada (N=568). Patients completed a series of validated pre-operative questionnaires, including the SF-12,ODI, PHQ9 and EQ5D. "Amber flags" were defined as having a score less than 42 on the SF-12 Mental component summary (MCS), or a score greater than or equal to 15 on the PHQ-9, or an EQ5D anxiety/depression response of "extreme"(n=424). These patients were compared to patients with "No Amber Flags": SF-12 MCS=42+, PHQ9<15, EQ5D anxiety/depression=none or moderate (n=144).Prior to surgery, patients are asked to choose the single most important change out of seven choices that they expect to occur as a result of their operation. Results: Those without amber flags listed a reduction in leg pain as their number one reason significantly most often (37.3%) and those with amber flags listed a reduction in back pain significantly most often (41.7%) (rs[568] = .13, p < .013); however, the effect size was very small. Pain was significantly more important than function to both groups (p<0.05). Conclusions: Surgeons should be especially careful to address patient expectations in patients who demonstrate psychiatric symptoms on pre-operative questionnaires.
Title of the research project - Titre du projet de recherche
The impact of a 6-month Intervention on Perceived Barriers to Weight loss in an Obese Sample

Poster presenter - Nom de la personne qui présentera l'affiche
Andrea Bowes

First author - Premier auteur
No

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Hamilton, Ryan; Bowes, Andrea; Miedema, Baukje; Reading, Stacey.

Abstract - Résumé
Obesity is a significant problem in Canada (Statistics Canada, 2014). A common ‘remedy’ includes diet, exercise or some combination of the two. Our research explores a third dimension; how psychological factors influence behavioral change. We look at self-reported barriers to fitness (e.g., lack of motivation, negative perception of exercise) and how intervention might change these perceived barriers. The H.E.A.L.T.H study was a community based intervention that consisted of 12 weeks of supervised physical activity, nutrition counselling and, of relevance to the present work, group mediated cognitive behavioral intervention (GMCBI). We hypothesized that those participants receiving GMCBI would show a reduction in perceived barriers to fitness over the course of the study. Additionally we predicted these participants would show significant improvements in self-reported physical and mental well-being. Results indicated the GMCBI group showed significant improvement in self-reported physical changes (e.g., feelings of energy, beliefs on personal health). Moreover, a hierarchical regression showed change in mental and physical scales significantly predicted change in perceived barriers to fitness. Participants’ experience of barriers was reduced over time and correlated with psychological well-being. These findings suggest that barriers are as much psychological obstacles as real ones. Results are discussed in light of the current literature on obesity and the role of psychological factors.
Use of St. Jude Medical Portico Valve: The Canadian Experience

Claudia Cote

Medical Students

Cote, Claudia; LeBlanc, Heather; Forgie, Rand; Paddock, Vernon; Archer, Brian; Ferguson, Darren; Hassan, Ansar; Ruel, Marc; Pelletier, Marc.

BACKGROUND: Transcatheter aortic valve implantation (TAVI) is an evolving treatment for patients with severe aortic stenosis who are high-risk surgical candidates. Technical challenges remain in terms of avoiding paravalvular leaks and conduction abnormalities. A valve that is repositionable such as the Portico Valve (St. Jude Medical, Minneapolis, Minnesota), may minimize common complications associated with TAVI. The objective of this study was to describe outcomes in a Canadian series of patients who underwent TAVI with the Portico Valve. METHOD/RESULTS: The Portico Valve was successfully implanted in 25 consecutive patients. Patients underwent transthoracic echocardiography before and after TAVI. Clinical outcomes were evaluated at 6 weeks following surgery. Average age was 80.2 yrs ±7.3 yrs. Preoperative echocardiography showed a mean aortic valve area of 0.7cm² ±0.4cm², mean aortic valve gradient (mAVG) of 43.4mmHg ±21.1mmHg, and an ejection fraction of 52.7% ±16%. Valve repositioning occurred once in 9 (36%) patients and twice in 4 (16%). Following implantation of the Portico Valve, mAVG were 8.8mmHg ±4.5mmHg. 9 patients (36%) had no paravalvular leak, while 6 (24%) had trivial, 7 (36%) had mild, and 3 (12%) had moderate paravalvular leaks. One patient (4%) required a pacemaker insertion. CONCLUSION: The first Canadian series of successful implantation of the Portico Valve. The repositioning feature was used in nearly one third of patients, resulting in adequate positioning in all patients with low rates of aortic insufficiency and pacemaker requirements. Further research will be needed to compare the Portico valve to other TAVI valves with regards to clinical outcomes.
Determining the cognitive contributions during standing balance control.

Poster presenter - Nom de la personne qui présentera l'affiche
Jean-Philippe Cyr

First author - Premier auteur
Non spécifié

Niveau de formation
Étudiants de 1er cycle

Researchers involved in this project - Chercheurs participant au projet
Cyr, Jean-Philippe; Mallet, Mathieu; Handrigan, Grant.

Abstract - Résumé
Introduction: For a human, maintaining upright standing requires the coordination of both our sensory systems and our neuromotor responses. This process is directed by the central nervous system and is known as perception-action coupling. Our success at maintaining our upright stance depends on an accurate sensorimotor integration. The central nervous system performs the sensorimotor integration process and relies heavily on our cognitive abilities. Therefore, it is important to be able to quantify the cognitive capacity of an individual during upright stance.

Reaction time has often been used as an indirect measure of the shared cognitive contributions for a dual-task experimental design. Here, we present a tool that has the capacity to measure reaction time during upright standing balance control. This tool, the RT2, has potential application in a clinical context.

Methodology: This tool consists of a custom hardware device that uses a microcontroller (Arduino® Mega 2560) interfaced with a force plate (Kistler® 9281) via a custom Matlab® script. The RT2 has the capacity to simultaneously capture ground reaction force data, to send a visual stimulus and measure reaction time in real-time.

Conclusion: The RT2 is in development and requires experimental validation before it can be potentially integrated into a clinical context. A theoretical and conceptual framework will be presented for discussion.
Title of the research project - Titre du projet de recherche
Cellular Uptake and Localization of a Peptide, SOR-C13, Targeting TRPV6 Channels: Towards Rationale Design of Anti-Cancer Peptide Drug Conjugates

Poster presenter - Nom de la personne qui présentera l'affiche
Michelle Davey

First author - Premier auteur
Yes

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Davey, Michelle; Dugourd, Dominique; Lutes, Tyler; Rice, Christopher; Gormley, Sean; J.M., Stewart.

Abstract - Résumé
The use of tumour-selective peptides for targeted delivery of anti-cancer drugs is evolving as a powerful strategy to improve treatment efficacy and minimize harmful side effects. SOR-C13, a peptide derived from soricidin, the paralytic component of saliva of the Northern Short-tailed shrew, specifically targets and inhibits TRPV6 calcium channels that are over-expressed in a number of cancers (e.g. breast, ovarian, prostate). Informed design of effective peptide-drug conjugates requires knowledge of the mechanism of peptide uptake and its intracellular fate. Modified SOR-C13 peptides were labeled with fluorescein maleimide to act as a drug payload surrogate and to enable monitoring of cellular uptake and localization. Peptide internalization was assessed by incubation of labeled SOR-C13 with cell lines expressing high (T-47D) and low (SK-OV-3) levels of TRPV6 and subsequent live cell fluorescence microscopy. Tagged SOR-C13 uptake via TRPV6 channels was demonstrated by competition assay with unlabeled parent peptide and co-localization with anti-TRPV6 antibody. Various organelle-specific fluorescent trackers for nuclei, actins, lysosomes, endoplasmic reticula, golgi and endosomes were paired with labeled SOR-C13 peptides and anti-TRPV6 antibody in fluorescence imaging time course studies to monitor the rate of SOR-C13 internalization and intracellular trafficking of SOR-C13 and peptide-TRPV6 complexes. This proof-of-concept study provides a basis for future design and optimization of SOR-C13 peptide (and other soricidin derived peptides) anti-cancer drug conjugates.
Title of the research project - Titre du projet de recherche
Current and Future Research Endeavors at York Care Centre

Poster presenter - Nom de la personne qui présentera l'affiche
Jennifer Donovan

First author - Premier auteur
Yes

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Pakzad, Sarah.

Abstract - Résumé
York Care Centre is known as a Centre of Excellence, striving to this standard for many years, continuously working on the quality of care and quality of life provided to all of their residents. With the goal of continuously striving toward this standard, recognizing the importance of research and evidence-based practice, York Care Centre has been involved with several research projects. One of the current projects is with Dr. Pakzad at Université de Moncton assessing for cognitive impairment within our resident population. This study will help advance the knowledge in the field of dementia. Another project that has seen substantive results in collaboration with the Canadian Foundation for Healthcare Improvement is “Appropriate Antipsychotic Medication Use in Long-term care”. This project has seen improvement in residents' abilities, function and interaction and engagement with their families and staff. There are a number of other projects under development at this time. We at York Care Centre would love to establish partnerships with other researchers within the Maritimes as well as Canada to build research capacity. York Care Centre is pleased with the partnerships established with various researchers and foundations. We intend to utilize the evidence to help enhance resident quality of life, the ultimate care in what long-term care encompasses.
Title of the research project - Titre du projet de recherche
Mechatronic Design of a Low-Cost Myoelectric Hand

Poster presenter - Nom de la personne qui présentera l'affiche
Christian Grandmaison

First author - Premier auteur
Yes

Education Level
Undergraduate Students

Researchers involved in this project - Chercheurs participant au projet
Grandmaison, Christian; Sensinger, Jonathan.

Abstract - Résumé
People with an upper limb amputation often use a prosthetic hand to interact with objects in their environment. These devices must move and generate forces, and the fingers must be able to be positioned in a variety of grasp patterns to interact with different types of objects, such as the way a key is held vs. the way a glass is held. Existing prosthetic devices have either used a single motor to provide a single grasp, resulting in poor interaction with the environment; or they have used multiple motors so that multiple grasp patterns can be achieved, resulting in a fragile and highly expensive device. The field needs a simple device that can achieve multiple grasp patterns with a simple motor in a rugged, low-cost design. We have designed a prosthetic hand in which the thumb, rather than the fingers, is actuated. The rotation of the thumb can be manually positioned to enable grasps such as a key grip vs. cylindrical grip. Each of the fingers may be manually locked in either a flexed or extended position using a novel and simple spring mechanism enables the fingers to remain stationary in either configuration. Thus we have decoupled the problem of grasp patterns (provided by our passive and positionable fingers) from the problem of generating force (provided by our thumb), resulting in a low-cost prosthetic hand that is appropriate to grasp a myriad of objects.
Title of the research project - Titre du projet de recherche
Repetitive Strain Injury Risk Factors in Upper Limb Amputees

Poster presenter - Nom de la personne qui présentera l'affiche
Wendy Hill

First author - Premier auteur
Not specified

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Leblanc, Shannon; Biden, Ed.

Abstract - Résumé
Background: Little research has been done regarding repetitive strain injury or its risk factors in upper limb amputees although it has been reported that up to half have overuse symptoms. Aim: This study examined self-reported pain in working age adults within our clinic population and compared those results to an age matched group of normally limbed controls. Method: Our clinic has an active caseload of approximately 140 upper limb amputees. This study consisted of a survey designed to identify activities and characteristics which might be risk factors for Repetitive Strain Injury. The survey included basic information on gender, height, weight, etc. There were also questions about participation in activities with or without a prosthesis and questions related to pain. Results were analysed using MiniTab statistical software. Comparisons were made between the amputee and normally limbed groups to ensure comparability. Amputees were compared with normally limbed for activity and pain, and comparisons were made between pain levels associated with the sound limb of the amputees and the dominant arm of the normally limbed group. Results: Normally limbed individuals reported minimal levels of pain in a combined neck/shoulder/upper arm measure. By comparison 25% of the amputee population reported more than minimal pain levels. 12% of normally limbed reported wrist and hand pain vs 36% for the sound side of the amputees. These are broadly comparable to results in the literature. Texting was the activity which correlated most closely with pain in the amputees sound hand and wrist.
Title of the research project - Titre du projet de recherche
Partnering to Improve Patient Transitions from Hospital to Home

Poster presenter - Nom de la personne qui présentera l'affiche
Hodgins, Marilyn

First author - Premier auteur
Not specified

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Hodgins, Marilyn; Logan, Susan; Buck, Dawn Marie; Smith, Colleen; Janes, Laurie; Fraser, Jacqueline; Violett, Jeanna.

Abstract - Résumé
BACKGROUND: Unplanned use of acute care services (emergency department visit or hospital readmission) by recently discharged patients is costly not only to the healthcare system but also to patients and their families. To reduce the rate of such usage, patients who are identified at risk for problems following discharge are frequently referred to home healthcare programs. Although it is recognized that such referrals are not always successful in preventing re-entry into the acute care system, the rate and reasons for unsuccessful transitions and how these differ for those who receive home care services post-discharge are currently unknown. PURPOSE: This project was undertaken to: examine the incidence of acute care service use by patients within 30 days of hospital discharge; describe the demographic, clinical, and social profile of these patients; and compare the pattern of use for those who did and did not receive home healthcare post-discharge. METHOD: Project involved an analysis of administrative data for 13,403 discharges to a private residence. RESULTS: Approximately 9% of these discharges involved a referral to home support services. Of the 2,205 (16.5%) patients who experienced a readmission within 12 months, almost half were readmitted within 30 days of discharge. Only 12.6% of these cases were identified as being at-risk for readmission based on their Blaylock Risk Assessment Screen. DISCUSSION: Findings will be discussed in terms of the insights that they offer regarding the proportion of unsuccessful transitions occurring within 30 days of hospital discharge and aspects of the transition process warranting closer examination.

CONTEXTE: l'utilisation non planifiée des services de soins de courte durée (visite au service d'urgence ou de réadmission à l'hôpital) par les patients récemment déchargé est coûteuse, non seulement pour le système de santé, mais aussi pour les patients et leurs familles. Pour réduire le taux de cette utilisation, les patients qui sont identifiés à risque des problèmes après avoir été déchargé sont souvent référés aux programmes de soins à domicile. C'est reconnu que ces références ne sont pas toujours couronnés de succès dans la prévention de ré-entrée dans le système de soins actifs, le taux et les raisons de transitions infructueuses et comment ceux-ci diffèrent de ceux qui reçoivent des services de soins à domicile post-décharge sont actuellement inconnus. BUT: Ce projet a été entrepris pour: examiner l'incidence de l'utilisation des services de soins de courte durée par les patients dans les 30 jours de congé de l'hôpital; décrire le profil démographique, clinique et sociale de ces patients; et de comparer le modèle d'utilisation pour ceux qui a fait et n'a pas reçu de soins à domicile post-décharge. MÉTHODE: Projet comportait une analyse des données administratives pour 13,403 rejets dans une résidence privée.
RÉSULTATS:
Environ 9% de ces rejets impliqués un aiguillage vers des services de soutien à domicile. Sur les 2.205 (16,5%) patients qui ont subi une réadmission dans les 12 mois, près de la moitié ont été réadmis dans les 30 jours suivant la sortie. Seulement 12,6% de ces cas ont été identifiés comme étant à risque de réadmission sur la base de leur évaluation des risques écran Blaylock.
DISCUSSION: Les résultats seront discutés en termes de les idées qu'ils offrent concernant la proportion de transitions infructueuses survenant dans les 30 jours suivant la sortie de l'hôpital et les
Title of the research project - Titre du projet de recherche
The effect of supramaximal exercise training on mechanical efficiency values among sedentary obese adults

Poster presenter - Nom de la personne qui présentera l'affiche
Iancu Horia-Daniel

First author - Premier auteur
Oui

Niveau de formation
Professionnels de la santé

Researchers involved in this project - Chercheurs participant au projet
Jabbour, Georges.

Abstract - Résumé
Purpose: Mechanical efficiency (ME) refers to the ability of an individual to transfer energy consumed by external work. This performance indicator is impaired by obesity and is associated with decreased high intensity exercise performance. However, it is unclear if ME may be improved in response to high intensity training (HIT). This study aimed to determine if ME increases in response to HIT in obese adults and to identify the factors associated with these changes.

Methods:
Twenty-four obese adults (body mass index =~33 kg/m2) were randomized into control (n=12) and trained (n=12) groups. Following baseline metabolic, anthropometric, fitness and ME measurements, the participants completed a 6-week exercise intervention that included 18 sessions of 6 repeats of 6-second supramaximal sprints on an electromagnetically braked cycle ergometer. The metabolic, anthropometric and fitness assessments were repeated post-intervention. ME (expressed as a %) was calculated during an incremental maximal cycling test at stages of 25, 50, 75, 100 and 125 watts.

Results: Mechanical efficiency did not differ across the groups at 25 and 50 W. Following HIT, ME increased significantly at 75, 100 and 125 watts (p<0.01, respectively) compared with the control group (p<0.01, respectively). Although no changes in fat free mass were observed following HIT, the increases in ME at 75, 100 and 125 W correlated positively with both HOMA-IR index decreases (r=0.9; r=0.89 and r=0.88, p<0.01, respectively) and peak power increases (r=0.87, r=0.88 and r=0.9, p<0.01, respectively).

Conclusion: Although there were no changes in the participants' anthropometric variables, HIT improved ME in obese adults, an enhancement that appears to be related to increases in muscle strength and metabolic adaptations.
Title of the research project - Titre du projet de recherche
Longitudinal assessment of Mechanical efficiency in children with different body weights

Poster presenter - Nom de la personne qui présentera l'affiche
Jabbour Georges

First author - Premier auteur
Non spécifié

Niveau de formation
Professionnels de la santé

Researchers involved in this project - Chercheurs participant au projet
Tremblay, Angelo.

Abstract - Résumé
Background: Net mechanical efficiency (MEnet), which reflects the body's ability to transfer energy above resting levels in external work, is similar in young children regardless of their body weights. However, it is unclear if MEnet remains stable during growth and maturation. Objective: To determine if MEnet changes over a period of 3 years in children and to identify the factors associated with said changes. Design: A total of 169 children participating in the QUALITY cohort completed an incremental maximal cycling test, resulting in the same maximal power output during both visits. MEnet was calculated at the 25, 50, 75, 100 and 125 Watt stages. Results: MEnet did not differ across the visits at the 25, 50 and 75 Watt stages. However, the participants exhibited lower MEnet values at follow-up for the 100 and 125 W stages (22.3 vs. 20.1%; 22.4 vs. 20.1%; p<0.01). Declines in MEnet correlated positively with declines in moderate-to-vigorous physical activity levels (r=0.78, p<0.05). The declines in moderate-to-vigorous physical activity levels across the visits were identified as significant predictors of MEnet changes at 100 and 125 W over 3 years, accounting for 22% of the relationship. Conclusion: In children, reductions in MEnet were observed in the setting of high intensity exercise within a period of three years and appeared to be related to high-intensity physical activity.
Title of the research project - Titre du projet de recherche
How well does a Memory Clinic support patients in a community?

Poster presenter - Nom de la personne qui présentera l'affiche
Pamela Jarrett

First author - Premier auteur
Not specified

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
McCollum, Alexander; Jarrett, Pamela; Moorhouse, Paige; McCloskey, Rose; Godin, Judith; Fay, Sherri; McMillan, Miranda; Andrew, Melissa.

Abstract - Résumé
Background: The Memory Clinic in Saint John, NB offers a unique model of care, providing follow-up care for those with a known diagnosis of dementia living in the community and is staffed by a part-time nurse and a geriatrician. The goal of this clinic is providing ongoing support for the management of the patient’s cognitive, behavioural, functional, and social needs. Methods: Charts were reviewed retrospectively on all consecutive discharges from the clinic over a one year period. Results: There were 122 discharges from the clinic with an average follow-up of 28.9 months. The majority were female (69.6%) with a mean age of 85.0 years. Alzheimer’s disease (68.6%) was the most common diagnosis. The mini-mental state exam (MMSE) score declined 4.6 points. There were 192 emergency department (ED) visits by 54.9% of the patients (0.62 visits/year per patient) and 122 acute care hospitalizations of 65.7% (0.52 admissions/year per patient). The most common reasons for discharge from the memory clinic were admission to a nursing home (38.2%), admission to hospital resulting in an alternate level of care stay (20.6%) and 19.6% died. Conclusion: An outpatient based memory clinic focusing on follow-up for patients with dementia supports the patient and family to help them stay in the community for as long as their care needs and supports would allow. The majority transitioned to a nursing home directly from home. Many patients were supported at home until their death.
Title of the research project - Titre du projet de recherche
Validation of the transient receptor potential vanilloid 6 channel (TRPV6) as a potential biomarker in ovarian cancers

Poster presenter - Nom de la personne qui présentera l'affiche
Tyler Lutes

First author - Premier auteur
Yes

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Lutes, Tyler; Stewart, John; MacCormack, Tyson; Davey, Michelle; Dugourd, Dominique; Rice, Chris.

Abstract - Résumé
During the last 15 years over-expression of TRPV6 in multiple epithelial cancer types (breast, prostate, ovarian) has been reported and recently it has been classified as an “oncochannel”. Over-expression of this non-voltage gated calcium channel has been linked to oncogenesis and cancer progression in epithelial-derived cancer types. While TRPV6 is recognized as an oncochannel with the potential to be used as a biomarker in oncology, there are few comprehensive quantitative data available to assess the degree of over-expression of TRPV6 in tumours. To confirm the identity of TRPV6 as a potential biomarker that can be used for diagnostic purpose or in targeted therapies, we present: 1) A comprehensive assessment of the mRNA expression of TRPV6 gene in 191 ovarian biopsies (26 normal and 165 malignant tissue samples) covering the 5 histological subtypes. 2) TRPV6 protein expression assessed with immunohistochemistry in tissue microarrays for ovarian cancers (101) compared to normal (23) biopsies. In the 191 ovarian biopsies, TRPV6 mRNA ranges from 2-fold to 2074-fold larger than for normal controls in 159/165 tumours (p < 0.0001). Elevated TRPV6 gene expression occurred across all ovarian tumour stages, grades, histopathological types and subtypes with the mean of all carcinomas 69-fold (n = 20) and adenocarcinomas 100-fold (n = 134) above normal tissue (n = 26). Similarly, the immunohistochemistry analysis showed significantly higher ranking for cancer biopsies versus normal. These data clearly support TRPV6 as a novel and significant biomarker for TRPV6-targeted treatment modalities such as TRPV6 inhibitors, peptide drug conjugates (PDCs), and tumour imaging.
Title of the research project - Titre du projet de recherche
Loneliness as a Predictor of Substance Use in Emerging Adults

Poster presenter - Nom de la personne qui présentera l'affiche
Lillian MacNeill

First author - Premier auteur
Yes

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
MacNeill, Lillian; DiTommaso, Enrico; Brunelle, Caroline.

Abstract - Résumé
The quality of interpersonal relationships has a pervasive impact on functioning as human beings are inherently social by nature. An inadequate sense of belongingness can lead to numerous negative consequences, such as loneliness. Research suggests that most young adults experience significant levels of loneliness, particularly during the initial transition to college and/or independent living. In addition, young adulthood is a period in which exploration and experimenting with alcohol and drugs is common. Emotional and social loneliness have been shown to be distinct constructs with different antecedents and behavioural outcomes; however, the role of different types of loneliness in understanding substance use in emerging adults has not been previously explored. The current study examined loneliness as a predictor of substance use, and the potential role of coping style in moderating this relationship. Two hundred and ninety-nine young adults (18 to 30 years of age) completed self-report questionnaires which measured loneliness, coping style, and substance use. In the current sample 60.3% of participants met the criteria for alcohol misuse, and 3.3% of participants met the criteria for alcohol dependence, while 48.3% of participants met the criteria for drug misuse. Results indicated that chronic social loneliness predicted higher levels of alcohol use, over and above the effect of personality, depression, and anxiety. Additionally, there was no significant interaction between loneliness and coping style in the prediction of alcohol use. The current findings have important implications for the prevention of substance use disorders in emerging adults, as well as informing interpersonally-based intervention strategies.
Title of the research project - Titre du projet de recherche
Development of a new spasticity metric for neurological assessment of patients with upper motor neuron syndrome

Poster presenter - Nom de la personne qui présentera l'affiche
McGibbon, Chris A.

First author - Premier auteur
Yes

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
McGibbon, Chris A.; Sexton, Andrew; Hughes, Glen; Wilson, Adam; Jones, Melony; O'Connell, Colleen.

Abstract - Résumé
Background: Muscle tone assessment of patients with upper motor neuron syndrome (UMNS) is currently limited to subjective rating scales such as the Modified Ashworth Scale (MAS). Clinicians rely on these tools for managing UMNS symptoms of weakness, contracture and spasticity. The purpose of this work was to develop and evaluate the BioTone system for objective assessment of muscle tone that can be used during routine clinical protocols. Methods: The BioTone system consisted of wearable sensors for quantifying joint strength, range of motion, and muscle tone. The system was deployed at three rehabilitation hospitals and data were acquired from 103 UMNS patients. Upper-extremity (UE) assessment was performed on arms of 72 patients. Data acquired from wearable sensors during the UE examination were then used in a linear discriminant analysis (LDA) to classify patients according to the MAS categories, and a new metric (BT-SRFX score) derived using classification probabilities on a continuous 0-10 scale. Results: The LDA correctly classified 72% of elbow flexor and 75% of elbow extensor MAS scores. However, allowing for +/- 1 MAS category, the model predicted 92% and 94% of cases. The new BT-SRFX score correlated with predicted MAS score ($R^2 = .92$) and clinician rated MAS score ($R^2 = .76$). Conclusions: The results support using wearable sensor systems for objectively quantifying elbow muscle spasticity using routine clinical protocols. The integrated measurement and database features of the BioTone system could be integrated EHR systems and/or clinical repositories, and could be easily deployed to conduct multi-site randomized clinical trials.
Title of the research project - Titre du projet de recherche
Care for Children and Youth with Mental Disorders

Poster presenter - Nom de la personne qui présentera l'affiche
Stephen O'Reilly

First author - Premier auteur
Not specified

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Martin-Rhee, Michelle; Cheng, Clare; Gula, Cheryl.

Abstract - Résumé
Mental health is a significant concern for Canada’s children and youth. An estimated 10-20% may develop a mental disorder. Using data from the Canadian Institute for Health Information, this analysis examines trends and patterns in the use of emergency and inpatient services in hospital-based settings among children and youth with mental disorders. Results show that rates of emergency department (ED) use have increased 45% and rates of inpatient hospitalizations have increased 37% between 2006-07 and 2013-14, while hospital visits for other conditions declined. This can be explained mostly by an increase in the rates of youth 10-17 seeking care for Mood and Anxiety disorders. This presentation includes findings specific to Atlantic Canada where possible. The number of patients per 100,000 with an inpatient stay for a mental disorder varied across the Atlantic provinces, from 374 in Nova Scotia to 785 in PEI. More data and information is needed to understand how community-based mental health services contribute to the overall mental health system for children and youth, and may help to examine the impact of stigma reduction on health care utilization. Better coordination and integration of services across the continuum of care could also help front line service delivery and patients’ lived experiences, while impacting provincial funding and accountability.
The increasing rates of sexually transmitted infections (STIs)—in particular chlamydia, gonorrhea and syphilis—have made STIs an important public health priority. Some argue that addressing this increase through the provision of clinical services is not necessarily within the purview of public health. Sexual health clinics provide services to prevent and control the spread of STIs. However, there are no studies in the published literature that capture the breadth of services provided through these sexual health clinics, restrictions affecting those services, or the clients that they serve. The current study is the first nationally-representative study of clinical sexual health services offered by public health. We collected 73 multiple-clinic and 43 single-clinic in-depth surveys across Canada. All clinics contacted were asked to have an informed representative provide us with key service data for the operating year of 2013 through an online survey. The most frequently offered clinical services were: STI risk assessment (86%), sexual risk counseling (77%), HIV outreach and referrals (64%), provision of emergency contraception samples (49%), pelvic exams (48%), and contraception prescription (48%). Nearly half (48.7%) indicated that there were restrictions on who could access sexual health services. These restrictions pertained primarily to age (33%); only 63% offered services to all ages. The findings will provide first insights into the scope of STI and clinical sexual health services available nationally. It will also highlight the implications, challenges and possible future directions for public health in the provision of sexual health programming for Canadians.

*Funded by a grant from the Public Health Agency of Canada.
1 Department of Psychology, University of New Brunswick, Fredericton
2 UNB Student Health Centre, University of New Brunswick, Fredericton
3 Department of Sociology, University of New Brunswick, Fredericton
Title of the research project - Titre du projet de recherche
In Medicine: To Microwave or Not to Microwave

Poster presenter - Nom de la personne qui présentera l'affiche
J. R. Jocelyn Paré

First author - Premier auteur
Not specified

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Paré, J. R. Jocelyn; Bélanger, Jacqueline M. R..

Abstract - Résumé
The NB Innovation Research Chair in Medical Technologies at the Atlantic Cancer Research Institute has launched an ambitious RD&D program aiming at increasing the applicability of electromagnetic energy-based minimally-invasive surgical technologies. The goals are to design, test and commercialise intelligent surgical tools that will adapt in function to the tissues being treated, as well as to the patient-specific characteristics of the tissues in real time as their necrosis progresses. The technology would allow the treatment of currently difficult-to-reach tumours, in addition to increasing the range of tissues that can be treated by the surgical tools. The importance of this RD&D program stems from the relatively short and non-invasive procedures resulting from the use of this technology, which only require local anesthesia and limited patient preparation procedures and time. The latter advantages are also characterised by a reduced impact on the patient compared to conventional surgical procedures and/or radiotherapy and chemotherapy treatments. The combination of reduced recovery time and improved quality of life should bring significant cost savings to the healthcare system as well as to the overall economy. The basic technology also finds applications in other medical areas such as atrial fibrillation, urology, dermatology, as well as in various detection procedures such as CVA, heart attack, and tumour formation.

La Chaire de recherche en innovation de la Fondation de l'innovation du Nouveau-Brunswick (FINB) en technologies médicales à l'Institut atlantique de recherche sur le cancer a lancé un programme ambitieux de RD&D visant à accroître l'applicabilité des technologies chirurgicales minimalement invasives utilisant des énergies électromagnétiques. Les buts sont de designer, éprouver et commercialiser des outils chirurgicaux intelligents qui s’adapteront en fonction des tissus sous traitement et des caractéristiques des tissus spécifiques au patient en temps réel durant la progression de la nécrose. La technologie permettrait de traiter des tumeurs qui présentement sont difficiles à atteindre, en plus d’accroître la gamme de tissus qui peuvent être traités à l’aide de ces outils chirurgicaux. L’importance de ce programme de RD&D vient de la mise en place de procédures minimalement invasives de courte durée qui ne nécessite qu’une anesthésie locale et une préparation du patient plus courte et plus simple. Ces procédures sont aussi caractérisées par un impact plus limité sur le patient en comparaison avec des procédures chirurgicales traditionnelles de même que comparé à la radiothérapie et la chimiothérapie. La combinaison d’une récupération plus rapide et d’une amélioration de la qualité de vie devraient entraîner des réductions de coûts importantes pour le système de santé et sur l’économie en général. La technologie de base trouve aussi des applications dans d’autres domaine médicaux tels que la fibrillation atrial, l'urologie, la dermatologie, de même que dans diverses procédures de détection telles que les ACV, les crises cardiaques et la formation de tumeurs.

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Title of the research project - Titre du projet de recherche
Does High-intensity training affect lipid oxidation use in sedentary obese adults?

Poster presenter - Nom de la personne qui présentera l'affiche
Paulin Amelie

First author - Premier auteur
Non

Niveau de formation
Étudiants de 1er cycle

Researchers involved in this project - Chercheurs participant au projet
Iancu, Horia Daniel; Paulin, Anne; Jabbour , Georges.

Abstract - Résumé
Aim: This study evaluates the effects of six weeks of high-intensity training (HIT) on lipid oxidation (LO) rate during incremental exercises in obese adults. Methods: Twenty-four obese adults (body mass index = ~33 kg.m-2) were randomized into a control group (n=12) and an HIT group (n=12). The LO in percentage (%LO) contribution was computed at each stage (~5 min each) in both groups before and after training via a graded maximal cycling test. Results: Before HIT, the %LO contribution at rest and at the 25, 50 and 75W stages did not differ between the groups. After HIT, the %LO contribution increased significantly in the HIT group (+20% at 25W, +21% at 50W and +14% at 75W; p<0.01) and was significantly higher than it was among the control group (p<0.01). Conclusions: In obese adults, HIT increased lipid contributions to energy release in response to incremental exercise. This appeared to be related to the improvement in insulin resistance although there were no changes in participants' fat-free mass.
Title of the research project - Titre du projet de recherche
Does it matter which surgeon works with which assistant? Studying the impact of surgical team makeup on operating room efficiency

Poster presenter - Nom de la personne qui présentera l'affiche
Edward Percy

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Percy, Edward D; Yip, Alexandra M; MacLeod, Jeffrey B; Lutchmedial, Sohrab; Brown, Craig D; Forgie, Rand; Pelletier, Marc P; Hassan, Ansar.

Abstract - Résumé
Background: It remains unclear whether the composition of the surgeon-assistant team has any measurable effect on efficiency in cardiac surgery. The purpose of this study was to examine the effect of surgeon-assistant pairings on cardiac surgical operative times. Methods: All patients undergoing first time, on-pump, isolated CABG with a left internal mammary artery and/or saphenous vein graft between January 2009 and December 2014 were considered. Emergent cases and patients with BMI >40kg/m2 were excluded. Four cardiac surgeons (Surgeons A-D) worked with any one of five assistants (Assistants 1-5). Mean operative times were calculated for each surgeon-assistant team. Multivariable linear regression models were generated for each individual surgeon and adjusted for differences in baseline comorbidities to determine the independent effect of surgeon-assistant pairings on operative times. Results: 2085 cases were included. For each surgeon, significant unadjusted differences in mean operative time were noted between assistants. Following risk adjustment, differences in mean operative times for each surgeon were noted to persist by assistant. For example, the pairing of Surgeon C-Assistant 3 led to an increase in mean operative time of 20 minutes when compared to the pairing of Surgeon C-Assistant 1 (p=0.0009), while the pairing of Surgeon C-Assistant 2 resulted in a relative decrease of 25 minutes (p<0.0001). Conclusion: The make-up of the surgeon-assistant team is found to be an independent predictor of operative time in cardiac surgery. We anticipate that these results may stimulate a discussion as to how surgical team pairings are assigned in order to optimize health care efficiencies.
Title of the research project - Titre du projet de recherche
Masculinities, Lifetime Violence, and Health: Findings of a Pilot Study

Poster presenter - Nom de la personne qui présentera l'affiche
Dr. Kelly Scott-Storey

First author - Premier auteur
Yes

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Scott-Storey, Kelly; O'Donnell, Sue; Wuest, Judith; Hodgins, Marilyn; MacIntosh, Judith; Merritt-Gray, Marilyn.

Abstract - Résumé
Because major causes of death and disability in men have not been explained adequately by decades of biomedical research, the research focus has shifted to social determinants. How violence and gender intersect to affect men’s health has received little attention despite the pervasiveness of violence in men’s lives. The purpose of this NBHRF-funded pilot study was to explore how masculinities and lifetime violence affect the health and health behaviours of men living in New Brunswick (NB). We examined the: (1) reliability, validity, and scoring of a new Lifetime Violence (LV) measure, (2) suitability of the proposed conceptual model, and (3) feasibility of recruitment strategies, protocols, and survey administration. A community sample of 53 men ages 19 to 57 completed an online survey examining current health, LV exposure, and endorsement of masculine norms and took part in a health check including measurement of blood pressure, blood sugar, cholesterol, weight and height. Psychometric testing of the new LV measure revealed acceptable internal consistency, construct validity, and concurrent validity. Bivariate associations among LV, masculinities and indicators of health such as chronic pain, depressive symptoms, and Framingham cardiac risk indices suggest support for the conceptual framework. Protocols for recruitment, online survey administration, and health checks were established and effective. Based on the study outcomes and further review of current literature, minor modifications are being made to the LV measure and to the study questionnaire in preparation for the 2016 launching of a similar study of 600 men that has been funded by CIHR (OG#136901).
Objective: The first aim of this study was to identify if encouragement to be more active, significantly increased total time in Moderate-Vigorous-Physical-Activity (MVPA) and 10-minute bouts in MVPA in six weeks (phase 1). The second aim was to identify if using a pedometer and an individualized cadence prescription to reach MVPA (≥ 150 minutes/week) while walking for an additional six weeks increased total time in MVPA and 10-minute bouts in MVPA.

Methods: Inactive older adults (N = 51) were instructed to walk 150 minutes/week at no specified intensity during phase 1 (six weeks). In phase 2 (six weeks), the intervention group (N = 23) received instructions on how to reach moderate intensity, using a pedometer and individualized walking cadence, while the control group (N = 22) did not.

Results: During phase 1, total MVPA time and MVPA in 10-minute bouts significantly increased for all (p ≤ 0.05). During phase 2, the intervention group significantly increased total MVPA time and time in MVPA in 10-minute bouts (p ≤ 0.01), while the control group significantly decreased both variables (p ≤ 0.01). In addition, only participants in the intervention group reached the CPAG (35%; p <.01).

Discussion/Importance: Previously inactive older adults can increase time in MVPA and time in 10-minute bouts MVPA, as recommended by the CPAG, by using prescribed walking cadence. These results are of great importance as it suggests that personalized walking cadence might be a useful strategy to promote exercise at the target intensity for older adults.
Title of the research project - Titre du projet de recherche
The CARE/SAINES Project: Creating healthy transitions in Maritime families / Créer des transitions saines chez les familles des Maritimes

Poster presenter - Nom de la personne qui présentera l'affiche
Baukje (Bo) Miedema

First author - Premier auteur
No

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet
Baukje (Bo), Miedema; Carole, Tranchant; Mathieu, Bélanger; Jennifer, Taylor; Ed, Barre; William, Montelpare.

Abstract - Résumé
The Maritimes have higher than average rates of obesity and obesity-related preventable chronic conditions. This impacts personal health, healthcare and the economy of the region. With support from PHAC, a 5-year project with a 36-month intervention will target perinatal and prenatal families to improve lifestyle, reduce obesity and subsequent risk factors for chronic disease. The project spearheads knowledge translation & exchange, involving parents, communities of practice, researchers and stakeholders. Partnership with sponsors is being invited for fund matching. Sixteen communities with 30 families each will be enrolled in the three Maritime provinces. Weekly face-to-face group meetings and a Virtual Health Intervention (VHI) platform will allow 24/7 access to interactive information and will be used for data collection. Bilingual activities will focus on nutrition and physical activity. They will be grounded in Social Learning Theory and based on knowledge and skill co-creation by participants and facilitators. Quantitative and qualitative measurements will be made at individual, family and community levels, including physical activity, nutrition/food literacy and security, and used with data from existing datasets. The intervention cohort will be compared to a control from existing datasets. Expected results and deliverables include: a validated VHI and intervention content; a tested pilot amenable to program development/evaluation for interested stakeholders; a birth cohort that can be tracked over a long time; assessment of the social determinants that affect health behavior; positive health behavior changes among parents that will transfer to children; reduction of obesity and chronic disease prevalence in the intervention cohort and communities.
Abstract - Résumé
There is growing concern about the nutritional quality of in-kind food assistance (FA) offered in Canada but data on this subject are limited. This study aimed to assess FA nutritional quality in New Brunswick. It was part of a larger study on community food security. Multiple-case studies involving food banks and soup kitchens were conducted at various locations reflecting the rural/urban and linguistic diversity. Data were corroborated by data from a survey (100 respondents from not-for-profit organizations) and focus groups. Food hampers and meals were assessed for nutrients and categories of foods, with comparisons against Dietary Reference Intakes (DRI) and Canada’s Food Guide (adult women). Items frequently donated to food banks were also characterized according to their nutritional profile and glycemic index. On average, hampers contained more than twice the daily recommendations for Grain-Products and Meat-and-Alternatives, but only half the recommendations for Vegetables-and-Fruit and Milk-and-Alternatives. Other Foods, for which moderation is advised, were present in high proportions. Provisions for energy and important nutrients (e.g., proteins, folate, iron) exceeded DRI. For others (e.g., vitamin C, calcium), provisions barely met DRI. Sodium was about 5x the DRI. Added sugars exceeded the WHO’s recommendation. Nutritional profiling indicated that 78% of food items were in classes 4 and 3 (least nutritious), 14% in class 1 (most nutritious). Findings suggest detrimental nutritional imbalances in the FA provided, which may contribute to malnutrition and accentuate the nutritional vulnerability of food-insecure individuals and their health concerns. Better alignment of FA with provincial/national nutrition strategies is warranted.
Title of the research project - Titre du projet de recherche
Method of presentation to healthcare system significantly affects times to treatment of STEMI patients: New Brunswick experience

Poster presenter - Nom de la personne qui présentera l'affiche
Abigail White

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
White, Abigail; Hassan, Ansar; Paddock, Vernon; Lutchmedial, Sohrab.

Abstract - Résumé
Background: Having Emergency Medical Services (EMS) involved in the management of STEMI patients prior to their arrival to the emergency room (ER) has been shown to improve time to treatment goals as compared to patients who are walk-ins to the ER. We report the New Brunswick experience with these two modes of presentation and their effects on time to treatment in STEMI patients. Methods: All patients with a confirmed diagnosis of STEMI who received thrombolysis and possessed data regarding mode of presentation in the New Brunswick Heart Centre STEMI database between December 31, 2010 and June 29, 2013 were included. Results: A total of 643 patients met the inclusion criteria. Patients presented by walk-in in 51.3% of cases (n=330), while 48.7% (n=313) of patients presented via EMS. Shorter D2EKG and D2N times were noted among EMS patients as compared to self presenters (walk-ins). Furthermore, presentation via EMS as compared to walk-in was associated with significantly higher rates of D2EKG within the guidelines recommended goal of ≤ 10 min (67.1% vs. 44.8%; p value < 0.001) and D2N ≤ 30 min (57.2% vs. 41.8%; p value < 0.001). Conclusion: Mode of presentation to the ER significantly influenced delivery of care in STEMI patients across New Brunswick. Mechanisms must be put in place to ensure that STEMI patient walk-ins to ER receive the same access to treatment and investigations as patients who are brought in via EMS.
Title of the research project - Titre du projet de recherche
Should patients only receive "new" blood when undergoing cardiac surgery?

Poster presenter - Nom de la personne qui présentera l'affiche
Abigail White

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
White, Abigail; MacLeod, Jeffrey B; Yip, Alexandra M; Ouzounian, Maral; Brown, Craig D; Forgie, Rand; Pelletier, Marc P; Hassan, Ansar.

Abstract - Résumé
Background: The purpose of this study was to examine the effect of age of packed red blood cells (pRBC) on in-hospital outcomes following cardiac surgery.

Methods: All patients undergoing non-emergent, on-pump cardiac surgery between January 2005 and September 2013 who received 1–5U of pRBC during or after surgery were included. Those who experienced a post-operative length of stay >30 days were excluded. “New” blood was defined as a unit drawn <14 days prior to transfusion, while “old” blood was defined as a unit drawn ≥14 days prior. Patients who received only “new” blood were compared to those who received all “old” blood or a mixture of “new” and “old” on the basis of baseline characteristics, intra-operative variables and in-hospital outcomes. The risk-adjusted effect of age on the likelihood of adverse in-hospital outcomes was determined using multiple logistic regression modeling techniques.

Results: 2015 patients were included in the final analysis. 1052 (52%) received only “new” blood, while 963 (48%) received any “old” blood. Patients receiving only “new” blood were more likely to be female, have unstable angina, to have undergone isolated CABG or valve surgery, to have experienced shorter bypass and cross-clamp times, and to have left the OR on inotropes. Post-operatively, patients receiving only “new” blood experienced fewer complications. Following risk-adjustment, receiving only “new” blood was associated with a significant reduction in a composite outcome (OR 0.79, 95% CI 0.65-0.95, p=0.01).

Conclusion: Receiving only “new” blood was associated with a significant reduction in rates of in-hospital adverse events.
Evaluating Prosthesis Incorporation

Poster presenter - Nom de la personne qui présentera l'affiche
Adam Wilson

First author - Premier auteur
Not specified

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Wilson, Adam; Blustein, Dan; Sensinger, Jon.

Abstract - Résumé
Peripheral nerve interfaces are opening up a new realm of possibilities for advanced control of prosthetic limbs and for the first time in history, the possibility of providing an amputee with accurate feedback from their prosthesis. To evaluate the quality and effectiveness of the feedback provided to the amputee, quantitative outcome measures must be developed. Current outcome measures do not test for the impact of sensory feedback directly so a new method must be developed. This work aims to assess the degree to which an amputee feels that their prosthetic limb is an extension of their body (prosthesis incorporation). The proposed outcome measure will evaluate the level of incorporation experienced by a prosthesis user by using the crossmodal congruency effect (CCE) test. Feedback is provided by incorporating sensing into a prosthesis using force sensitive resistors, load cells, etc and relaying that feedback to the person via vibratory motors, linear actuators, or peripheral nerve interfaces. Using these feedback pairs, the CCE test measures a person's reaction time while the pairs of feedback are presented in complementary fashion (congruent) vs conflicting fashion (incongruent). A bypass prosthesis has been developed that allows normally limbed subjects to be fitted with a prosthetic hand next to their actual hand. The impact of various actuators, the physical (or perceived) location of feedback, and the condition under which the feedback is learned will be investigated. The resulting outcome measure will provide a reliable and quantitative method of evaluating the quality and effectiveness of newly developed feedback technologies.
Title of the research project - Titre du projet de recherche
The Effect of Control Signal Noise on Simultaneous Sub-Movements

Poster presenter - Nom de la personne qui présentera l'affiche
Katie Wilson

First author - Premier auteur
Yes

Education Level
None selected

Researchers involved in this project - Chercheurs participant au projet

Abstract - Résumé
When the properties of our bodies and our environment change, our nervous system is still capable of producing accurate movements, a process called motor adaptation. This process can be characterized by assuming that the nervous system uses internal models to compensate for motor errors. A platform that simulates a theoretical controller that mimics the way humans control prosthesis is under development. This report describes the framework and the fundamental capabilities that this controller will have. The model accommodate 2-degree of freedom tasks, using proportional control (user selectable speed). A probabilistic model will be utilized to not only compensate for motor errors, but to also estimate the sources of these errors. For arm movements, trajectories will be selected to optimize a cost that is integrated over the movement, such as jerk or torque change. Experimental and theoretical comparisons will be performed across different cost functions, in order to optimize the theoretical controller. Once an implementation of this model has been empirically validated, a discrete and solvable goal will be established. An experiment will then be developed and conducted across a group of 20 subjects. Once the data have been collected, a statistical analysis will be performed. The following questions will then be considered: if the algorithms are optimized, is there an observable increase in performance? As the ratio of additive to multiplicative noise, does that change the point at which it switches from simultaneous to single-degree of freedom? This research is proposed to improve performance of powered upper limb prostheses.
Title of the research project - Titre du projet de recherche
The changing paradigm of pain management in patients undergoing cardiac surgery “Is new Better”

Poster presenter - Nom de la personne qui présentera l’affiche
Rachel Harris

First author - Premier auteur
Yes

Education Level
Health Professionals

Researchers involved in this project - Chercheurs participant au projet
Harris, Rachel.

Abstract - Résumé
Management of pain following cardiac surgery has traditionally revolved around a “reactive” strategy where pain is treated after it has already occurred. The purpose of this study is to compare the current reactive strategy to a “proactive” strategy, which will include the administration of scheduled doses of non-narcotic analgesics. Methods 100 consecutive patients undergoing cardiac surgery via sternotomy were identified prior to and following the institution of the “proactive” strategy in May 2014. The “reactive” strategy consisted solely of as needed Tylenol #3 or Percocet, while the “proactive” strategy consisted of a scheduled non-opioid analgesic in addition to “as needed” opioids. Data was collected on all patients from postoperative day 1 to 4 regarding level of pain, as measured by the Verbal Rating Scale. Results Patients in the “reactive” group were similar to patients from “proactive” group in terms of age, female gender and case distribution. While the total amount of acetaminophen administered was significantly higher in the “proactive” group (9.8±1.0g vs. 4.5±2.2g, p=0.0001), the total amount of opioid administered, expressed in terms of morphine equivalent, was similar between both groups (121.6±82.9mg vs. 111.3±91.2mg, p=0.41) as was opioid dosing frequency (7.4±6.0 vs. 7.2±5.1, p=0.81). No differences were found between the two groups with regard to level of pain and average dosing of ondansetron. Conclusion Overall pain control was similar in both groups. This suggests that pain following cardiac surgery may be well-managed with a variety of strategies and that a “reactive” strategy may be as effective as a “proactive” one.
Title of the research project - Titre du projet de recherche
Using post-operative creatinine trajectory to determine clinical impact of cardiac surgery-associated acute kidney injury

Poster presenter - Nom de la personne qui présentera l'affiche
Edward Percy

First author - Premier auteur
Yes

Education Level
Medical Students

Researchers involved in this project - Chercheurs participant au projet
Percy, Edward D; Green, Alana J; MacLeod, Jeffrey B; Yip, Alexandra M; Lutchmedial, Sohrab; Brown, Craig D; Forgie, Rand; Pelletier, Marc P; Murray, Josh; Hassan, Ansar.

Abstract - Résumé
Background: The purpose of this study was to examine creatinine (Cr) trajectories in patients with post-cardiac surgery acute kidney injury (AKI) in order to identify subgroups with clinically relevant outcomes. Methods: All patients undergoing cardiac surgery between January 2010 and December 2013 who developed post-operative AKI, defined as a post-operative Cr>176umol/L or a rise in Cr of ≥40umol/L above baseline in patients with pre-existing renal disease, were included. Latent trajectory analysis was performed to identify subgroups of patients with similar rates of rise in Cr. Comparisons were performed on the basis of baseline characteristics, intra-operative variables and in-hospital outcomes. Results: 220 patients were included. Two patient subgroups were identified. Over the first 72 hours after surgery, Group 1 experienced an average increase in creatinine of 1.2umol/hr, while Group 2 experienced an average increase of 4.0umol/hr. Group 2 patients were more likely to have had pre-operative renal failure (34% vs. 7%, p<0.0001). Intraoperatively, they had longer aortic cross clamp (126±69min vs. 93±49min, p=0.001) and total bypass times (167±88min vs. 127±61min, p=0.003). While in-hospital mortality was similar between groups (13% vs. 11%, p=0.95), patients in Group 2 were more likely to require dialysis (11% vs. 2%, p=0.009) and experience a longer length of stay (18±16 days vs. 13±11 days, p=0.01). Conclusion: This is the first study to use post-operative creatinine trajectory in an effort to identify patients with differing risk profiles. The results of this study may be used by clinicians to risk-stratify patients with post-operative AKI and better predict adverse clinical outcomes and resource utilization.