

# 10th ANNUAL NEW BRUNSWICK HEALTH RESEARCH CONFERENCE – 2018

## Poster Program



**10e Congrès Annuel sur la recherche en  
santé au Nouveau-Brunswick – 2018**

**Programme des affiches**

Poster Number/N uméro d'affiche	Name of presenter - Nom du présentateur	Institution	Category -Catégorie	Title of Abstract - Titre du résumé
1	BEANEY, AMELIA	DEPARTMENT OF HEALTH	Health Professionals - Professionnel de la santé	REHABILITATION AND REABLEMENT SERVICES
2	Darling, Mariah	Canada East Spine Centre	Health Professionals - Professionnel de la santé	IMPROVEMENTS IN PATIENT REPORTED OUTCOME SCORES 6-WEEKS FOLLOWING NEW BRUNSWICK INTERPROFESSIONAL SPINE ASSESSMENT AND EDUCATION CLINIC (NB-ISAEC) ASSESSMENT.
3	Gallant, François	Centre de formation médicale du Nouveau-Brunswick	Health Professionals - Professionnel de la santé	GET OUTDOORS FOR MORE PHYSICAL ACTIVITY AND BETTER MENTAL HEALTH
4	Hajji, Ilyass	Atlantic cancer research institute	Health Professionals - Professionnel de la santé	THE DEVELOPMENT OF A COMPUTATIONAL PIPELINE TO COMPARE RNA EXPRESSION BETWEEN CELL LINES AND EXTRACELLULAR VESICLES.
5	KUMAR AWANIT	ATLANTIC CANCER RESEARCH INSTITUTE	Health Professionals - Professionnel de la santé	CHITOSAN BASED EXTRACELLULAR VESICLE ISOLATION TECHNOLOGY: POTENTIAL FOR THERAPUTIC AND LIQUID BIOPSY APPLICATIONS.
6	McCullum, Shane	Stan Cassidy Centre for Rehabilitation	Health Professionals - Professionnel de la santé	COMMUNITY CIRCUIT CLASS STUDY IN THE NEUROLOGICAL POPULATION
7	Sarah Melville	CardioVascular Research New Brunswick (CVR-NB)	Health Professionals - Professionnel de la santé	CLINICAL ALGORITHM DEVELOPMENT FOR VITAL SIGN MEASUREMENTS FOR REMOTE PATIENT MONITORING
8	Sproul, Ashley	Horizon Health Network	Health Professionals - Professionnel de la santé	MOBILE HEALTH FOR SENIORS
9	Sarah Bridges	University of New Brunswick	Master's Student - Étudiant à la maîtrise	A NEIGHBOURHOOD ASSESSMENT OF OPPORTUNITIES FOR PHYSICAL ACTIVITY IN SAINT JOHN, NEW BRUNSWICK
10	Benjamin Howard Colpitts	University of New Brunswick	Master's Student - Étudiant à la maîtrise	EXPLORING THE BENEFITS OF COMPREHENSIVE PHYSICAL ACTIVITY INDEXES FOR TYPE 2 DIABETES
11	Lebel, Andréa	Université de Moncton	Master's Student - Étudiant à la maîtrise	CHARACTERIZATION OF ANALOGUES OF NATURAL POLYPHENOLS AS 12-LIPOXYGENASE PATHWAY INHIBITORS IN HUMAN PLATELETS
12	Lee, Amanda	University of New Brunswick	Master's Student - Étudiant à la maîtrise	SEDENTARY PATTERNS ARE ASSOCIATED WITH MOBILITY STATUS IN LONG-TERM CARE RESIDENTS
13	Léger, Jacob	Université de Moncton	Master's Student - Étudiant à la maîtrise	ISOLATION AND PURIFICATION OF FUNCTIONAL PLATELET MITOCHONDRIA USING DISCONTINUOUS PERCOLL GRADIENT
14	Martin, Danick	Université de Moncton	Master's Student - Étudiant à la maîtrise	FUNCTIONAL CHARACTERIZATION OF PAX-5 CIRCULAR RNAs IN HEMATOPOIETIC CANCERS
15	Norouzimahalli, Mohammadhossein	University of New Brunswick	Master's Student - Étudiant à la maîtrise	PREDICTION-FOCUSED MISSING DATA IMPUTATION IN HEALTHCARE DATASETS: FALL DETECTION IMPROVEMENT IN NOISY DATASETS
16	Ashirbad Pradhan	University of New Brunswick	Master's Student - Étudiant à la maîtrise	FREQUENCY DIVISION TECHNIQUE (FDT) FOR ROBUST SIMULTANEOUS AND PROPORTIONAL MYOELECTRIC CONTROL (SPMC) DURING MEDIUM AND HIGH CONTRACTION-LEVEL VARIATION
17	Caitlin Robertson	University of New Brunswick	Master's Student - Étudiant à la maîtrise	PHYSICIAN PERSPECTIVES OF MEDICAL ASSISTANCE IN DYING (MAID): A SCOPING REVIEW
18	Smith, Ian	University of New Brunswick	Master's Student - Étudiant à la maîtrise	RETROSPECTIVE FEEDBACK TRAINING USING INSTRUMENTED ASSISTIVE DEVICES IMPROVES COMPLIANCE IN PARTIAL WEIGHT BEARING
19	Veilleux, Vanessa	Université de Moncton	Master's Student - Étudiant à la maîtrise	FUNCTIONAL CHARACTERIZATION OF PLATELET-DERIVED MICROVESICLES IN CANCER
20	Wright, Emily	University of New Brunswick	Master's Student - Étudiant à la maîtrise	PHYSICAL ACTIVITY AND PHYSICAL CAPACITY LEVELS OF COMMUNITY-DWELLING OLDER ADULTS AS MEASURED BY WEARABLE HEALTH SENSORS
21	McLean, Anna	Dalhousie Medicine New Brunswick	Medical Student - Étudiant à la médecine	GEOGRAPHIC MAP OF BRAIN TUMOUR INCIDENCE IN NEW BRUNSWICK
22	Prime, Craig	Dalhousie Medicine New Brunswick	Medical Student - Étudiant à la médecine	ASSESSING THE IMPACT OF A TRANSITIONAL CLINIC FOR PEDIATRIC PATIENTS WITH TYPE 1 DIABETES TO ADULT ENDOCRINOLOGY
23	Quinn, Nicholas	Dalhousie Medicine New Brunswick	Medical Student - Étudiant à la médecine	INCOME INEQUALITIES IN THE RISK OF POTENTIALLY AVOIDABLE HOSPITALIZATIONS FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE
24	Ranasinghe, Dulanga	Dalhousie Medicine New Brunswick	Medical Student - Étudiant à la médecine	NO SIGNIFICANT VARIATION IN VOLUME OF INTRACRANIAL HEMORRHAGE BETWEEN PATIENTS ON NEW ORAL ANTICOAGULANTS APIXABAN, DABIGATRAN, AND RIVAROXABAN AND THOSE ON WARFARIN.
25	Danielle Rioux	Dalhousie Medical School New Brunswick	Medical Student - Étudiant à la médecine	ACQUIRED BRAIN INJURIES OF SENIORS LIVING IN NEW BRUNSWICK
26	Jordan Thorne	Dalhousie Medicine New Brunswick	Medical Student - Étudiant à la médecine	EVOLVING MANAGEMENT AND OUTCOMES OF ACUTE CORONARY SYNDROME IN NEW BRUNSWICK
27	Bouhamdani, Nadia	Université de Moncton	PhD Student - Étudiant doctorale	BLOCKING AUTOPHAGY BY INHIBITING LYSOSOME FUNCTION CAUSES SELECTIVE CYTOTOXICITY IN VHL-DEFICIENT RENAL CELL CARCINOMAS
28	D'Souza, Kenneth	Dalhousie Medicine New Brunswick	PhD Student - Étudiant doctorale	BIOACTIVE WHEY PEPTIDES HAVE AN INSULIN-SENSITIZING EFFECT ON ADIPOCYTES AND MUSCLE CELLS
29	HRUBENIUK, Travis	University of New Brunswick	PhD Student - Étudiant doctorale	EVERY MINUTE OF PHYSICAL ACTIVITY CONTRIBUTES TO MAINTAINING INDEPENDENCE IN OLDER ADULTS: A CROSS-SECTIONAL ANALYSIS

30	Jennings, Chris	University of New Brunswick	PhD Student - Étudiant doctorale	A NOVEL AND DIRECT TREATMENT FOR ATHEROSCLEROSIS: ENCASING HIGHLY POROUS MATERIALS WITHIN A BIOCOMPATIBLE VESICLE CAPSULE
31	Mathieu Johnson	Université de Moncton	PhD Student - Étudiant doctorale	IMPACT OF A SMALL MOLECULE TARGETING VHL-DEFICIENT CELLS ON GLUTAMINE METABOLISM AND FATTY ACID PRODUCTION
32	Alireza Manashty	University of New Brunswick	PhD Student - Étudiant doctorale	Artificial intelligence research has the potential to solve problems with medical diagnostic free-text data to advance epidemiological surveillance in New Brunswick
33	Page, Patric	Université de Moncton	PhD Student - Étudiant doctorale	STUDY OF MIR-2355-5P AND ITS POTENTIAL TARGET, SUSD4, IN CLEAR CELL RENAL CELL CARCINOMA
34	Rioux, Brittany Victoria	University of New Brunswick - Fredericton	PhD Student - Étudiant doctorale	AGING IS NOT ASSOCIATED WITH ACUTE RESISTANCE TRAINING-INDUCED CHANGES IN IRISIN
35	Slade, Logan	Dalhousie Medicine New Brunswick	PhD Student - Étudiant doctorale	TRANSCRIPTION FACTOR EB PROMOTES DNA REPAIR AND INHIBITS APOPTOSIS IN BREAST CANCER CELL LINES
36	Purvi C Trivedi	Dalhousie Medicine New Brunswick	PhD Student - Étudiant doctorale	RESTORATION OF TFEB ACTION ATTENUATED NUTRIENT OVERLOAD-INDUCED CARDIOMYOCYTE DYSFUNCTION
37	BERA AMIT	Atlantic Cancer Research Institute	Post-Doc Fellows- Boursier postdoctoraux	CYTOPLASMIC hnRNP H LOCALIZES TO STRESS GRANULES AND IS REQUIRED FOR EFFICIENT STRESS RECOVERY.
38	Biswas, Dipsikha	Dalhousie Medicine New Brunswick	Post-Doc Fellows- Boursier postdoctoraux	DYSREGULATED BRANCHED CHAIN AMINO ACID METABOLISM ACTS AS PREDICTOR OF GROWTH, INSULIN SENSITIVITY AND CARDIOMETABOLIC OUTCOMES.
39	Bowes, Andrea	The University of New Brunswick	Post-Doc Fellows- Boursier postdoctoraux	AN INVESTIGATION OF ACCESS TO MENTAL HEALTH SERVICES AMONG ATLANTIC CANADIAN MILITARY PERSONNEL USING POPULATION HEALTH DATA
40	DAS, Alekhya	Applied Research and Innovation Dept. New Brunswick Community College, New Brunswick, Canada.	Post-Doc Fellows- Boursier postdoctoraux	INTEGRATED-COMPREHENSIVE MODEL AS AN EFFECTIVE SYSTEM FOR MEDICAL CARE AND EMPOWERMENT SERVICES FOR VISIBLE MINORITY AND NEWCOMER WOMEN VICTIMS OF INTIMATE PARTNER VIOLENCE (IPV)
41	Deprez, Pierre	Atlantic Cancer Research Institute	Post-Doc Fellows- Boursier postdoctoraux	OLFACTORY RECEPTORS: NEW TARGETS IN NON-SMALL CELL LUNG CANCER THERAPY
42	Sherif Eltonsy	Centre de Formation Médicale du Nouveau-Brunswick	Post-Doc Fellows- Boursier postdoctoraux	COMPARING THE EFFECT OF COMBINING EXERCISE WITH ROSUVASTATIN VERSUS ATORVASTATIN ON LIPID PROFILE AND FUNCTIONAL CAPACITY: A RETROSPECTIVE COHORT STUDY
43	Gill, Satinder	Institute of Biomedical Engineering, University of New Brunswick	Post-Doc Fellows- Boursier postdoctoraux	LOW COST INSTRUMENTED ASSISTIVE DEVICES CAN CAPTURE RELEVANT AND DETAILED GAIT INFORMATION
44	Rostyslav Horbay	Atlantic Cancer Research institute	Post-Doc Fellows- Boursier postdoctoraux	A HIGHLY-SENSITIVE LIQUID BIOPSY DNA METHYLATION ANALYSIS METHOD FOR EARLY PANCREATIC CANCER DETECTION
45	Jougleux, Jean-Luc	Université de Moncton	Post-Doc Fellows- Boursier postdoctoraux	PLATELET-DERIVED MICROPARTICLES MODULATE THE INFLAMMATORY STATE OF THE NEUTROPHIL-LIKE PLB-985 CELL LINE
46	Luck, Kerrie	University of New Brunswick	Post-Doc Fellows- Boursier postdoctoraux	IMPLEMENTATION OF A COMPREHENSIVE SMOKE-FREE HOSPITAL POLICY STRENGTHENS TOBACCO-FREE WORKPLACE CULTURE AMONG HEALTHCARE PROVIDERS
47	Sandra Magalhaes	UNB	Post-Doc Fellows- Boursier postdoctoraux	REGIONAL DIFFERENCES FOUND IN THE INCIDENCE OF MULTIPLE SCLEROSIS IN NEW BRUNSWICK
48	Eric Merzetti	Atlantic Cancer Research Institute	Post-Doc Fellows- Boursier postdoctoraux	The Wnt effectors NOTUM and DKK4 are putative therapeutic targets in non-small cell lung cancer.
49	Shreya Sarkar	New Brunswick Heart Centre/ Dalhousie Medicine New Brunswick	Post-Doc Fellows- Boursier postdoctoraux	GDF15 CAN BE USED A NOVEL CIRCULATING BIOMARKER FOR OBESITY IN PATIENTS UNDERGOING CARDIAC SURGERY
50	Connolly, Michael	Dalhousie Medical School New Brunswick	Undergraduate Student - Étudiant de 1er cycle	MEASURING CARDIAC DYSFUNCTION VIA FRAILTY INDEX IN RAT MODELS
51	Wesley Finck	University of New Brunswick	Undergraduate Student - Étudiant de 1er cycle	IMMERSIVE AUGMENTED REALITY BOX AND BLOCKS TEST EFFECTIVE SIMULATION OF PHYSICAL TEST FOR MYOELECTRIC CONTROL TRAINING
52	Alissa Moore	University of New Brunswick	Undergraduate Student - Étudiant de 1er cycle	ANDROCENTRIC CANCER POLICIES SHAPE WOMEN FIREFIGHTERS' PERCEIVED OCCUPATIONAL CANCER RISK AND COPING STRATEGIES
53	Tyler Savoy	University of New Brunswick	Undergraduate Student - Étudiant de 1er cycle	AN IN VITRO MODEL FOR MONITORING DISEASE PROGRESSION IN HEMATOLOGICAL MALIGNANCIES
54	Titus, Allison	Dalhousie Medicine New Brunswick	Undergraduate Student - Étudiant de 1er cycle	SYNTHESIS OF A PH-SENSITIVE LIPID NANOCARRIER FOR POST-MYOCARDIAL INFARCTION DRUG DELIVERY
55	Doucet, Marco	Réseau de santé Vitalité	Health Professionals - Professionnel de la santé	DEVELOPED POLICIES AND PROCEDURES FOR MANAGING CONCUSSIONS IN CHILDREN AND ADOLESCENTS
56	Azadeh Naimi	Université de Moncton	Master's Student - Étudiant à la maîtrise	LES CONDITIONS ET INTERVENTIONS EN LIEN AVEC LA SANTE DES CONDUCTEURS DE POIDS LOURDS
57	Elassady, Hassan	Université de Moncton	Master's Student - Étudiant à la maîtrise	CELLS' NUCLEI DEEP SEMANTIC SEGMENTATION TO SPEED UP THE ANALYTICAL PROCESS AND NEW DRUGS DEVELOPMENT
58	Kaine D Black	University of New Brunswick	Master's Student - Étudiant à la maîtrise	UTILIZING A RANDOM FOREST CLASSIFIER TO PREDICT FALLS USING WEARABLE HEALTH MONITORING DEVICES
59	Robert Paul Joseph Cormier	Université de Moncton	Master's Student - Étudiant à la maîtrise	FAT FLIES AS A MODEL TO STUDY METABOLIC DISEASES

60	Murray, Ryan	University of New Brunswick	Master's Student - Étudiant à la maîtrise	HIGH USE OF PRIMARY CARE AMONG CANADIAN ARMED FORCES VETERANS IS ASSOCIATED WITH POOR HEALTH AND WELL-BEING
61	Courtnei Soucy	University of New Brunswick	Master's Student - Étudiant à la maîtrise	VARIABILITY IN PHYSICAL FUNCTION IMPROVEMENTS FOR PATIENTS LIVING WITH BREAST CANCER DURING A 12-WEEK EXERCISE PROGRAM
62	Denise Amirault	Dalhousie Medicine New Brunswick	Medical Student - Étudiant à la médecine	THE ROLE OF THE FAMILY PHYSICIAN IN PROVIDING PATIENT-CENTRED ONCOLOGY CARE TO THEIR PATIENTS WITH BREAST CANCER
63	Khaloud Mousa Aldiabat	University of New Brunswick		BARRIERS THAT HINDER NURSING STUDENTS AT UNIVERSITY OF NEW BRUNSWICK FROM PROVIDING A COMPREHENSIVE SMOKING CESSATION AND PREVENTION INTERVENTION FOR THEIR CLIENTS
64	Alsrayhean, Enam	University of New Brunswick		THE LIVED EXPERIENCE OF SYRIAN REFUGEES IN NEW BRUNSWICK-CANADA: A DESCRIPTIVE PHENOMENOLOGICAL STUDY
65	Gander, Sarah	Horizon Health Network		A PROSPECTIVE ANALYSIS OF THE RATES AND PATTERNS OF AUTISM SPECTRUM DISORDER DIAGNOSIS IN SAINT JOHN, NEW BRUNSWICK
66	CAMPBELL, Sarah	Horizon Health Network		PRENATAL SUBSTANCE-USE-DISORDER: UNDERSTANDING THE IMPACT AND EXPLORING INTERVENTIONS
67	Doucet, Shelley	University of New Brunswick, Saint John		A LIVING LABORATORY SUPPORTING INDIVIDUALS WITH COMPLEX CARE NEEDS: UNB'S CENTRE FOR RESEARCH IN INTEGRATED CARE
68	Kate Ellis	Loch Lomond Villa		GETTING HURT IN NEW BRUNSWICK NURSING HOMES: STAFF INCIDENTS RELATED TO LOCATION AND CARE ROLES.
69	Éric Forgue et Carole Tranchant	Université de Moncton		LES DIMENSIONS DE L'INSÉCURITÉ ALIMENTAIRE CHEZ DES FRANCOPHONES DES MARITIMES – DES LEVIERS IMPORTANTS POUR AMÉLIORER LA SÉCURITÉ ALIMENTAIRE
70	Flood, Kathryn	Horizon Health Network		MAKING A CASE FOR THE IMPLEMENTATION OF COMMUNITY SOCIAL PEDIATRICS IN NEW BRUNSWICK.
71	Neeru Gupta	University of New Brunswick		Feminization of Primary Care Medical Workforces is Overlooked in Assessments of Pay-for-performance: Results of a Systematic Review through a Sex and Gender lens
72	Hodgins, Marilyn	University of New Brunswick		FOUR PATTERNS OF POST-DISCHARGE COPING: FINDINGS FROM A LONGITUDINAL INVESTIGATION OF THE TRANSITION FROM HOSPITAL TO HOME
73	IANCU, Horia-Daniel	School of Kinesiology and Leisure, Université de Moncton, Moncton, NB		ASSESSMENT OF FUNDAMENTAL MOTOR SKILLS FOR ELEMENTARY AND MIDDLE SCHOOL STUDENTS: VALIDATION OF A NEW PHYSICAL EDUCATION CRITERIA-BASED TEST BATTERY
74	Jose, Caroline	Maritime Strategy for Patient Oriented Research Support Unit, Université de Moncton		CLINICAL, SOCIAL AND FINANCIAL FACTORS LINKED WITH UNMET PRIORITY SERVICE NEEDS FOR ADULTS WITH AUTISM SPECTRUM DISORDER
75	LAYES, Audrey	Public Health Agency of Canada		THE HEALTH INEQUALITIES DATA TOOL STRENGTHENS CANADA'S CAPACITY TO MEASURE AND MONITOR HEALTH INEQUALITIES
76	Victor Szymanski	University of New Brunswick		A LOGIC MODEL TO GUIDE THE IMPLEMENTATION AND EVALUATION OF NAVICARE/SOINSNAVI: A NEW BRUNSWICK NAVIGATION CENTRE FOR CHILDREN AND YOUTH WITH COMPLEX CARE NEEDS
77	LUKE, Alison	University of New Brunswick, Saint John		EXPERIENCES OF FAMILIES USING NAVICARE/SOINSNAVI: A PATIENT NAVIGATION CENTRE FOR CHILDREN WITH COMPLEX CARE NEEDS IN NB
78	MacLeod, Jeff	New Brunswick Heart Centre		INCREASED DISTANCE FROM THE TERTIARY CARDIAC CARE CENTRE PROLONGS WAIT TIMES BUT DOES NOT AFFECT LONG-TERM OUTCOMES IN PATIENTS UNDERGOING CARDIAC CATHETERIZATION IN NEW BRUNSWICK
79	Thibault, Véronique	Réseau de santé Vitalité		PHYSICIANS' LEVEL OF COMFORT WITH A NEW TOOL TO GUIDE CEREBRAL CONCUSSION CARE IN CHILDREN
80	Ward, Stephanie	Université de Moncton		PLUS DE LÉGUMES ET DE MEILLEURS COMPORTEMENTS ALIMENTAIRES CHEZ LES JEUNES DE 8 À 12 ANS PARTICIPANT AU CAMP CULINAIRE CHEF JUNIOR À MONCTON : UN PROJET PILOTE
81	Étienne HÉBERT CHATELAIN	Moncton University	PhD Student - Étudiant doctorale	THE ALTERING EFFECTS OF AMYLOID $\beta$ ON MITOCHONDRIAL PROTEIN KINASE A ACTIVITY AND MITOCHONDRIAL FUNCTIONS IN J20 MOUSE MODEL OF ALZHEIMER'S DISEASE.
82	Ankona Banerjee	University of New Brunswick	PhD Student - Étudiant doctorale	Likelihood of long-term disability can be predicted using machine learning and demographic data
83	TRAORÉ, Abdarahmane	Université de Moncton	Undergraduate Student - Étudiant de 1er cycle	APPRENTISSAGE PROFOND ET RÉSEAUX DE NEURONES CONVOLUTIFS POUR LA DÉTECTION EFFICACE DES TUMEURS CANCERUSES DU POU MON
84	Maxim F. Landry	Mount Allison University	Undergraduate Student - Étudiant de 1er cycle	COMBINING BORON AND HOT PEPPERS: A RECIPE FOR POTENTIAL BIOACTIVITY

### 1. BEANEY, AMELIA

#### REHABILITATION AND REABLEMENT SERVICES

BEANEY, Amelia 1, JARRETT, Pamela 1, ARBEAU, David 2, WILLIAMS, Mary 2, BASTARACHE, Nancy 3, ELLIOTT, Jennifer 1, BUSTARD, Jean 4, MCGOWAN, Joan 5, JOSSELYN, Andrew 1, BUCK, Dawn-Marie 2, MORRISSEY, Terry 6, PELLERIN, Ginette 4, GAUDET, Alyssa 5

1 Home Care Unit, Department of Health Province of New Brunswick 2

Extramural/Ambulance New Brunswick (EM/ANB) 3 Réseau de santé Vitalité 4 Medavie Health Services New Brunswick

5 department of Social Development, Province of New Brunswick 6 Horizon Health Network

**BACKGROUND:** Rehabilitation and Reablement is a patient centered, integrated service delivered in the senior's home or assisted living facility. It is an enhanced, rapidly accessible service that provides intensive rehabilitation and reablement to promote self-management and independence so that seniors can remain in their homes longer. It is delivered in collaboration by the publically funded home healthcare Extra-Mural Program (EMP) team and the Department of Social Development.

**OBJECTIVES:** This program was designed to facilitate earlier discharge from hospital as well as to assist frail seniors in the community so that admission to hospital could be avoided.

**METHODS:** Patients in hospital or in the community who had potential for improvement within 9 weeks were eligible. Patients were discharged from hospital within 24-48 hours with supports in place at no cost. Targeted diagnoses included chronic obstructive pulmonary disease, congestive heart failure, diabetes, mild/moderate stroke/transient ischemic attack, falls, musculoskeletal injuries, fractures and dementia (mild to moderate). The home health care services were provided by an interdisciplinary health care team including up to 6 hours per day of personal support. Care was tailored to the specific needs of the patient using a tool called "My Health Plan" which involved the patient in goal setting and focus of care.

**RESULTS:** Out of 348 patients screened, 131 (38%) received this service. The average age was 80.3 years and had a Clinical Frailty Scale of 5.31 (Moderate). The majority (77.8%) were in hospital with the most common diagnosis being fracture (45%). Eighty percent of patients successfully remained at home. Standardized measures of frailty, mobility, basic activities of daily living and instrumental activities of daily living all showed statistically significant improvements ( $p < 0.0001$ ). Although caregiver burden decreased, it was not a statistically significant finding ( $p = 0.063$ ). Patient satisfaction exceeded 80%, being satisfied or strongly satisfied.

**CONCLUSION:** This patient centered, integrated approach to care demonstrates improvement in overall mobility and function, facilitating senior's independence so that they can remain home.

### 3. Gallant, François

#### GET OUTDOORS FOR MORE PHYSICAL ACTIVITY AND BETTER MENTAL HEALTH

1, 2 GALLANT\_François, 3 LAROUCHE\_Richard, 4 GUNNELL\_Katie, 5 SYLVESTRE\_Marie-Pierre, 6 SABISTON\_Catherine, 5,6 DORÉ\_Isabelle, 1, 5 ABI-NADER\_Patrick, 5 O'LOUGHLIN\_Jennifer, 1,2,7 BÉLANGER\_Mathieu  
1 Centre de formation médicale du Nouveau-Brunswick; 2 Université de Sherbrooke; 3 Lethbridge University; 4 Carleton University; 5 École de santé publique, Université de Montréal; 6 University of Toronto; 7 Vitalité Health Network

**INTRODUCTION:** More wide-reaching strategies to promote positive mental health in youth are warranted. Spending time outdoors has been found to improve mental health. Physical activity has also been found to improve mental health. Given the outdoor environment provides an optimal space for physical activity a better understanding of the relationships between positive mental health, physical activity and time spent outdoors is needed in order to properly guide interventions.

**OBJECTIVE:** Examine if physical activity mediates the relationship between outdoor time and positive mental health.

**METHODS:** Two-hundred-forty-two participants (15.3 (0.7 SD) years old, 59% girls) in the Monitoring Activities of Teenagers to Comprehend Their Habits (MATCH) study were included in the current analysis. They self-reported their weekly time spent outdoors and weekly moderate to vigorous physical activity (MVPA) three times between October 2016 and June 2017 as well as their mental health in October 2017. The three measures of MVPA and outdoor time were averaged to represent mediator and exposure variables, respectively. Mental health was dichotomised as positive/not positive and was the outcome of the mediation analysis. The analyses were developed under the counterfactual framework of causal mediation effects, using the mediation package in R.

**RESULTS:** A small, but significant mediation effect ( $p < 0.05$ ) and no significant direct effects were noted suggesting that MVPA mediates the effect of outdoor time on positive mental health. Specifically, 65% of the effect of outdoor time was mediated through MVPA.

**CONCLUSIONS:** Physical activity mediates the relationship between outdoor time and positive mental health. Through increases in physical activity, the promotion of outdoor time might help promote mental health among youth.

### 2. Darling, Mariah

#### IMPROVEMENTS IN PATIENT REPORTED OUTCOME SCORES 6-WEEKS FOLLOWING NEW BRUNSWICK INTERPROFESSIONAL SPINE ASSESSMENT AND EDUCATION CLINIC (NB-ISAEC) ASSESSMENT.

1 DARLING\_Mariah, 2 EASTWOOD\_Donna, 3 MANN\_Tara, 3 GRONDIN\_Gwen, 2 MCCOLLUM\_Rebecca, 2 GALLAGHER\_Patricia, 3 PARKER\_Nancy, 2 CARR\_Nancy, 1 PAIXAO\_Richard, 1,2,4 ABRAHAM\_Edward, 1,2,4 MANSON\_Neil  
Affiliation(s) 1 Canada East Spine Centre, Saint John, NB; 2 Horizon Health Network-Saint John Regional Hospital, Saint John, NB; 3 Horizon Health Network-The Moncton Hospital, Moncton, NB 4 Dalhousie University, Department of Surgery, Saint John, NB;

**INTRODUCTION:** It is widely recognized that 70-80% of Canadian adults experience low back pain (LBP). The ISAEC model of care has proven successful in Ontario for LBP patients, reducing MRI utilization and chronicity, with high levels of patient and PCP satisfaction. This model was adapted for the New Brunswick LBP population and it was implemented in two centers in Saint John and Moncton.

**OBJECTIVE:** To determine if patients experience significant improvements in outcome scores 6 weeks following an NB-ISAEC appointment.

**METHODS:** Prospectively collected data from the NB-ISAEC database was included for all patients with both intake and 6 week follow-up data as of October 1st, 2018 (N=75). A paired samples t-test was conducted for outcome variables of interest: Oswestry Disability Index (ODI), Pain Catastrophization Scale (PCS), and Numeric Rating Scales for Back and Leg Pain (NRS-B/L). Chi squared analysis was performed for categorical variables of interest: Pain Status, and Weekly Exercise. Significance was set at  $p < 0.05$ .

**RESULTS:** 6 weeks following a NB-ISAEC appointment participants reported clinically and statistically significant improvements in ODI scores ( $t(74)=7.121, p < 0.001$ ), NRS-B scores during activity ( $t(71)=4.639, p < 0.001$ ), NRS-L scores during activity ( $t(67)=5.254, p < 0.001$ ), and statistically significant improvements in PCS scores ( $t(65)=6.974, p < 0.001$ ), NRS-B scores at rest ( $t(71)=2.439, p = 0.017$ ), and NRS-L scores at rest ( $t(68)=4.565, p < 0.001$ ). There was also a statistically significant change in patient's self-reported pain status between intake and follow-up ( $\chi^2(3)=35.494, p < 0.001$ ), with a 44% increase in patients reporting improvement at 6 weeks. There was a significant change in patient's self-reported weekly physical activity ( $\chi^2(3)=21.890, p < 0.001$ ) with a 36% increase in patients reporting weekly exercise at 6 weeks.

**CONCLUSIONS:** After participation in NB-ISAEC program, patients reported improvements in their outcome scores, with statistically significant improvements in ODI, PCS, NRS-B, NRS-L, Pain Status, and Weekly Exercise. These significant improvements in outcome measures, along with high compliance with the exercise program, suggest the NB-ISAEC program as an appropriate and viable option for New Brunswick's LBP population.

### 4. Hajji, Ilyass

#### THE DEVELOPMENT OF A COMPUTATIONAL PIPELINE TO COMPARE RNA EXPRESSION BETWEEN CELL LINES AND EXTRACELLULAR VESICLES.

1 HAJJI\_Ilyass, 1 WAJNBURG\_Gabriel, 1 EL BEKKOURI\_Naoufal, 1 CHAKO\_Simi, 1 LACROIX\_Jacynthe, 1 BEAUREGARD\_Annie-Pier, 1 CRAPOULET\_Nicolas, 1 LEVVIS\_Stephen, 1,2 TURCOTTE\_Sandra, 1,2 OUELLETTE\_Rodney  
1 Atlantic Cancer Research Institute, Moncton, NB; 2 Université de Moncton, Moncton, NB;

**INTRODUCTION:** Extracellular vesicles (EVs) are secreted by parent cells and contain different genetic material, such as messenger RNAs (mRNAs), long noncoding RNAs (lncRNAs) and micro RNAs (miRNAs). The EVs found in plasma are produced by all tissues in the human body, so it is still unclear how to identify the genetic content in plasma EVs that is exclusively produced by tumor cells. Here we present a new pipeline to help elucidate the similarities and differences between EVs and parent cell expression profile.

**OBJECTIVE:** Develop a computational pipeline to compare differentially expressed mRNAs, lncRNAs and miRNAs in EVs produced by the corresponding parent cell line in a tumor model and create a report of data visualization.

**METHODS:** During this study, we used tumor cell lines and immortalized cell lines from the same tissue. We isolated EVs with the synthetic peptide Vn96. The RNA content of EVs and cell lines was sequenced with the Ion Torrent Proton platform. The read counts per coding and noncoding gene mapped within the human genome were normalized using TMM normalization after filtering low counts genes. We calculated the differentially expressed (DE) genes comparing tumor cells and the normal cell line with EdgeR package.

**RESULTS:** The new pipeline was able to identify the best individual cut-off of low counts per RNA family type. The optimal cut-off optimizes the proportion between the lowest number of false positives and the total number of genes lost. This new method is also capable of generating different types of data visualization, which compares the expression pattern between EVs' and parent cells' RNA content. As a final step, the pipeline generates results of how different types of RNAs can be correlated.

**CONCLUSION:** This new tool can be used in the future to compare different RNA type expression patterns in EVs from the plasma of cancer patients and tumor biopsy samples in order to identify new candidate biomarker signatures that may provide real-time/real-world evidence that informs clinical decision-making.

**5. KUMAR AWANIT****CHITOSAN BASED EXTRACELLULAR VESICLE ISOLATION TECHNOLOGY: POTENTIAL FOR THERAPUTIC AND LIQUID BIOPSY APPLICATIONS.**

KUMAR\_Awanit, DHADI\_Surendar\_Reddy, FOURNIER\_Sebastien, NGOC-NU\_Mai, BARNETT\_David, OUELLETTE\_Rodney\_J, GHOSH\_Anirban.  
 CHITOSAN BASED EXTRACELLULAR VESICLE ISOLATION TECHNOLOGY@: POTENTIAL FOR THERAPUTIC AND LIQUID BIOPSY APPLICATIONS.  
 KUMAR\_Awanit, DHADI\_Surendar\_Reddy, FOURNIER\_Sebastien, NGOC-NU\_Mai, BARNETT\_David, OUELLETTE\_Rodney\_J, GHOSH\_Anirban.  
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**INTRODUCTION:** Extracellular vesicles (EVs) are a group of membrane bound nanometric vesicles which represent the real-time state of their parent cells and involved in cell-cell communication. EVs carry tremendous potential for liquid biopsy and therapeutic applications, but clinical adaptability is challenging. Almost all currently available EV isolation methods have limitations due to efficiency, purity or complexity. Thus there is a great demand for simple, robust, non-toxic, and clinically adaptable and applicable EV isolation methods that can be applied cost-effectively even at large scale.

**OBJECTIVES:** (1) To validate the EV capture efficacy of chitosan, a non-toxic polysaccharide, and (2) to evaluate efficiency of the chitosan-captured EVs as cellular delivery vehicle. Chitosan is FDA-approved for various clinical applications.

**METHODS:** Purified chitosan of various molecular sizes from non-animal origin were used for this study. Different formulations of chitosan based on pH and effective concentration were evaluated for EV isolation from cell culture-conditioned media, urine, saliva, and plasma. Chitosan-isolated EVs (CH-EVs) were characterized using nanoparticle tracking analysis (NTA), transmission electron microscopy (TEM), atomic force microscopy (AFM), Western blot, mass spectrometry, and polymerase chain reaction. We also tested CH-EVs as cellular delivery vehicles.

**RESULTS:** We evaluated the optimal formulation (pH) and concentrations of chitosan to isolate EVs from different source materials using various physical and molecular analyses as mentioned in the method section. We found a wide range of chitosan concentrations are suitable for EV isolation using acidic as well as neutralized formulations. Our preliminary data indicate that chitosan-isolated EVs are internalized into new cells, indicating its therapeutic potential.

**CONCLUSIONS:** The chitosan-EV complex may be a superior matrix for future therapeutic manipulations and applications because chitosan is non-toxic. This method of EV isolation may also be used for liquid biopsy assays to identify disease markers and actionable mutations.

@Patent pending

**6. McCullum, Shane****COMMUNITY CIRCUIT CLASS STUDY IN THE NEUROLOGICAL POPULATION**

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**INTRODUCTION:** Circuit Class therapy has been widely studied, and although it has been shown to be an effective treatment for patients who are post-stroke, effectiveness in other neurological populations has not yet been determined. A pilot study conducted at the Stan Cassidy Centre for Rehabilitation in 2012-13 found physical improvements for participants after an 8 week circuit class program held at the Centre, but it has been noticed that many individuals become more sedentary once discharged into the community.

**OBJECTIVE:** The objective of this study was to determine the effectiveness of circuit class exercise training with person with neurological impairments in a community setting.

**METHODS:** Participants attended 60 minute classes at the local YMCA twice weekly for 8 weeks, while completing 4 exercise stations: Arm strengthening, leg strengthening, cardiovascular endurance and balance. Exercises were tailored to each individual, and classes were led by a Physiotherapist and student volunteers. Outcomes for the study included the 6 minute walk test (6MWT), timed up-and-go (TUG), walking speed, chair stand test, fullerton advanced balance (FAB) scale and the SF-36 quality of life (QOL) survey. Outcomes were completed at baseline, post-8 week class and at a 12 week follow-up session.

**RESULTS:** A total of 16 participants completed the 8 week circuit class, with the final group of participants scheduled to complete their 12 week follow-up in mid-September. Results from baseline to post-8 week class showed significant improvement in all 5 physical measures (p-value <0.05), while there was no change in the QOL measure.

**CONCLUSIONS:** The results of this study are promising in spite of the small sample size. The next step for this research is to examine the feasibility of implementing this exercise program full-time in the community in Fredericton and other communities throughout New Brunswick.

**7. Sarah Melville****CLINICAL ALGORITHM DEVELOPMENT FOR VITAL SIGN MEASUREMENTS FOR REMOTE PATIENT MONITORING**

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**Introduction:** Respiratory rate (RR) is one of the vital signs used by health professionals as an early and sensitive predictor of the health status of patients, and it is often assessed via intermittent manual auscultatory measurements which is time consuming. Indirectly, RR can be calculated from cardiovascular signals such as electrocardiography, plethysmography, or via an arterial pulse pressure waveform. The Cloud DX, Inc. Pulsewave Health Monitor is a non-invasive wrist cuff (WC) device that estimates health vital signs: blood pressure (BP) and RR via the radial artery pulse waveform. The algorithm to estimate BP is iteratively calibrated via direct intra-arterial pressures. Similarly, the algorithm to estimate RR needs to be calibrated via clinical reference standards.

**Objective:** The purpose of this study is to compare the RR measurements of the WC device with manual auscultatory measurements to assess the clinical reliability of the non-invasive device as a potential tool for RR monitoring.

**Methods:** Healthy volunteers were consented to participate (N=50). Simultaneous RR measurements were made with the WC device on the left wrist and the dual-observer auscultatory method with the diaphragm of the stethoscope placed on the side of the neck (upper trachea). Participants were seated and breathing naturally for three sets of simultaneous RR measurements. Then, RR was simultaneously measured during paced breathing using a metronome (8, 16, 24 breaths/ minute).

**Results:** The RR measures of the WC device were compared with the RR measures of the auscultatory method by 2 trained researchers. The device RR measurements were accurate for regular breathing patterns, yet further algorithm and device development is required for RR measurement of irregular breathing patterns and improved clinical reliability.

**Conclusions:** Further research with patients in a clinical setting to assess accuracy and reliability of the device is warranted. Clinically calibrated vital sign monitoring devices could provide new tools for chronic disease management, particularly for distance care.

**8. Sproul, Ashley****MOBILE HEALTH FOR SENIORS**

SPROUL\_Ashley HHN-SJRH; LANDRY, Daniel VHN-GDH, FURLONG, Dolores UNB; ALWASHMI, Meshari MUN; RICHARD, Jacqueline DAL

**Background:** It is well known that seniors have a high chronic disease burden resulting in a large medication burden. Advancing age strongly correlates with a decrease in health literacy. Furthermore low health literacy is associated with decreased medication knowledge, adherence and increased adverse medication effects. Seniors are already at high risk of medication related adverse effects due to high disease burden, the use of multiple medications and pharmacokinetic/dynamic changes. Interventions to help reduce this risk can often be labor and resource intensive and require seniors, who often face mobility and financial challenges, to travel to access services. Technology and mobile health may therefore present an opportunity to reach seniors and improve health outcomes.

**Objective:** To determine seniors' preferences for mobile apps/technology and their use for health, medication management and education in order to inform future research.

**Methods:** A 36 question survey of New Brunswick (NB) residents aged 60 years and older was conducted from July 9th, 2018 to August 17th, 2018 through both paper questionnaires in 15 NB community pharmacies and electronic questionnaires (hosted by Survey Monkey). The survey was available in English and French, and contained questions about demographics, mobile phone usage, app usage, and interest in using apps for health management.

**Results:** A total of 157 respondents answered the survey (140 electronic, 17 paper). There was a difference in use of health apps between electronic respondents (25.8%) and paper respondents (12.5%). Both groups had interest in using a health app, with 58.0% of electronic and 25.0% of paper respondents displaying interest. Respondent interest in asking a pharmacist questions about their health or medication via an app was at 63.3% in electronic and 33.3% in paper.

**Conclusions:** The study provides insight into New Brunswick seniors' current use of mobile technology and health related apps as well as their interest in leveraging their current use of that technology to access information about their health and medications.



### 9. Sarah Bridges

#### A NEIGHBOURHOOD ASSESSMENT OF OPPORTUNITIES FOR PHYSICAL ACTIVITY IN SAINT JOHN, NEW BRUNSWICK

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**INTRODUCTION:** Community physical activity (PA) programs have been associated with positive outcomes in the rehabilitation of non-communicable disease and injury, as well as reductions in return to work times, but the availability and location of these opportunities is not always known within these communities.

**OBJECTIVES:** To compile existing PA opportunities including those that focus on rehabilitation, which are targeted to working-aged adult populations in Saint John, New Brunswick, and assess the accessibility and distribution of these programs across the city.

**METHODS:** All PA opportunities available to adults aged 19-65 in Saint John were considered. Characteristics of opportunities were gathered from program resources and contact with program coordinators using a standardized template. Descriptive statistics were used to summarize key program characteristics, and ArcGIS was used to map PA opportunities evaluate the distribution of programs.

**RESULTS:** 100 PA opportunities in Saint John were included, and 36% responded. 27% of programs were free, 53% had membership fees (\$49.5/month average), and 20% were pay-per-use. 99% of programs in Saint John were accessible by public transportation, and 93% were physically accessible, and one organization offered childcare. Ten PA opportunities offered classes for specific groups, such as women's only, men's only, or older adult classes. Three opportunities offered classes for specific health statuses of participants such as cardiac issues, musculoskeletal injuries, or to those who were physically challenged. Three organizations offered rehabilitation specific programs to those who survived cancer, had cardiac events, suffered from arthritis, or for smoking cessation. PA programs were not evenly distributed across the city.

**CONCLUSIONS:** This study highlights the accessibility characteristics of PA opportunities in Saint John, New Brunswick. Our findings highlight the need for rehabilitative PA programs within Saint John, and an increase in programs in the census tracts on the outer limits, which have a higher population of adults. Future studies should look to evaluate the relation to average income of these census tracts and the distribution of PA and rehabilitative PA programs.

### 10. Benjamin Howard Colpitts

#### EXPLORING THE BENEFITS OF COMPREHENSIVE PHYSICAL ACTIVITY INDEXES FOR TYPE 2 DIABETES

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**BACKGROUND:** The Canadian Physical Activity (PA) Guidelines for adults only consider aerobic activities completed at moderate-to-vigorous PA intensity (MVPA) and resistance training (RT). Recent data suggest that low-intensity activities such as sleeping, sitting, and light intensity PA are also important for health, and could impact the risk of Type 2 diabetes (T2D).

**OBJECTIVE:** To investigate the association between three comprehensive PA indexes and T2D.

**METHODS:** Cross-sectional analyses from the Canadian Longitudinal Survey on Aging (CLSA; n=20,968) and the 2003 cycle of the National Health and Nutrition Examination Survey (NHANES; n=891) were performed. The primary outcome measure, T2D, was self-reported. PA was quantified by using the PA Scale for the Elderly in the CLSA and by accelerometry data in NHANES. In both datasets, sleep and RT were self-reported using questionnaires. Three PA indexes were created to represent more comprehensive measures of PA than current recommendations: (1) total activity index (all activities performed within 24 hours-7days), (2) ratio of RT/MVPA index, (3) ratio of sedentary time/total activity. All indexes were expressed as MET/min/week.

**RESULTS:** The presence of T2D was positively associated with the RT/MVPA index in CLSA [OR(95% CI) 1.006 (1.001-1.011; p=0.024)] and with sedentary time/total activity in NHANES [1.28 (1.01-1.61; p=0.029)]. No other associations were found to be statistically significant. These associations were independent of age sex, race, BMI, and the Canadian PA Guidelines.

**CONCLUSIONS:** Depending on the type of activities, using a comprehensive approach to measure PA throughout the day could improve our understanding of how PA is associated with T2D.

### 11. Lebel, Andr ea

#### CHARACTERIZATION OF ANALOGUES OF NATURAL POLYPHENOLS AS 12-LIPOXYGENASE PATHWAY INHIBITORS IN HUMAN PLATELETS

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**INTRODUCTION:** Eicosanoids are lipid mediators involved in several critical steps of the inflammatory response. While the response is necessary for the host's defense against pathogens, uncontrolled or unregulated production of these mediators has been associated with several types of chronic inflammatory diseases including arthritis, asthma and cardiovascular diseases. The 12-hydroxyeicosatetraenoic acid (12(S)-HETE) lipid mediator is among those inflammatory molecules abundantly produced in various diseases and is primarily biosynthesized via the 12(S)-lipoyxygenase (12-LO) pathway. While most developed compounds primarily target the cyclooxygenase (COX) pathways, very few compounds have been designed to selectively inhibit the 12-LO pathway. We previously demonstrated that caffeic acid phenethyl ester (CAPE) inhibits the 12-LO pathway. However the compound is non-specific as it also affects the production of eicosanoids via the COX pathway.

**OBJECTIVES:** In this study, we investigated the ability of analogues of natural polyphenols to inhibit specifically the 12-LO or COX pathway in human platelets.

**METHODS:** Analogues of natural polyphenols were synthesized to investigate structure modifications on 12L-O and COX inhibition compared to the control drugs. Human platelets were isolated from healthy consenting volunteer and pre-incubated in presence of the test compounds (at 1 and 10  $\mu$ M) and then stimulated with thrombin to initiate 12(S)-HETE and 12-hydroxyheptadecatrenoic acid (12-HHTrE) production. The 12(S)-HETE and the 12-HHTrE were quantified by high-performance liquid chromatography with UV detection.

**RESULTS:** Our data demonstrates that of the 16 analogues tested at 10  $\mu$ M, 12 significantly inhibited the 12-LO pathway and all 16 significantly inhibited the COX pathway. Further investigation at 1  $\mu$ M indicates that of the 16 analogues tested, 10 and 13 analogues significantly inhibited the 12-LO and COX pathway respectively.

**CONCLUSION:** In this study, we identify a new series of analogues of natural polyphenol compounds with the ability to inhibit eicosanoid production in human platelets. Some analogues specifically target either the 12-LO or the COX pathway and will require further characterization in vitro before exploring the beneficial properties of these compounds in vivo.

### 12. Lee, Amanda

#### SEDENTARY PATTERNS ARE ASSOCIATED WITH MOBILITY STATUS IN LONG-TERM CARE RESIDENTS

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**INTRODUCTION:** In general, sedentary behaviour is associated with outcomes including mortality and mobility. However, very little is known about sedentary patterns for older adults living in long-term care (LTC) facilities and how it affects changes in mobility over time. The objectives of this study were to document sedentary patterns for LTC residents and to test if these patterns were predictors of changes in mobility after a year follow-up.

**HYPOTHESIS:** We hypothesized that sedentary patterns at baseline would be associated with and a predictor for changes in mobility status.

**METHODS:** At baseline, 20 residents in a LTC facility were recruited from three mobility status categories: independent (N= 10), assistance in transfers (N=5), and dependent for transfers (N=5). These categories are based on the provincial regulations specific to nursing homes. Sedentary patterns were defined as sedentary time, # of transfers from sitting to standing, light physical activity, and standing time measured via an ActivPal. This was attached to the leg with Tegaderm tape for a minimum of seven consecutive days. Mobility status was reviewed 12 months later.

**RESULTS:** The sample population was 60% women with a median age (25-75th) of 83 (67-89) years old. At baseline, participants spent a median of 21.9 hours (18.6-23.6) performing sedentary activities per day. At baseline, there was a significant difference between the three mobility groups in regards to the # of transfers from sitting to standing (p=0.002), light physical activity (p<0.001), and standing time (p=0.03). At follow-up, five out of 20 residents declined in their mobility status. All variables related to sedentary patterns differed between the two groups (p<0.01), but when using a logistic regression model, these variables did not predict the changes in mobility status.

**CONCLUSIONS:** Older adults living in LTC are highly sedentary. Our results show that sedentary patterns are associated with mobility status and changes in mobility, but they do not predict it. Longitudinal studies are required with a larger sample size to confirm our findings.

**13. Léger, Jacob****ISOLATION AND PURIFICATION OF FUNCTIONAL PLATELET MITOCHONDRIA USING DISCONTINUOUS PERCOLL GRADIENT**

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**INTRODUCTION:** The isolation of organelles is gaining importance in experimental and clinical laboratory settings. Many previously established techniques exist for the isolation of cell organelles, including mitochondria. The mitochondria are known as the powerhouse of the cell as it releases the chemical energy from food to power most cellular functions. However, mitochondrial dysfunction has been involved in several human pathologies, such as diabetes, cancer, Alzheimer's disease, Parkinson's disease, cardiovascular disease and others. Therefore, stringent methods of isolation and purification of mitochondria are of the utmost importance in assessing mitochondrial related disorders. While several isolation kits are available commercially, they can be expensive and not suitable for some downstream applications. In this project, we provide an alternative purification method yielding mitochondria of high purity and integrity using human platelets.

**OBJECTIVES:** Evaluate the purity, integrity and yield of two different methods of isolation of mitochondria in human platelets.

**METHODS:** The brute fraction of platelet-derived mitochondria was obtained using a Potter homogenizer, followed by differential centrifugation. To obtain the purified fraction, the mitochondrial extract was centrifuged on a discontinuous Percoll gradient. The purity of mitochondria was determined by flow cytometry (FC500, Beckman Coulter) using anti-CD41-FITC, and by electron microscopy. The activity of mitochondria was measured by high-resolution respirometry (Oroboros instruments). The total yield of mitochondria was determined by flow cytometry using MitoTracker Deep Red and by the micro-Smith method. Finally, the integrity of the mitochondrial membrane potential was assessed with JC-1 staining.

**RESULTS:** Data generated by flow cytometry and electron microscopy shows that the Percoll gradient increases mitochondria purity by removing platelet membrane debris. Additionally, the activity per milligram of isolated mitochondria is higher in purified than brute mitochondria, while JC-1 staining shows similar membrane integrity between the two methods.

**CONCLUSIONS:** Results of this study suggest that the Percoll discontinuous gradient purifies viable platelet-derived mitochondria. Relatively inexpensive, this method of purification is ideal for studying complex mitochondrial disorders.

**15. NorouziMahalli, Mohammadhossein****PREDICTION-FOCUSED MISSING DATA IMPUTATION IN HEALTHCARE DATASETS: FALL DETECTION IMPROVEMENT IN NOISY DATASETS**

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**INTRODUCTION:** Fall detection has been a very critical task in healthcare services for a long time, especially for in-home care services for elderly. It is necessary to detect a fall at the first place to predict a fall in the future to avoid further physical injuries. Researchers developed many techniques to overcome this problem, but most of these data analysis methods are not robust to missingness. The missing data issue is a well-known problem in most of the real datasets and real-life scenarios that cause a meaningful decrease in these data analysis methods' performances.

**OBJECTIVE:** The proposed technique improves fall detection in noisy datasets with imputing the missing data using a multilevel clustering method and finding the nearest record in the datasets to the record with missing data.

**METHODS:** To achieve this goal, instead of analyzing every single record in our dataset with each other, we reduce the dimensionality to increase the computation speed and performance in large health datasets. In order to measure the performance and the robustness of the model, we change the missingness rate from 10%-45%.

**RESULTS:** We used a dataset of 70 sequences (patients) and almost 14000 records. Fall events are recorded with accelerometric data.

The study improves fall-detection on 70 patients by up to 9% when we used the proposed technique and up to 4% in comparison to other imputation techniques. In both scenarios, we used SVM, Random Forrest, CN2, Logistic Regression, SGD, Naïve Bayes and KNN as our main classifiers.

**CONCLUSIONS:** The study shows a significant improvement in fall detection in noisy datasets. Although the research was conducted using UR Fall Detection Dataset as the primary test data source and was focused on Missing Completely At Random data (MCAR) and Missing At Random data (MAR), the proposed model is compatible with most of the large health database with the same characteristics and even for Missing Not At Random data (MNAR) the results are promising.

**14. Martin, Danick****FUNCTIONAL CHARACTERIZATION OF PAX-5 CIRCULAR RNAS IN HEMATOPOIETIC CANCERS**

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**INTRODUCTION :** RNA is an important molecule which derives from DNA and is implicated in almost every cellular activity. More recently, an increasing number of studies have characterized RNA in a circular form (circRNA) in comparison to the common linear RNA molecule. CircRNAs regulate many biological processes including the development and progression of cancer. We have recently identified novel circRNAs generated from the Pax-5 gene, a known cancer-causing gene (i.e. oncogene).

**OBJECTIVES :** Given the pivotal role for Pax-5 gene products in cancer pathology, we set out to elucidate the role of Pax-5 circRNAs in B cell cancer development and progression.

**METHODS :** We developed a quantitative assay capable of detecting various isoforms of Pax-5 circRNAs in cell models and clinical samples.

**RESULTS :** We developed a tool capable of detecting Pax-5 circRNA in a isoform-specific manner. Using this system, we also demonstrate that the expression levels of Pax-5 circRNAs correlate with the onset of B-cell cancer lesions in clinical samples.

**CONCLUSION :** These observations strongly suggest that Pax-5 circRNAs represent adequate biomarkers of cancer development and progression. We are currently studying interacting partners and pathways associated with Pax-5 circRNAs to elucidate the mechanisms of cancer biology. These studies will help in the development of efficient diagnostic and therapeutic tools against this disease.

**16. Ashirbad Pradhan****FREQUENCY DIVISION TECHNIQUE (FDT) FOR ROBUST SIMULTANEOUS AND PROPORTIONAL MYOELECTRIC CONTROL (SPMC) DURING MEDIUM AND HIGH CONTRACTION-LEVEL VARIATION**

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**INTRODUCTION:** Myoelectric prostheses are able to provide assistance to individuals with transradial amputations. Even though extensive research has been completed in machine learning techniques, such as pattern recognition (PR) and Simultaneous and Proportional Myoelectric Control (SPMC), commercially available prostheses continue to use the control strategies prevailing since the 1960s. For clinical applications, the prosthesis should be simultaneous, proportional, intuitive and robust to the various non-stationaries in the EMG signal. In recent developments, frequency division technique (FDT) associated with PR has been capable of addressing contraction level variance as an EMG non-stationary. With SPMC known to address the limitations of PR, it was important to associate FDT with SPMC to achieve a freedom of performing varying contraction levels with accurate prosthetic hand movements.

**OBJECTIVES:** The purpose of this study was to investigate the robustness of SPMC to contraction level variations when associated with FDT pre-processing.

**METHODS:** Twenty (n=20) able-bodied and four individuals (n=4) with trans-radial amputations performed wrist movements in 2 two degrees of freedom goal-oriented tasks, divided in three groups of Type I, Type II, and Type III. The task completion rate (CR) which is the ratio of the number of successful trials to the total number of trials, was analyzed for differences between the train-medium and train-high experimental runs

**RESULTS:** The CR of all the trials was very high (~95% for control participants and ~91% for clinical participants). There was no significant (p<0.05) difference in the performance of SPMC between train-medium and train-high runs for any of the three types of task. Also, the variability of CR was very low in both the training contraction levels.

**CONCLUSIONS:** No significant differences in CR between the two training contraction levels suggest a robust control scheme and processing technique. This study shows that FDT provides advantages in online myoelectric control as it introduces a more accurate, contraction level invariant control scheme which shows great promise for performing prosthetic hand movements.



**17. Caitlin Robertson****PHYSICIAN PERSPECTIVES OF MEDICAL ASSISTANCE IN DYING (MAiD): A SCOPING REVIEW**

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**BACKGROUND:** Medical assistance in dying (MAiD) was legalized in Canada in 2016. Despite this, access to MAiD is largely dependent upon physician willingness to provide this service. For this reason, we performed a scoping review on physicians' opinions toward this topic worldwide.

**OBJECTIVES:** To examine the literature surrounding this topic globally, as well as the literature in Canada specifically since the law is so new.

**METHODS:** A scoping review of the literature was conducted by first assessing the titles, abstracts, and then full articles using our exclusion criteria. Papers published from May 2012 to April 2018 were included. Papers that focused on other healthcare providers, and any acts that would be considered illegal in Canada were excluded. This was meant to identify perspectives that would be relevant specifically to physicians in Canada.

**RESULTS:** A total of 149 papers were identified, of which 74 were included in the final analysis. Of the 74 papers included, 24 originated from Canada, with most of those being opinion pieces. Early thematic analysis points to the importance of religion, the Hippocratic oath, harm to the doctor-patient relationship, patient dignity and ending patient suffering, as factors in shaping the physician perspective toward MAiD.

**CONCLUSIONS:** Legalization of MAiD is an important first step towards providing terminally ill Canadians with control over the conditions of their death. There is a potential that physician perspectives on MAiD can influence access for patients, but further research is needed in the Canadian context.

**18. Smith, Ian****RETROSPECTIVE FEEDBACK TRAINING USING INSTRUMENTED ASSISTIVE DEVICES IMPROVES COMPLIANCE IN PARTIAL WEIGHT BEARING**

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**INTRODUCTION:** The world healthcare system is increasingly burdened by an aging population and sedentary behaviors. Proactive health monitoring and preventive intervention can alleviate some of this pressure, tasks in which emerging wearable and mobile devices and the Internet of Things (IoT) may play an important role. These "smart" technologies can be unobtrusively incorporated into a patient's daily routine by adding instrumentation to objects they already interact with anyway. Passive assistive devices such as canes or crutches are used to improve stability and support weight bearing in patient groups ranging from diabetes to orthopedics, or post-acute stroke. We have seamlessly integrated sensors and computational capabilities into a traditional cane to create a "SmartCane": an assistive device capable of measuring and offering biofeedback regarding its user's loading, mobility, and stability information.

**HYPOTHESIS:** Feedback from smart assistive devices can be used to improve regulation and instruction of proper cane use.

**METHODS:** Fourteen healthy subjects participated in seven, 20-minute sessions. Each subject was asked to lean on the SmartCane while standing stationary. Loading information from the cane was transmitted to a laptop computer for processing and storage. Subjects were offered feedback from the computer to assist them in loading the cane to a target amount. After being distracted, they were asked to recall this target load without assistance. Each session occurred on a different day and each offered subjects a different feedback scheme. These training methods varied in modality (audio, visual, and tactile), resolution, and latency.

**RESULTS:** Our results indicate that complex gait motor skills are best retained when trained by summary feedback, whereas continuous regulation of such skills is best achieved by concurrent feedback. No one modality stood out as optimal for all users.

**CONCLUSIONS:** Based on these results, devices like the SmartCane could be used to improve instruction and retention of partial weight bearing. Ongoing work is focused on developing and deploying smart assistive technologies with patient populations to monitor and improve gait and facilitate early intervention.

**19. Veilleux, Vanessa****FUNCTIONAL CHARACTERIZATION OF PLATELET-DERIVED MICROVESICLES IN CANCER**

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**INTRODUCTION:** It is well established that platelets promote multiple processes of the cancer metastatic cascade. More recently, platelets have received increasing attention for their role in cancer progression through the production of platelet-derived microvesicles or microparticles (PMPs). More interestingly, PMPs and their packaged bioactive content are transferred to recipient cells upon their internalization. Recently, we identified a new subpopulation of these vesicles (termed mitoMPs) that retain functional mitochondria inside.

**HYPOTHESIS:** Given the predominant role of mitochondria in cancer processes and malignancy, we believe that a gain in additional mitochondrial mass (and consequently mito-function) supplied by mitoMPs will provide cancer cells with a significant advantage leading to disease progression. Our objectives are to: 1) Evaluate the modulatory effects of mitoMPs on the bioenergetics state of recipient cancer cells and 2) investigate the modulating capacity of mitoMPs on cancer processes leading to metastasis.

**METHODS:** Technically, we isolated mitoMPs from human platelets and co-incubated them with various cancer cell models (i.e. breast and lymphoid cancers). MitoMP internalization was determined by flow cytometry whereas cellular respiration was performed by a high-resolution respirometer.

**RESULTS:** Our results show that mitoMPs physically associate with cancer cells as quick as 1 hour. We also found that cancer cells treated with mitoMPs gain mitochondrial-dependent functions by increasing metabolic via oxygen consumption. Finally, we observe that cancer cells incubated with mitoMPs have greater survival rates in comparison to untreated cells.

**CONCLUSION:** This innovative research will provide new insight on the role of a novel subpopulation of microvesicles in cancer disease. Specifically, we characterize for the first time, the components and mechanism(s) of a new class of microparticles, which may reveal a new source of cancer modulators. The knowledge gained from these studies will foster the development of new strategic interventions to help mitigate the morbidity and mortality associated with cancer progression.

**20. Wright, Emily****PHYSICAL ACTIVITY AND PHYSICAL CAPACITY LEVELS OF COMMUNITY-DWELLING OLDER ADULTS AS MEASURED BY WEARABLE HEALTH SENSORS**

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**INTRODUCTION:** Approximately 19% of New Brunswick's population is 65 years of age or older. Aging is accompanied by several adverse events (e.g., increased disease/disability) but may be positively influenced by physical activity (PA) and physical capacity (PC). Research is limited on typical PA and PC levels of older Canadians, but wearable health sensors have been developed to aid in the measurement of such concepts. Devices such as the McRoberts MoveTest (MT) and MoveMonitor (MM) allow for more precise and reliable measurements of PC and PA/movement. While these sensors are commonly used in many European countries, their full use has yet to be explored within the Canadian population.

**OBJECTIVES:** To measure PA and PC levels of community-dwelling older Canadians using McRoberts MT and MM sensors.

**METHODS:** A total of 53 participants (M = 73.96±5.09 years) participated in this study, 15 men (M = 72.73±5.79 years) and 38 women (M = 75.45±4.79 years). PC was measured using the 6-Minute Walk Test (6MWT), the Sway Test, the Short Physical Performance Battery (SPPB), Sit to Stands (STS), and the Timed Up and Go (TUG), as recorded by the McRoberts MT. The McRoberts MM was then used to summarize one week of participants' daily PA/movement.

**RESULTS:** Overall, 37.3% of this sample met Canadian exercise guidelines. Results indicated no significant differences between male and female PC data, except for total STS duration, nor were there differences across age. MM data indicated men had significantly greater daily sitting, cycling, walking, and moderate PA durations but lower standing and sedentary PA durations. Additionally, those 65-69 spent significantly more time shuffling than all other ages, while those 70-74 had a significantly lower daily lying duration.

**CONCLUSIONS:** Few significant differences were observed within PC data in terms of sex or age; however, significant differences were observed in PA data. Further research using wireless health sensors is required to better understand older Canadians' PC and PA levels and their influence on successful aging.

**21. McLean, Anna****GEOGRAPHIC MAP OF BRAIN TUMOUR INCIDENCE IN NEW BRUNSWICK**

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**INTRODUCTION:** While brain tumours carry some of the worst prognoses of all cancers, there exists very little epidemiological data collection on their distribution in the form of a registry, limiting the degree to which we are able to understand the aetiologies of these cancers. Additionally, many developed nations which possess a brain tumour registry only legally mandate the reporting of malignant neoplasms, which marginalizes the similarly severe negative impacts benign neoplasms can incur in patients.

**OBJECTIVES:** To create a comprehensive geographical map of the Horizon Health authority in province of New Brunswick. This map will visually plot brain tumour incidences of adult patients who were surgically and/or radiologically diagnosed and referred through the Saint John Regional Hospital. Additionally, this map will demonstrate regional brain tumour patterns or clusters relative to geographic area.

**METHODS:** The patient population consisted of the health records of over 600 patients with brain tumour diagnoses seen through the Saint John Regional's Department of Neurosurgery. Multiple geographic tumour maps were created according to postal code, illustrating incidence patterns across three distinct variables: age, sex, and tumour type. In the mapping process, the anonymized patient information was linked to provincial census data to demonstrate incidence according to population.

**RESULTS:** Geographic mapping of the specified variables demonstrated clustering around city centres, however no abnormal hotspots were identified within the map's catchment area. Statistics are currently being finalized with regards to identifying the prevalence of specific tumour types in each of the variables. More specifically, the most common tumour type in females, males, and each of the age categories are being identified.

**CONCLUSIONS:** The geographic maps did not demonstrate any concerning or striking clustering outside of relatively highly populated city centres.

**23. Quinn, Nicholas****INCOME INEQUALITIES IN THE RISK OF POTENTIALLY AVOIDABLE HOSPITALIZATIONS FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

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**INTRODUCTION:** Hospitalizations related to ambulatory care sensitive conditions represent an indirect measure of access to primary care and the capacity of the system to manage chronic conditions such as COPD. Although overall COPD mortality decreased between 1966 and 2012 in Canada, differences in COPD mortality between low and high income increased. The effects of these unequal health outcomes for persons with COPD can be experienced as acute needs requiring hospitalizations if primary care services are not available.

**OBJECTIVE:** The objective of this research is to explore the influence of income inequalities on the risk of potentially avoidable hospitalizations for COPD in Canada.

**METHODS:** This secondary analysis utilizes the 2006 Census linked to the 2006/07-2008/09 Discharge Abstract Database (DAD). The outcome variable is hospitalizations and re-hospitalizations due to COPD while the independent variable of interest is income –assessed as after-tax household income quintile. The analysis controls for age, gender, marital status, Aboriginal identity, immigrant status, province, and education. Multiple logistic regression is performed for the risk of both hospitalizations and re-hospitalizations due to COPD.

**RESULTS:** The risk of being hospitalized for COPD is significantly influenced by age, sex, Aboriginal identity, marital status, immigrant status, education, and province. Compared to the highest income quintile, there is a significantly increased odds of being hospitalized for COPD as income decreases from the 4th income quintile (OR 1.38, CI: 1.30-1.47; P<0.05) to the lowest income quintile (OR 2.92, CI: 2.77-3.09; P<0.05)

Among individuals who had been hospitalized for COPD, and compared to the highest income quintile, there is a significantly increased odds of being re-hospitalized for COPD as income decreases from the 4th income quintile (OR 1.16, CI: 1.00-1.36; P<0.05) to the lowest income quintile (OR 1.39, CI: 1.22-1.58; P<0.05)

**CONCLUSIONS:** The findings suggest that individuals of lower income are significantly more likely to be hospitalized and re-hospitalized for COPD, a finding that may reflect income inequalities in the capacity of our primary care system.

**22. Prime, Craig****ASSESSING THE IMPACT OF A TRANSITIONAL CLINIC FOR PEDIATRIC PATIENTS WITH TYPE 1 DIABETES TO ADULT ENDOCRINOLOGY**

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**INTRODUCTION:** The study examined the implementation of a structured transitional clinic for pediatric patients with type 1 diabetes to adult endocrinology in Saint John, NB.

**OBJECTIVE:** To determine the impact a structured transitional clinic in Saint John, NB has on type 1 diabetes management.

**METHODS:** A retrospective cohort study design was utilized to assess type 1 diabetes management following the transition from pediatric care to adult endocrinology in Saint John, NB. The control cohort was matched to the experimental cohort who transitioned to an adult endocrinology clinic using a new structured transition model. A combination of descriptive statistics, tallies, and Wilcoxon signed-rank tests were completed to assess HgA1c, Creatinine, ER Visits, and Hospital Admissions for both control and experimental groups 15 months pre-transition and 15 months post transition.

**RESULTS:** 38 patients with type 1 diabetes were divided into control (i.e., not exposed to the transitional clinic) and experimental groups (i.e., exposed to the transitional clinic). A Wilcoxon signed-rank test revealed a significant increase in mean rank HgA1c in the control group ( $Z = 2.22$ ,  $p = .027$ ,  $r = .57$ ), and no significant difference in HgA1c in the experimental group ( $Z = 0.175$ ,  $p = .861$ ,  $r = .05$ ). No significant difference was found in creatinine values. Of 66 ER visits in the experimental group, 9% were attributed to diabetes related events. Of 32 ER visits in the control group, 6% were attributed to diabetes related events. There were 3 diabetes related hospitalizations in the experimental group, and 2 in the control group.

**CONCLUSION:** The implementation of a new structured transition clinic for pediatric patients with type 1 diabetes to adult endocrinology in Saint John, NB has been shown to have some benefit in maintaining HgA1c values at 15 months post transition.

**24. Ranasinghe, Dulanga****NO SIGNIFICANT VARIATION IN VOLUME OF INTRACRANIAL HEMORRHAGE BETWEEN PATIENTS ON NEW ORAL ANTICOAGULANTS APIXABAN, DABIGATRAN, AND RIVAROXABAN AND THOSE ON WARFARIN.**

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**INTRODUCTION:** This study examined the volume of intracranial hemorrhage based on type of oral anticoagulant.

**OBJECTIVE:** Determine whether there is variation in the volume of intracranial hemorrhage in patients on the anticoagulants warfarin, apixaban, dabigatran and rivaroxaban, as well as those not on an anticoagulant.

**METHODS:** Patients who were treated for a nontraumatic intracranial hemorrhage (ICH) at the SJRH, DECH and URVH between 2014 and 2018 were identified retrospectively. Patients were divided into categories based on the type of oral anticoagulant (warfarin, rivaroxaban, apixaban, dabigatran, or no anticoagulant). The volume of ICH was calculated using CT images and the ABC/2 formula. A chart review was done to identify other comorbidities and medications, ensuring participants were not on other anticoagulants or antiplatelet therapies. A Kruskal-Wallis analysis was done to determine variation in the volume of ICH based on anticoagulant.

**RESULTS:** 68 patients formed the final study population. The Kruskal-Wallis analysis showed significant variation between the no anticoagulant (no drug) group and the new oral anticoagulants ( $p=0.014$ ) with an average rank ICH volume (in cm3) of 31.32 for the No Drug group and 47.77 for the NOAc group. However, there was no significant variation between the warfarin and NOAc group ( $p = 0.072$ ) or the No Drug and warfarin group ( $p = 0.693$ ). Due to small sample numbers it was not possible to statistically analyze the new oral anticoagulants separately.

**CONCLUSIONS:** There is significant variation in the volume of ICH between patients who are not on an anticoagulant and those on a new oral anticoagulant. Further study is needed to determine its clinical impact. There is no significant variation between warfarin and new oral anticoagulants.

**25. Danielle Rioux****ACQUIRED BRAIN INJURIES OF SENIORS LIVING IN NEW BRUNSWICK**

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**INTRODUCTION:** Approximately one million people live with an acquired brain injury (ABI) in Canada, and seniors comprise 30% of this population.

Unsurprisingly, the number of seniors living in an assisted-living complex is growing. Research suggests that residence-type influences seniors' falling rates, and their acquisition and severity of an ABI. Furthermore, among persons >65 years, patients with an ABI tend to be female, older, and suffer a higher comorbidity. There is limited research investigating how gender and residence-type influence ABI severity in seniors, especially in New Brunswick where the population of seniors is greater than the national average.

**OBJECTIVES:** Determine whether there is an effect of gender and residence-type (i.e., home or assisted-living) on severity of ABI, as measured by rate of head CT scans and Glasgow Coma Scale (GCS) scores among a sample of seniors from New Brunswick.

**METHODS:** Data on all seniors (>65 years) presenting at the Saint John Regional Hospital from 2009-2012 with an ABI was collected. A retrospective review of data was performed.

**RESULTS:** Chi-square analyses revealed no significant difference in head CTs, as a function of gender ( $p = 0.204$ ) or residence-type ( $p = 0.360$ ). A 2x2 analysis of variance found no significant main effects of gender ( $p = .304$ ) and residence-type ( $p = .120$ ) on GCS scores, and no significant gender-by-residence interaction on GCS ( $p = .193$ ).

**CONCLUSIONS:** There were no significant effects of gender and residence-type on the severity of ABIs. Due to previous research suggesting a link between gender, residence-type and ABI severity, further research on these factors may be beneficial as the results could help tailor ABI-prevention strategies to seniors.

**FUNDING:** Dalhousie Research in Medicine Studentship

**26. Jordan Thorne****EVOLVING MANAGEMENT AND OUTCOMES OF ACUTE CORONARY SYNDROME IN NEW BRUNSWICK**

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**INTRODUCTION:** The most recent Canadian Cardiovascular Society antiplatelet guidelines recommend the use of Ticagrelor over the more commonly prescribed Clopidogrel in NSTEMI patients undergoing PCI, and STEMI patients undergoing PCI not receiving fibrinolytic therapy. As the transition to using Ticagrelor as a first line agent in NB continues, an analysis of current prescription patterns and outcomes will help guide physician practice. To date, there has been no systematic follow up of ACS patient therapy or outcome of any sort in the province of New Brunswick.

**HYPOTHESIS:** Due to the absence of Ticagrelor from the provincial formulary, prescription patterns were expected to be only for ACS patients at high risk of recurrence.

**METHODS:** This study focuses on patients prescribed ticagrelor at the NBHC in 2015 (n=662). One year re-admission outcomes were gathered from CIHI in both Horizon and VitaliteNB health networks. Readmissions were sorted into one of eight categories: ACS, other cardiovascular disease, CHF, Bleeds, Renal Impairment, Hepatic Impairment, Dyspnea and "Other". Patient descriptors included age, sex and BMI, and triage/TIMI score.

**RESULTS:** There were no statistical differences in readmission rates among NSTEMI and STEMI patients discharged on ticagrelor. However, the overall rate was significantly higher than historical Canadian data (21.4%). There was no difference in readmission rates for those patients discharged on Ticagrelor versus those who only had inpatient doses. There was no significant difference in rates between Health authorities, referral centres, or language, but women did have a significantly higher rate than men (40.1% vs 29.1%). Older patients had markedly higher rates of readmission (55.4% vs 20.9%). Discharge prescription patterns did not fluctuate with TIMI scores, ACS diagnosis, sex or age.

**CONCLUSION:** This study was the first in the NBHC to seek readmission rates and follow up data on ACS patients undergoing catheterization. It demonstrates that NB's unique population and delivery of care may influence readmission rates and adverse events post-PCI, and that further research regarding ACS management and outcomes in NB is needed.

**27. Bouhamdani, Nadia****BLOCKING AUTOPHAGY BY INHIBITING LYSOSOME FUNCTION CAUSES SELECTIVE CYTOTOXICITY IN VHL-DEFICIENT RENAL CELL CARCINOMAS**

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**BACKGROUND.** Renal cell carcinoma is the most frequent type of kidney cancer with an increasing incidence rate in developed countries. The clear cell histologic subtype (ccRCC) is the most commonly diagnosed and is characterized by the combined loss of chromosome 3p with inactivation of the remaining von Hippel-Lindau (VHL) gene copy. Targeting truncal drivers such as VHL loss reveals a promising approach to overcome tumor resistance and ameliorate patient outcomes. The possibility of achieving this type of strategy was demonstrated with the identification of a small compound, STF-62247, a blocker of late stages of autophagy, a process assuring cellular homeostasis through lysosome degradation. Blocking autophagy in established tumors has shown promise as it confers stress tolerance and maintains cell survival.

**HYPOTHESIS.** Lysosomes of VHL-inactivated ccRCCs are more vulnerable and can be selectively targeted to sensitize resistant tumors.

**METHODS.** Freely-available data from cBioPortal for Cancer Genomics was analyzed to investigate the alteration frequency of essential autophagic and lysosomal genes from ccRCC primary tumor samples. Lysosome physiology was investigated in VHL-inactivated and -proficient ccRCC models in vitro by immunolabeling and confocal microscopy methods, western blots and by lysosomal enzymatic activity assays. Clonogenic assays were used to monitor cell survival in response to lysosome-disrupting agents in VHL-mutated and -wildtype ccRCC models as well as in a newly generated VHL-mutated STF-62247-resistant cell model.

**RESULTS.** Lysosomal genes are altered in ~25% of cases of ccRCC patient primary tumor samples. VHL-mutated cells possess a higher autophagic flux level compared to VHL-functioning cells. STF-62247 selectively targets VHL-inactivated ccRCCs through lysosome disruption, a decrease of cathepsin B activity, and causes the selective accumulation of cytoplasmic inclusion bodies. Lastly, cell models lacking VHL are selectively killed by both STF and several lysosomal disrupting agents tested.

**CONCLUSION.** We show in vitro that VHL-inactivation renders cell models more sensitive to lysosomal disrupting agents. The results gathered in this study presents strong preliminary evidence that targeting lysosomes in truncal VHL-driven ccRCCs could be a promising approach.

**28. D'Souza, Kenneth****BIOACTIVE WHEY PEPTIDES HAVE AN INSULIN-SENSITIZING EFFECT ON ADIPOCYTES AND MUSCLE CELLS**

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**INTRODUCTION:** Adipose tissue and skeletal muscle dysfunction are hallmarks of obesity and insulin resistance. Insulin-sensitization of adipose and muscle may prevent or reverse obesity-induced complications. Bioactive peptides derived from food sources including milk and dairy products have gained interest for their roles in metabolic disorders, including obesity and insulin resistance. However, it remains unclear whether and how peptides generated by whey protein digestion impact adipose and muscle metabolism and insulin function.

**HYPOTHESIS:** Bioactive whey peptides have an insulin-sensitizing effect on adipocytes and muscle cells.

**METHODS:** Whey peptide mixture was generated via the hydrolysis of whey protein with pepsin and pancreatin, mimicking natural whey digestion in the gut. 3T3-L1 pre-adipocytes were incubated with 2.5 mg/ml of bovine serum albumin (BSA) or whey peptides during differentiation and collected at day 0, 4, and 8 of differentiation for immunoblotting analysis. C2C12 myotubes were incubated with BSA or whey peptides for 16 h in the absence or presence of 0.4 mM palmitate to induce insulin resistance, followed by insulin signaling analysis.

**RESULTS:** Incubation of 3T3-L1 cells with whey peptides increased expression of the master-regulators of adipogenesis, CCAAT enhancer binding protein  $\alpha$  (C/EBP $\alpha$ ) and peroxisome proliferator-activated receptor  $\gamma$  (PPAR $\gamma$ ). PPAR $\gamma$  upregulation was associated with increased expression of the PPAR $\gamma$  targets, perilipin and adiponectin, markers of enhanced lipid storage and insulin sensitivity. In C2C12 myotubes, whey peptides protected from palmitate-induced insulin resistance, as determined by improved AKT phosphorylation and Glut4 expression. Insulin sensitization of C2C12 myotubes was accompanied by decreased inflammation and ER stress markers following whey peptide treatment.

**CONCLUSIONS:** Whey peptides promote differentiation in adipocytes, which is associated with a more insulin-sensitive phenotype that may protect from obesity-induced insulin resistance. In myotubes exposed to an obese-diabetic milieu, whey peptides ameliorate insulin resistance, potentially by reducing inflammation and ER stress. Taken together, our data suggest that whey peptides directly enhance insulin function in adipocytes and muscle cells and could potentially be used to treat obesity-induced insulin resistance.

**29. HRUBENIUK, Travis****EVERY MINUTE OF PHYSICAL ACTIVITY CONTRIBUTES TO MAINTAINING INDEPENDENCE IN OLDER ADULTS: A CROSS-SECTIONAL ANALYSIS**

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**INTRODUCTION:** To improve physical function and maintain independence, current guidelines for older adults recommend completing a minimum of 150 minutes of moderate to vigorous physical activity (MVPA) per week, in bouts of 10 minutes or more. However, limited research has examined if bouts of MVPA shorter than 10 minutes are associated with physical function. The primary objective of this study was to determine the association between various patterns of MVPA and the likelihood of greater physical function in older adults. The secondary objective was to determine the association between various patterns of sedentary behaviour and the likelihood of reduced physical function in older adults.

**HYPOTHESIS:** It was hypothesized that MVPA accumulated in bouts shorter than 10-minutes would be associated with a higher likelihood of above average physical function, whereas various bouts of sedentary behaviour would be associated with a lower likelihood of above average physical function.

**METHODS:** Older adults (age 65+) from the National Health and Nutrition Examination Survey (n = 1,274) were included. MVPA and sedentary bouts lasting 1, 5, 10, 30, and 60 minutes were quantified using accelerometers. Physical function was assessed using a Likert scale reflecting self-reported capability to complete 11 tasks. A single function score was computed using factor analysis. Logistic regression analyses calculated the association between MVPA bout length and the likelihood of above median function, followed by sedentary bout length and the likelihood of above median function.

**RESULTS:** MVPA performed in 1-minute (odds ratio [OR] 1.02; 95% confidence interval [CI], 1.01–1.03), 5-minute (OR 1.02; CI 1.01–1.03), and 10-minute bouts (OR 1.02; CI 1.01–1.03) was associated with greater physical function independent of age, sex, body mass index, ethnicity, household income, and chronic disease. None of the investigated bouts of sedentary behaviour displayed a significant association with physical function.

**CONCLUSIONS:** The findings suggest every minute engaged in MVPA is associated with physical function. Future longitudinal research is warranted to assess if various patterns of MVPA lead to long-term independence.

**31. Mathieu Johnson****IMPACT OF A SMALL MOLECULE TARGETING VHL-DEFICIENT CELLS ON GLUTAMINE METABOLISM AND FATTY ACID PRODUCTION**

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**INTRODUCTION:** Clear cell renal cell carcinomas (ccRCC) are characterized by the inactivation of VHL, occurring in up to 85% cases. Specific metabolic changes are observed in cells lacking VHL. It has been shown that ccRCCs are dependent on glutamine for fatty acid synthesis, making glutamine metabolism a potential target for new therapies. In our previous studies, we identified a small molecule, STF-62247, that specifically targets VHL-deficient cells. Our recent results indicate decreased glutamine levels in these cells when treated to STF-62247.

**OBJECTIVE:** The goal of this study was to investigate the implication of glutamine metabolism on STF-62247 cytotoxicity.

**METHODS:** Protein expression was evaluated by western blot analysis while enzymatic assays were performed to measure glutaminase's activity. Metabolic flux analysis was assessed using L-Glutamine-5-13C and quantified by GC-MS. Fatty acid synthesis from glutamine was evaluated by using radiolabeled glutamine (L-[14C(U)]-Glutamine).

**RESULTS:** Our results indicated a significant decreased of glutamine and glutamate intracellular levels in response to STF-62247. However, glutaminase expression and activity were unaffected by the small molecule. Interestingly, the metabolic flux analysis showed changes in the flow of the tricarboxylic acid cycle (TCA), indicating that the normal TCA was favored over the reductive TCA. Following these results, we investigated expression of acetyl-coA carboxylase (ACC) and showed an activation of this enzyme in VHL-inactivated cells exposed to STF-62247. In line with this signaling cascade, fatty acid synthesis from glutamine increased in VHL-deficient cells treated with STF-62247.

**CONCLUSIONS:** Altogether, this study shows how glutamine metabolism is affected in VHL deficient cells following treatment with STF-62247. These metabolic changes could be a consequence of the autophagic flux blockage induced by the small molecule. Further studies are needed to better understand the mechanism of action of STF-62247 which could provide new insight into VHL-deficient cancer cells' metabolism to identify new targets to fight kidney cancer.

**30. Jennings, Chris****A NOVEL AND DIRECT TREATMENT FOR ATHEROSCLEROSIS: ENCASING HIGHLY POROUS MATERIALS WITHIN A BIOCOMPATIBLE VESICLE CAPSULE**

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**INTRODUCTION:** Atherosclerosis, or the build-up of cholesterol-rich fatty plaques in the bloodstream, is a disease with a vast, global impact. It is the root cause of life-threatening events such as heart attacks and strokes, and accounts for one in every five deaths in Canada. Our current work is focused on the development of non-harmful 'molecular sponges' to actively remove cholesterol from a person-at-risk's bloodstream.

**OBJECTIVE:** To develop an efficient cholesterol-removal agent, the biocompatibility of which will be ensured by enclosing the agent within a vesicle (a cell-like carrier).

**METHODS:** Eight candidate metal-organic framework (MOF) sponges were selected and tested for their ability to take up cholesterol. Giant unilamellar vesicles (GUVs) were formed using the electroformation technique, and have an inbuilt fluorescent probe that enables their imaging. A fluorescent MOF particle - the sponge itself - has been incorporated into the formation process in a number of ways in order to encourage its internalization into the delivery system.

**RESULTS:** Of the eight MOFs that were trialed, one candidate showed an exceptional capacity for extracting cholesterol from a bulk system. For the safe transport of the sponges by a vesicular capsule, a number of experimental parameters were changed. From these progressive changes, significantly more interaction between the MOF cargo and GUV carriers was observed by fluorescence microscopy. These interactions are, however, limited to being between the external surfaces of the MOF sponge and GUV delivery system.

**CONCLUSIONS:** A viable molecular sponge has been identified as an effective cholesterol-removal agent. Moreover, this candidate can readily be used as a frame of reference to identify similarly attractive agents. Encouraging early results have also been made in the development of biologically inspired carriers. Further study is required to encourage these carriers to internalize the molecular sponge cargo over interacting via their surfaces. Achieving this will put our innovative treatment for atherosclerosis well within reach.

**32. Alireza Manashty****Artificial intelligence research has the potential to solve problems with medical diagnostic free-text data to advance epidemiological surveillance in New Brunswick**

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**INTRODUCTION:** In New Brunswick, medical diagnostic data is collected in free-text form in physician billings, hampering its routine use to support health policy and research. Advances in artificial intelligence may lead to solutions to attribute a standardized coding system to text-based clinical information in provincial health administrative data sets.

**OBJECTIVES:** To investigate the potential use of data mining algorithms and natural language processing (NLP) applications to assign diagnostic codes of the International Classification of Diseases, 10th Revision (ICD-10) for diabetes and other high-burden chronic conditions in the physician billing claims database.

**METHODS:** We use text data on patient diagnoses from medical billing records for the month of January 2017 for our research. A two-tiered approach was developed to assign ICD-10 codes to free-text diagnosis text. In the first tier, K-nearest-neighbour classification algorithm assigns each entry to a frequent entry. The distance function is a combination of two string-editing distances of Damerau-Levenshtein and Jaro-Winkler. These distances assign a lower distance between bilingual abbreviations. In the second tier, an NLP algorithm trained on ICD-10 descriptions matched the high-frequent free-text classes to ICD-10 codes providing the top five probable ICD-10 codes for each entry. Finally, an expert-generated consolidation table was used to reconcile any discrepancies between the output terms and the ICD-10 codes.

**RESULTS:** There were 79,244 unique diagnostic terms of 309,249 total billing entries. More than 95.5% of the unique terms occurred 9 times or less. Both English and French entries were found, and the abbreviations used varied per language. The results indicated that the system trained on ICD-10 catalogue could identify the top five ICD-10 codes correctly in 95% of cases using support vector machines. A decision forest could provide probabilities of each assignment but with less accuracy.

**CONCLUSIONS:** Computational linguistics and problem-solving using artificial intelligence and NLP with provincial administrative health data sets can be leveraged to identify ICD-10 codes and therefore key predictive insights to inform health system planning and policy.

**33. Page, Patric****STUDY OF MIR-2355-5P AND ITS POTENTIAL TARGET, SUSD4, IN CLEAR CELL RENAL CELL CARCINOMA**

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**INTRODUCTION:** Kidney cancer is the 8th most common cancer in Canada. Clear Cell Renal Cell Carcinoma (ccRCC) is known to be initiated with the loss of function of the tumor suppressor gene von Hippel-Lindau (VHL). Despite the advances in targeted therapy, the 5-year survival rate for metastatic ccRCC rarely exceeds 10%. Thus, better understanding of RCC pathogenesis is crucial to the development of new targeted therapies and the identification of effective biomarkers. MicroRNAs (miRs) are a family of small non-coding RNA capable of negatively regulating gene expression.

**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 in ccRCC. Taqman probes and qRT-PCR were used to validate the expression of candidate microRNA in different RCC cell lines. The CRISPR/Cas9 was used to generate stable miRNA KO cell lines and evaluate the survival and migration capacity. Luciferase assay was used to evaluate miR-mRNA interaction between miR-2355-5p and SUSD4.

**RESULTS:** We have identified 19 up- and 13 down-regulated miRNAs in VHL-mutated ccRCCs. MiR-2355 is overexpressed in 97% of patients and dependent of the hypoxia inducible factor-2 $\alpha$ . Interestingly, the inhibition of miR-2355-5p in 786.0 VHL-/- cell line increased their migration and survival capacity. Bioinformatics and transcriptomic data of stable miR-2355 KO cell lines identified Sushi Domain Containing 4 (SUSD4) as a potential target. Decreased expression of SUSD4 is observed in VHL -/- cell lines compared to their genetically match counterpart expressing wild type-VHL and is rescued following miR-2355 inhibition.

**CONCLUSION:** Altogether, our study identified novel VHL-regulated miRNAs and potential target genes that could provide new therapeutic and diagnostic tools for ccRCC.

**34. Rioux, Brittany Victoria****AGING IS NOT ASSOCIATED WITH ACUTE RESISTANCE TRAINING-INDUCED CHANGES IN IRISIN**

1,2 RIOUX\_Brittany\_V, 3,4,5 BRUNT\_Keith\_R, 4 EADIE\_Ashley, 1,2

BOUCHARD\_Danielle\_R, 1,2 SÉNÉCHAL\_Martin.

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**INTRODUCTION:** Studies demonstrate that exercise-induced irisin might impact metabolism and health. Some data suggest that irisin release might be influenced by the aging process; however, no study has yet to quantify the impact of resistance training-induced irisin release across the aging spectrum.

**OBJECTIVE:** The purpose of this study was to compare irisin release during an acute bout of resistance training between younger and older adults living with overweight or obesity. It was hypothesized that a significant difference in the response of irisin to resistance training would be observed between the two age groups.

**METHODS:** Adults aged between 19-35 (25.9 +/- 5.0; n=15) or 60-80 years old (67.7 +/- 4.1; n=14) living with overweight or obesity (BMI  $\geq$  25 kg/m<sup>2</sup>) participated in this study. Participants performed an acute bout of resistance training that consisted of: 3 sets of 12-15 repetitions at 65-70% of 1-Repetition Maximum (bench press, latissimus pull-down, and bicep curl), 3 minutes each of squats and step-box, and 1 minute of the plank. Cardiorespiratory fitness was measured by VO<sub>2</sub>max. Irisin was quantified by enzyme-linked immunosorbent assay before, during, and after exercise.

**RESULTS:** Baseline irisin was not significantly different (younger: 20.5 +/- 13.7 vs. older: 20.3 +/- 11.9 ng/dl; p > 0.05) while cardiorespiratory fitness was significantly different between age groups (p < 0.05). A significant correlation between cardiorespiratory fitness and percent change in irisin was observed in older adults (r = 0.54; p < 0.05), but not in younger adults (r = 0.19; p > 0.05). Using repeated measures analyses, no significant increase in irisin was observed over time and no interaction effect (age group and time) was observed for the acute change in irisin after adjusting for cardiorespiratory fitness (p > 0.05).

**CONCLUSIONS:** These results suggest that younger and older adults living with overweight or obesity do not have a different irisin response to an acute bout of resistance training.

**35. Slade, Logan****TRANSCRIPTION FACTOR EB PROMOTES DNA REPAIR AND INHIBITS APOPTOSIS IN BREAST CANCER CELL LINES**

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**INTRODUCTION:** Doxorubicin (DOX) is the standard of care treatment for triple-negative (TNBC) and hormone-therapy resistant breast cancer. Increased incidence of chemoresistance at lower doses and toxicity at higher doses limit the usefulness of DOX. By targeting pathways of chemoresistance, DOX can be an efficacious antitumor agent at lower doses. Lysosomal autophagy promotes resistance to several chemotherapies by guarding cells from cytotoxic metabolites and enabling tumour cells to scavenge cellular materials to accommodate increased levels of proliferation and energy production.

**HYPOTHESIS:** Since transcription factor EB (TFEB) is a significant regulator of lysosomal biogenesis and autophagy in lung, renal and pancreatic carcinoma, we hypothesized a role for TFEB in breast cancer chemoresistance.

**METHODS:** We modeled the molecular effects of DOX treatment using cell culture models of breast cancer (MDA-231, MCF-7, BT-549, or non-cancerous MCF10A). Genetic manipulation of these cells was done using adenoviral delivery of short-haripin RNA or overexpression constructs (either wild-type TFEB or mutant TFEBs211A). Protein expression was analyzed by immunoblot and immunofluorescence microscopy, lysosome biogenesis and activity was measured by fluorescence microscopy. DNA damage was assessed by  $\gamma$ H2A.X immunofluorescence microscopy. Cell viability was analyzed by the presto blue method and colony formation assays.

**RESULTS:** In MDA-231 and BT549 TNBC cells, TFEB was hypo-phosphorylated and localized in the nucleus upon DOX treatment which corresponded with increased autophagy, lysosomal proteolysis and biogenesis. Knockdown of TFEB was sufficient to prevent DOX-induced autophagy activation and significantly sensitized MDA-231 and BT549 cells to DOX-induced apoptosis and loss of viability. Mechanistically, knockdown of TFEB significantly reduced the efficiency of DNA damage repair, which along with the anti-apoptotic effect of TFEB, was independent of lysosomal function. Finally, we show that calcineurin inhibition with cyclosporine A sensitized cells to DOX-induced apoptosis in a TFEB dependent fashion.

**CONCLUSION:** Overall our data demonstrate that independent of the role of TFEB in regulating the lysosome function, targeting TFEB in cancer cells will render DOX more effective at lower doses by decreasing DNA damage repair.

**36. Purvi C Trivedi****RESTORATION OF TFEB ACTION ATTENUATED NUTRIENT OVERLOAD-INDUCED CARDIOMYOCYTE DYSFUNCTION**

1 TRIVEDI Purvi\*, 1 BARTLETT Jordan, 2 KANE Daniel, 3 SURETTE Marc, 1 KIENESBERGER Petra, and 1 PULINILKUNNIL Thomas.

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**Background:** Our laboratory demonstrated that lipid (palmitate) overload within the cardiomyocyte decreases nuclear transcription factor EB (TFEB), the master regulator of lysosomal metabolism, signalling and autophagy. Since lysosomal function is disrupted in the obese and diabetic heart, we hypothesized that restoring TFEB content attenuates nutrient overload-induced cardiomyocyte dysfunction.

**Hypothesis:** Preserving TFEB action in the myocardium attenuate nutrient overload-induced metabolic cardiomyopathy during obesity/diabetes.

**Methods and results:** To examine the effect of different fatty acids (FA) on TFEB regulation and action in the heart, rat cardiomyofibroblasts (H9C2) were incubated with polyunsaturated FA (PUFA; arachidonic acid, eicosapentaenoic acid, linoleic acid) and saturated FA, such as palmitate. Immunoblot analysis revealed that 0.6 mM palmitate and above, augmented cleaved caspase-3 (apoptosis executor), whereas exceeding 0.8 mM palmitate declined TFEB protein, an effect not observed in response to PUFA. Notably, compared to chow diet, C57BL6J mice fed high-fat high-sucrose (HFHS) diet for 8, 12 and 16 but not 2 and 4 weeks exhibited decrease in nuclear TFEB content in the heart. In the absence of nutrient overload, cardiomyocyte contractile function was comparable between WT mice and cardiomyocyte-specific inducible TFEB-/- mice. Therefore, loss of TFEB precipitates cardiomyocyte stress only if myocyte threshold of lipid-loading exceeds its metabolic capacity. To assess whether the toxic effect of palmitate is inhibited by augmenting TFEB, neonatal rat cardiomyocytes (NRCM) and H9C2 cells were transduced with adenoviruses, overexpressing WT-TFEB or constitutively active phosphorylation-resistant TFEBs142A or their viral control followed by incubation with 1.2 mM palmitate for 16 hr. Restoration of TFEB levels attenuated palmitate-induced increase in caspase-3 cleavage, decrease in LAMP-2A content and suppression in cathepsin proteolytic activity. Adenoviral transduction of NRCM and H9C2 cells with TFEBs142A enhanced insulin-stimulated AKT Serine 473 phosphorylation when compared to control, signifying that increased TFEB content likely protects against lipid overload by modulating insulin control of metabolism and survival.

**Conclusions:** Restoring TFEB action during nutrient overload attenuates lysosomal dysfunction and loss of viability, likely by sensitizing the cardiomyocyte to insulin-signalling.

**37. BERA AMIT****CYTOPLASMIC hnRNP H LOCALIZES TO STRESS GRANULES AND IS REQUIRED FOR EFFICIENT STRESS RECOVERY.**

1BERA Amit, 1WALL Michael L., 1WONG Florence K., 1LEWIS Stephen M. 1Atlantic Cancer Research Institute, Moncton, NB;

**INTRODUCTION:** Heterogeneous nuclear ribonucleoprotein (hnRNP) H is a member of the hnRNP H/F protein subfamily of hnRNPs that regulate the maturation and post-transcriptional processing of pre-mRNA. It is a component of an mRNA export complex that shuttles mature mRNA from the nucleus to the cytoplasm. Following export, hnRNP H is reimported through interaction with Transportin 1. hnRNP H is primarily nuclear in most cells, it has been observed to accumulate in the cytoplasm of certain cell types. Cytoplasmic functions of hnRNP family members include the regulation of IRES-mediated translation and modulation of the stress response. Stress granule formation modulates the stress response, viral infection & signaling pathways.

**OBJECTIVES:** To understand the mechanism that regulates the alternative nucleo-cytoplasm distribution and the potential biological role of hnRNP H.

**METHODS:** We have performed co-immunoprecipitation, Western blotting, Microscopy and stress recovery assays.

**RESULTS:** We first examined the nucleo-cytoplasmic distribution of hnRNP H under stress conditions. Under osmotic stress with 0.6M sorbitol, endogenous hnRNP H accumulates in the cytoplasm, the association between hnRNP H & Transportin-1 is decreased, and hnRNP H is co-localized with cytoplasmic stress granules. By immunofluorescent microscopy we find that RRM3 domain of hnRNP H is necessary for its localisation with stress granules. Next, we examined how hnRNP H associates with stress granules and we find that hnRNP H binding with TDP-43 is associated with hnRNP H co-localization with stress granules. Further we checked the function of hnRNP H under stress. The cell viability data suggest that downregulation of hnRNP H delays cellular recovery from stress.

**CONCLUSIONS:** We demonstrate that hnRNP H is a novel stress-granule associated protein. In addition, we identified the RRM 3 domain of hnRNP H as being necessary for hnRNP H-stress granule association, which may require binding to the stress granule protein TDP-43. Finally, stress recovery assays suggest that hnRNP H plays a key role in the cellular stress response and is required for efficient recovery from stress conditions of human cells.

**38. Biswas, Dipsikha****DYSREGULATED BRANCHED CHAIN AMINO ACID METABOLISM ACTS AS PREDICTOR OF GROWTH, INSULIN SENSITIVITY AND CARDIOMETABOLIC OUTCOMES.**

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**Background:** Dysregulated branched amino acid (BCAA) metabolism is central to pathogenesis of impaired insulin sensitivity and cardiovascular dysfunction. Branched chain aminotransferase (BCAT) facilitates BCAA uptake yielding branched-chain  $\alpha$ -keto acids (BCKA). Branched chain ketoacid dehydrogenase (BCKDH), enzyme sensitive to inhibitory phosphorylation by BCKD kinase, catalyses mitochondrial oxidation of BCKA. BCAA activate mTORC1 which inhibit insulin signalling leading to insulin resistance (IR). However, the effect of BCKA on muscle insulin signalling is unexplored. Moreover, the clinical association between dysregulated BCAA catabolism and cardiovascular dysfunction merits investigation.

**Hypothesis:** A) Defective BCAA catabolism can act as a predictor of adverse metabolic outcomes following cardiac surgery in obese patients. B) Imbalance in muscle BCKA flux impairs insulin signaling.

**Methods and Results:** Atrial appendage (AAT) and subcutaneous adipose (SAT) tissue were collected from 136 patients during cardiac surgery with informed consent. Immunoblot analysis revealed that phosphorylated BCKDH correlated positively with BMI, length of stay (LOS) and HOMA IR in SAT. KLF15, a transcriptional regulator of BCAA oxidation, negatively correlated with BMI in both SAT as well as AAT; while BCAT2 positively correlated with BMI in AAT. Collectively, these findings suggest that impaired BCAA catabolism triggered by decreased KLF15 expression is strongly associated with obesity-induced IR.

Insulin resistant gastrocnemius muscles from high-fat, high sucrose (HFHS) diet fed mice also displayed an increase in phosphorylated BCKDH suggesting altered BCKA flux. Incubating adult and neonatal rat cardiomyocytes (ARCM & NRCM), mouse (C2C12) and rat (L6) skeletal myocyte with 0.4mM palmitate for 16 h followed by 30 mins 5mM BCKA and 15 min 100 nM insulin stimulation revealed increased mTOR signalling and reduced insulin-stimulated AKT phosphorylation. Genetic (adenoviral) and pharmacological activation of BCKDH using BCKDK inhibitor BT-2 in C2C12 cells potentiated insulin signalling with concomitant reduction of phosphorylated ribosomal p70S6K.

**Conclusion:** Adverse cardiometabolic outcomes in obese patients correlates strongly with defective branched-chain amino acid catabolism. Also, our study unravels the novel role of BCKAs in regulating insulin and mTOR signalling in skeletal and cardiac muscle.

**39. Bowes, Andrea****AN INVESTIGATION OF ACCESS TO MENTAL HEALTH SERVICES AMONG ATLANTIC CANADIAN MILITARY PERSONNEL USING POPULATION HEALTH DATA**

BOWES, Andrea; OLTHUIS, Janine  
The University of New Brunswick

**Introduction:** It is important for military service members to access mental health treatments, given the potential negative impact of mental health issues (e.g., PTSD, depression, etc.) on his/her/their quality of life and well-being. Stigma or other perceptions may negatively affect help-seeking behaviors. The Atlantic Canadian geographical area offers an important opportunity to understand treatment-seeking by service members given the intersecting influence of large, often rural military bases and the on and off base mental health services that this population may access.

**Hypotheses/Research goals:** This study looks at (a) the prevalence of mental illnesses, (b) perceived needs for mental health care, and (c) help seeking from professionals among Atlantic Canadian service members who meet the criteria for a past year mental illness.

**Methods:** The research uses de-identified data from the Canadian Armed Forces Mental Health Survey, administered by Statistics Canada in 2013 and accessed through the secure environment at the University of New Brunswick, Fredericton.

**Results:** Our work demonstrates that, although those seeking mental health care tend to report high levels of functional disability, 60- 74% of those participants self-reported that a professional provided 'some' or 'a lot' of help, depending on the type of health care professional they contacted. In contrast, those not seeking help still report high disability scores compared to the general population. We also find that an important factor in seeking care is encouragement from friends and family.

**Conclusions:** The data provide information on the prevalence of mental disorders in this population as well as how to align perceived needs with access to care. Important factors such as friends and family help those experiencing mental illness to recognize their needs. Results are discussed in light of how we might understand those who do not seek care and how to incorporate friends and family in care.

**40. DAS, Alekhya****INTEGRATED-COMPREHENSIVE MODEL AS AN EFFECTIVE SYSTEM FOR MEDICAL CARE AND EMPOWERMENT SERVICES FOR VISIBLE MINORITY AND NEWCOMER WOMEN VICTIMS OF INTIMATE PARTNER VIOLENCE (IPV)**

1 DAS, Alekhya. 1 Applied Research and Innovation Dept. New Brunswick Community College, New Brunswick, Canada.

**INTRODUCTION:** IPV is a significant portion within the wider subject of gender-based violence against women; and impact on health (physical and mental) is the foremost consequence, as physical assaults are the most frequent type (71%), and 51% of women survivors experienced some form of physical injury (2011).

**HYPOTHESIS (Objectives or Aims):** investigating the long-term mental and physical health consequences of IPV for visible minority & immigrant women in New Brunswick (NB), and the barriers faced while receiving care services. Also, assessing the effectiveness of single-source and integrated-comprehensive model, as solution for the barriers, and as facilitator of empowerment services for women survivors.

**METHODS:** mixed method design; focus group discussions, secondary data analysis.

**RESULTS:** Evidence is insufficient regarding - IPV among immigrant/visible minority women in NB, long-term impacts on mental and physical health, and experiences of availing support services. IPV is underreported and under-focused, because of inadequate understanding of Canadian definitions of IPV, fear that reporting may lead to the denial of refugee/asylum claim and/or deportation, and so on. As regards to newcomer women in NB who do seek help for IPV, research highlights numerous barriers, such as tedious navigation of the healthcare system, major systemic barriers (like wide assortment of services that are often disconnected, lack of coordination between service providers, etc.). Furthermore, particular aspects of support services are deterrents, such as involvement of law enforcement, which is connected to mistrust among newcomer/visible minority women, due to their own prior negative experiences.

**CONCLUSIONS:** A possible key solution is a single-source service provision mechanism for medical care and empowerment of women victims, and community healthcare centers as the source. A single-source with comprehensive services (i.e. healthcare, counselling, information, long-term care, mental health facilities, and so on) is more efficient and advantageous. Also, community healthcare centres are perceived as family-oriented and familiar, which makes them more approachable, as well as minimises newcomer women's mistrust with law enforcement (or government agencies in general).



<p><b>41. Deprez, Pierre</b>  <b>OLFACTORY RECEPTORS: NEW TARGETS IN NON-SMALL CELL LUNG CANCER THERAPY</b>  DEPREZ Pierre ML1, MERZETTI Eric1, CUMBY Nichole1, CHACKO Simi1, CRAPOULET Nicolas1, BARNETT David1, GHOSH Anirban1, ROBICHAUD Gilles1, TURCOTTE Sandra1, LEWIS Stephen1, OUELLETTE Rodney1  1Atlantic Cancer Research Institute, Moncton, NB  <b>INTRODUCTION:</b> Personalized medicine focuses on the identification of the most effective treatment for each patient. Moreover, unlike current chemotherapeutics, the design of new personalized medicine drugs must take into consideration curative efficiency while avoiding side-effects for the patient. With this idea in mind, we have performed a whole genome CRISPR-Cas9 screen to discover genes that are lethal for non-small cell lung carcinoma (NSCLC) cells, but leave non-cancerous lung cells unaffected.  <b>OBJECTIVES:</b> To discover new druggable NSCLC oncogenic factors which, when targeted by therapeutic intervention, induce the specific death of NSCLC cells.  <b>METHODS:</b> A genome-wide CRISPR-Cas9 screen was performed using the GeCKOV2 library in order to identify potential target genes across an array of NSCLC cell lines. This gene disruption experiment generated a list of potential therapeutic targets. The analysis of the lethal/non-lethal patterns of gene disruption highlighted a subset of targets belonging to a specific gene family. Validation of the targets was performed using an individual CRISPR-Cas9 gRNA experiment combined with a cell viability assay. Genomic alterations, as well as off-target effects, were verified by SANGER sequencing.  <b>RESULTS:</b> Bioinformatics analysis of the CRISPR-Cas9 screen results, which took into consideration the lethal effect of gene disruption as well as the location of encoded proteins on the cell surface, identified a subset of genes belonging to the olfactory receptor family. Because of the difficulty in targeting intra-cellular proteins therapeutically, only extracellular components of this gene family were considered for further analysis. Of the 16 genes identified, 5 met our requirements of gene specificity and NSCLC-specific lethality, attesting that specific gene targeting is responsible for the death of only NSCLC cells.  <b>CONCLUSIONS:</b> Our study shows that CRISPR-Cas9 is an effective tool to discover novel therapeutic targets in NSCLC. Moreover, the focus on encoded proteins that are located on the cell surface provides readily-accessible targets for therapeutic intervention.</p>	<p><b>42. Sherif Eltonsy</b>  <b>COMPARING THE EFFECT OF COMBINING EXERCISE WITH ROSUVASTATIN VERSUS ATORVASTATIN ON LIPID PROFILE AND FUNCTIONAL CAPACITY: A RETROSPECTIVE COHORT STUDY</b>  1,2 ELTONSY Sherif, 3 DUFOUR DOIRON Monique, 4 SIMARD Patrice , 1,5 JOSE Caroline, 6 SÉNÉCHAL Martin, 6 R. BOUCHARD Danielle, 3, 5 LEBLANC Rémi, 1,3,5 BÉLANGER Mathieu*  <b>Background:</b> Statins and exercise are recommended for managing hypercholesterolemia. However, statin types may vary in their interaction with exercise. We compared rosuvastatin versus atorvastatin combination with exercise on lipid profile and functional capacity.  <b>Methods:</b> We conducted a retrospective cohort study using data from a 12 week cardiovascular rehabilitation program between the years 2014 and 2016. Statins use was determined through prescriptions data and average exercise minutes/week was computed from exercise logs. The outcomes were changes in total cholesterol, low and high density lipoproteins (LDL &amp; HDL), triglycerides and functional capacity (6-minute walk test [6MWT]). Directed acyclic graphs were used to identify potential confounders, accounted for using multiple linear regression modeling.  <b>Results:</b> The cohort included 282 patients from 106 atorvastatin and 176 rosuvastatin users. The average exercise minutes/week was 109.4±66.1 among atorvastatin and 106.7±49.1 among rosuvastatin users. Interaction models suggested that a higher number of exercise minutes/week was more favorable among atorvastatin users on the outcomes of total cholesterol and LDL (0.004, 95% CI: 0.001, 0.008 and 0.004, 95% CI: 0.001, 0.007, respectively), but did not reach significance for HDL and triglycerides. Rosuvastatin use was associated with greater increases in 6MWT, however we observed no between-group differences in interaction estimates by type of statin used.  <b>Conclusion:</b> Rosuvastatin use could blunt the beneficial effect of exercise on LDL and total cholesterol compared to atorvastatin. No significant differences were observed in triglycerides, HDL and functional capacity levels. Additional studies are warranted with randomized treatments and larger samples. Healthcare providers should continue prescribing statins alongside recommending exercise modalities, with a careful follow-up for rosuvastatin users.</p>
<p><b>43. Gill, Satinder</b>  <b>LOW COST INSTRUMENTED ASSISTIVE DEVICES CAN CAPTURE RELEVANT AND DETAILED GAIT INFORMATION</b>  GILL_Satinder, SETH_Nitin and SCHEME_Erik  <b>INTRODUCTION:</b> Increasing demands on the global healthcare system, brought in part by the rise of chronic disease and an aging population, have led to a growing emphasis on proactive health monitoring and self-management. Potential exists in the wave of emerging wearable devices and the Internet of Things (IoT) to act as a conduit towards the decentralization of healthcare. Mobility impairments, caused by injury or chronic disease, are a major concern in the aging population. Individuals with mobility impairments often rely on assistive devices (ADs), such as walkers, to increase safety and stability. Given the prevalence of ADs among these users, there is potential for instrumented assistive technologies to provide effective and unobtrusive activity monitoring. We have developed a line of multi-sensor IoT enabled devices, including a cane, walker and rollator that are nearly indistinguishable from traditional ADs and are capable of measuring loading, mobility, and stability information.  <b>OBJECTIVES:</b> The goal of this research was to evaluate the performance of this line of instrumented ADs. This pilot work will inform research direction as we move towards unobtrusive long-term monitoring of individuals in the community.  <b>METHODS:</b> Standard commercially available walkers and rollators were instrumented with low-cost sensors to monitor movement and activity. Ten healthy subjects were asked to walk in different conditions, including simulating relevant injuries (pain in the big toe/heel), with an instrumented AD. . Sensor data from the ADs were collected and streamed to a remote data collection application and processed gait for analysis.  <b>RESULTS:</b> Pilot results demonstrate that these low-cost instrumented ADs are able to capture valuable information about a user's gait and mobility.  <b>CONCLUSIONS:</b> These results support the feasibility of using instrumented ADs to automatically and continuously monitor the movement and stability of individuals in the home and out in the community. Ongoing work is focused on developing, evaluating, and improving these smart assistive technologies to further develop and demonstrate their capabilities for the early identification and intervention of gait abnormalities.</p>	<p><b>44. Rostyslav Horbay</b>  <b>A HIGHLY-SENSITIVE LIQUID BIOPSY DNA METHYLATION ANALYSIS METHOD FOR EARLY PANCREATIC CANCER DETECTION</b>  1HORBAY Rostyslav, 1ROY Jeremy, 1WAJNBERG Gabriel, 1REDDI Surendar, 1TAYLOR Catherine, 1FOURNIER Sebastien, 1DEPREZ Pierre, 1ANISH Biji, 2ROBICHAUD Philippe-Pierre, 1KUMAR Awanit, 1CRAPOULET Nicolas, 1,2GHOSH Anirban, 1,2LEWIS Stephen, 1,2OUELLETTE Rodney J.*  1 - Atlantic Cancer Research Institute, Moncton, NB, Canada  2 - Université de Moncton, Moncton, NB, Canada  *RodneyO@canceratl.ca  <b>INTRODUCTION:</b> Pancreatic cancer (PC) is the fourth leading cause of cancer mortality. Due to lack of a definitive and reliable tool to detect it at an early stage, PC will become the second most common cause of cancer death by 2030. We have combined our Vn96 extracellular vesicle (EV) isolation technology with DNA hypermethylation analysis to develop a highly-sensitive PC-detection method that can be utilized with patient plasma samples.  <b>OBJECTIVES:</b> Identify, validate and analyse novel genes with specific methylation patterns in PC.  <b>METHODS:</b> We selected 11 candidate genes according to methylation beta values, specific methylated gene regions, shared other types of cancer, and number of patients. For target validation we screened 8 pancreatic cell lines (H6C7 immortalized pancreatic cell line and 7 adenocarcinoma cell lines: AsPC1, BxPC3, Capan-2, CFPAC-1, HPAF-II, PANC 10.05 and SW1990). Cells and media were collected and media subjected to Vn96-mediated EV isolation. After DNA extraction, methylation analysis of EV-DNA and genomic DNA was performed. To validate the methylation detection in body fluids, normal plasma was spiked with PANC 10.05 EVs followed by EV isolation, DNA extraction and methylation analysis as described above.  <b>RESULTS:</b> We were able to scale down the methylation assay to 2 ng DNA/gene target (vs 12.5 ng/gene target) and optimize the protocol for Vn96-captured EV-DNA. DNA isolated from EVs had a methylation pattern almost identical to genomic DNA. Our data resulted in a proprietary panel of 9 genes for highly-sensitive methylation detection in PC cell lines. We confirmed that the same methylation pattern is detected for PC cell-derived EVs that were spiked into human plasma samples.  <b>CONCLUSION:</b> The method we have developed for methylation analysis of DNA is suitable for patient plasma analysis and can detect up to 5 targets from 1 mL of patient plasma. Our findings indicate that DNA methylation signatures detected in a liquid biopsy format are a promising solution for pancreatic cancer early detection.</p>

**45. Jougoux, Jean-Luc****PLATELET-DERIVED MICROPARTICLES MODULATE THE INFLAMMATORY STATE OF THE NEUTROPHIL-LIKE PLB-985 CELL LINE**

1 JOUGOUX\_Jean-Luc, 1 LÉGER\_Jacob\_L, 1 ROY\_Patrick, 2 DJEUNGOUE\_PETGA\_Marie-Ange, 2 HÉBERT CHATELAIN\_Étienne, 1 BOUDREAU\_Luc\_H\*

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**RATIONAL:** Neutrophils have a relatively short lifespan (8-12h). For unknown reasons, their lifespan increases in the synovial fluid (SF) of rheumatoid arthritis (RA) patients. While neutrophils play an important role in the host's defense, an increase of their viability can lead to persistent inflammation and tissue dysfunction. Platelets amplify the inflammatory response by releasing microparticles (PMPs, including mitoPMPs, a subpopulation retaining mitochondria) in the SF of RA patients. Under inflammatory conditions, PMPs are internalized by neutrophils, resulting in an increase of the cell's bioactive content. We propose that this phenomenon modulates the mitochondrial content and inflammatory state of host cells, thus exacerbating their viability and inflammation.

**AIMS:** Investigate the effects of the horizontal transfer of PMPs content on the inflammatory state of the recipient cell.

**METHODS:** A human neutrophil-like cell line, PLB-985, was used for the study. Cells were co-incubated at various time points in presence of human PMPs. Their internalization by PLB-985 was confirmed by confocal immunofluorescence microscopy, mitochondrial DNA quantification and flow cytometry analysis. The mitochondrial activity was determined by high-resolution respirometry. The cell's viability was assessed by flow cytometry (7-AAD marker). The inflammatory profile (cytokines/eicosanoids relevant to RA) of recipient cells was assessed using qPCR, RP-HPLC and immunoblotting approaches.

**RESULTS:** PMPs internalization by PLB-985 significantly increased the respiration and viability of the recipient cells. We also demonstrate that PMPs significantly modulate the expression of cytokines (IL-1 $\alpha$ ) and increase the productions of leukotrienes, via the 5-lipoxygenase pathway.

**CONCLUSIONS:** Our data suggests that PMPs improve the respiratory state of the recipient cell, consequently increasing their viability. We have demonstrated that these processes are accompanied by an increased production of inflammatory mediators relevant to RA. The exact mechanisms by which these small cells affect PLB-985's viability, mitochondrial respiration and inflammatory status remain unclear and are an important objective of the current project. We believe that the horizontal transfer of the bioactive content such as transcription factors, ribosomes and mitochondrial content may contribute to these observations.

**47. Sandra Magalhaes****REGIONAL DIFFERENCES FOUND IN THE INCIDENCE OF MULTIPLE SCLEROSIS IN NEW BRUNSWICK**

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**INTRODUCTION:** Multiple sclerosis (MS) is a chronic autoimmune and neurodegenerative disease, usually diagnosed in young adulthood, which can result in significant physical and cognitive disability. MS has an interesting epidemiology, as rates vary geographically. Canada has the highest rates of MS globally, and within Canada, New Brunswick (NB) is thought to have among the highest. Routinely collected administrative data have been used across Canada to provide population-based estimates of the incidence of MS, and studies suggest interprovincial variation.

**OBJECTIVES:** To estimate the average annual incidence rate of MS, between January 1, 2001 and December 31, 2014, in each of the seven health regions in NB.

**METHODS:** This study was conducted using data housed at the NB Institute of Research, Data and Training (NB-IRDT). MS cases were identified using the Canadian Chronic Disease Surveillance System (1995-2014). A 6-year run-in period was used to limit bias from prevalent cases. Annual adjusted postcensal population estimates served as the denominator. Age- and sex- adjusted incidence rates were standardized using the 2001 Canadian Census, to allow for comparison with previous Canadian studies.

**RESULTS:** There were 1332 incident cases of MS identified in NB between 2001 and 2014. The average annual incidence rate of MS in NB was 16.6 per 100,000 person-years (95%CI: 15.7-17.5). When stratified by health region, Campbellton (24.6 per 100,000 person-years (95%CI: 18.6-30.6)) had the highest MS incidence, which was more than twice the incidence in Bathurst (10.9 per 100,000 person-years (95%CI: 8.6-13.1)). Incidence rates in the remaining health regions were more consistent with the provincial average.

**CONCLUSION:** Our results suggest geographic differences in the incidence of MS within NB; and we demonstrate, for the first time, that rates are highest in the Campbellton health region. Further research to investigate factors that may be contributing to this spatial variability is underway.

**46. Luck, Kerrie****IMPLEMENTATION OF A COMPREHENSIVE SMOKE-FREE HOSPITAL POLICY STRENGTHENS TOBACCO-FREE WORKPLACE CULTURE AMONG HEALTHCARE PROVIDERS**

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**RATIONALE:** While numerous patients are hospitalized due to tobacco related disease, the promotion of tobacco reduction by healthcare providers in smoke-free hospitals has historically been less than optimal. Greater understanding of what influences these newer smoke-free environments have on healthcare providers' practice is needed to reap the potential benefits on the delivery of care for tobacco dependence.

**OBJECTIVE:** The aim of this study was to explore the perceptions, experiences and behaviours of healthcare providers after the implementation of a comprehensive smoke-free policy.

**METHODS:** This qualitative descriptive study, using semi-structured interviews, was conducted with 28 healthcare providers working at the Saint John Regional Hospital. Thematic analysis was used to identify, analyze and report patterns across the data set, as well as organize and describe the data in rich detail.

**RESULTS:** Seventeen sub-themes emerged from the analysis based on the stories shared by the participants. These were mapped and merged into four overarching themes including: 1.) Greater support for tobacco reduction; 2.) Enhanced patient care and interactions; 3.) Improved staff morale; and 4.) Some barriers still exist.

**CONCLUSIONS:** The main findings suggest a comprehensive smoke-free hospital environment can strengthen the tobacco-free workplace culture within a hospital setting among healthcare providers where support for tobacco reduction is amplified, patient care and interactions regarding tobacco dependence are improved and staff morale is enhanced. While there are still some challenging barriers as well as opportunities for improvements, the implementation of a comprehensive smoke-free policy heightened the call-to-action among healthcare providers to take a more active role in tobacco reduction.

This work was supported by the New Brunswick Health Research Foundation.

**48. Eric Merzetti****The Wnt effectors NOTUM and DKK4 are putative therapeutic targets in non-small cell lung cancer.**

MERZETTI\_Eric, DEPREZ\_Pierre, CUMBY\_Nichole, MERILOVICH\_MAX, WAJNBURG\_Gabriel, HAJJI\_Ilyass, BULLERWELL\_Charles, CHACKO\_Simi, CRAPOULET\_Nicolas, BARNETT\_David, GHOSH\_Anriban, ROBICHAUD\_Gilles, TURCOTTE\_Sandra, LEWIS\_Stephen, OUELLETTE\_Rodney

**INTRODUCTION:** Future therapeutic development for tumours such as non-small cell lung cancer (NSCLC) will focus on therapies that selectively inhibit the growth of cancer cells while having little to no effect on normal tissue. In an effort to identify such therapeutic targets, we have performed a whole genome screen to discover genes that are necessary for cancer cell viability but not for the viability of immortalized cells of the same tissue type.

**OBJECTIVES:** To discover new therapeutic gene targets in NSCLC that may be manipulated to stop the growth of cancer in a specific manner.

**METHODS:** A genome-wide CRISPR-Cas9 screen was employed using the GeCKOV2 library to identify potential target genes across NSCLC cell lines. Disruption of genes that specifically caused a lethal phenotype in cancer cell lines, but not in immortalized, non-cancerous cell lines, led to the generation of a list of potential therapeutic targets. Lethality was confirmed at a gene-by-gene level using newly designed guide RNA sequences. Gene expression was reduced using small-interfering RNA (siRNA) and transcript reduction was quantified by quantitative reverse-transcriptase polymerase chain reaction (qRT-PCR). Cell viability was assayed through flow cytometry and protein expression confirmed by Western Blot.

**RESULTS:** The initial screen generated a list of genes whose disruption causes lethality specifically in NSCLC. Follow-up bioinformatics clustering helped determine common pathways that rely on these genes, which resulted in the identification of the Wnt signalling pathway as a potential therapeutic target for NSCLC. Of the Wnt genes identified in our screen, those that encode extracellular proteins were selected for further study, which resulted in two unique targets: NOTUM and DKK4. Analysis of these genes showed that a reduction of their transcript levels results in a loss of cell viability and premature death in NSCLC cells.

**CONCLUSIONS:** Whole genome CRISPR-Cas9 screening is an effective tool to identify novel therapeutic targets in a diverse population of cancer cells and both NOTUM and DKK4 are potential novel targets for therapeutic intervention in NSCLC.

**49. Shreya Sarkar****GDF15 CAN BE USED A NOVEL CIRCULATING BIOMARKER FOR OBESITY IN PATIENTS UNDERGOING CARDIAC SURGERY**

1,3,4 SARKAR Shreya, 2 LEGERE Stephanie, 2 HAIDL Ian, 2 MARSHALL Jean, 3 MCLEOD Jeff, 3 AGUIAR Christie, 3, 4 LUTCHMEDIAL Sohrab, 3, 4 HASSAN Ansar, 4 BRUNT Keith, 4 KIENESBERGER Petra, 1,4 PULINILKUNNIL Thomas, 2, 3, 4 LEGARE John Francois

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**INTRODUCTION** The disease burden of obesity is increasing at an alarming rate in New Brunswick and is a known risk factor for cardiovascular diseases. Although Body Mass Index (BMI) is the traditional indicator of obesity, several studies indicate its unreliability as an indicator of outcomes, suggesting the addition of biomarkers. On such biomarker is GDF15, which is a secretory protein involved in inflammation and metabolic homeostasis and shows increased expression under physiological stress conditions

**OBJECTIVES** The study aims to determine whether circulating levels of GDF15 correlate with obesity in patients undergoing elective cardiac surgery.

**METHODS** Patients (n= 80) requiring elective heart surgery were recruited from New Brunswick Heart Centre and grouped as non-obese (BMI 20-29.9) and obese (BMI >30). Pre-operative blood and tissues (atria, epicardial fat) were used to determine the levels of GDF15 using ELISA and western blot/qPCR respectively. The levels of GDF15 were correlated to markers of heart failure (NT-proBNP), metabolism (blood glucose, HbA1c, total cholesterol, triglycerides) and clinical parameters/ patient outcomes.

**RESULTS** GDF15 (mean 1633 vs. 1057, p=0.019) and triglyceride (mean 1.8 vs. 1.2, p<0.0001) were significantly high in the plasma of obese patients (mean BMI= 25.7, n=38) compared to non-obese patients (mean BMI= 35.8, n=42). GDF15 protein showed significant expression in atria of patients (reflecting serum levels) but its expression was minimal in epicardial adipose tissues, indicating that heart muscles might be an important source of circulating GDF15. Circulating GDF15 also showed a significant linear correlation with BMI (p= 0.003) and NTproBNP (p= 0.03), thus linking inflammation, obesity and heart failure. Furthermore, patients with high GDF15 had a significantly worst survival (p= 0.0048), although non- obese and obese patients showed similar in- hospital outcomes.

**CONCLUSIONS** Our observations indicate that circulating GDF15 might be a used as a novel biomarker to better classify obesity and determine patient outcomes. Atrium was an important source of circulating GDF15, which in turn could be used to mechanistically link obesity with inflammation and heart failure.

**51. Wesley Finck****IMMERSIVE AUGMENTED REALITY BOX AND BLOCKS TEST EFFECTIVE SIMULATION OF PHYSICAL TEST FOR MYOELECTRIC CONTROL TRAINING**

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**INTRODUCTION:** Amputees must go through a lengthy and difficult training process to learn new muscle contraction patterns in order to control their myoelectric prosthesis. Because of this, many amputees give up use of their prosthetic limb. To address this problem, games and other engaging training methods have been developed in attempt to keep amputees engaged throughout the training period. However, such activities are non-task specific and may be less effective for learning because of the lack of immersion and embodiment.

**HYPOTHESIS:** Our aim was to create an immersive augmented reality version of the box and blocks test in order to assess the feasibility of integrating off-the-shelf commercial hardware and software systems. The system would allow for low-cost, off-the-shelf hardware to be used for patients to accurately use a virtual prosthesis displayed and controlled in the same way as a physical prosthesis.

**METHOD:** This system is composed of three main components; visualization, 6-DOF tracking, and myoelectric control processing. A Microsoft HoloLens was used to display a hologram of a virtual limb and a virtual box and blocks test. An HTC Vive controller and two HTC Vive Base stations were used to track the residual limb. A Thalmic Labs Myo armband was used to control the virtual prosthesis to complete the test.

**RESULTS:** The completed system, with all functioning components, was tested by 3 pilot subjects including an occupational therapist. With no previous experience, two of the three subjects were able to successfully pick up blocks and move them over the virtual partition, as in the real test. The therapist identified usability issues to be addressed before formal evaluation, however, they felt the system had great potential.

**CONCLUSION:** Our work demonstrates that the general approach for creating a virtual prosthesis training environment using low-cost, commercially available devices is feasible and is a worthwhile direction for future research. Our future work will include improvements to the general usability of the system and evaluating the system in clinical practice.

**50. Connolly, Michael****MEASURING CARDIAC DYSFUNCTION VIA FRAILITY INDEX IN RAT MODELS**

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I.M.P.A.R.T. investigator team Canada

**BACKGROUND:** Frail patients have worse outcomes than non-frail patients of the same age. Frailty is a heightened vulnerable state characterized by a decreased capacity to react to biological stressors and results in reduced physical ability. Frailty Indexes (FIs) quantify frailty by accounting for deficits, preferably over time, and enabling mortality risk prediction with potential to better treat vulnerable patients. Currently, no FI effectively models cardiac dysfunction and its mortality risk with treatment.

**OBJECTIVE:** To use a rat frailty index as a means of assessing cardiac dysfunction.

**METHODS:** Male spontaneously hypertensive aged rats (SHR; n=24), between 12-32 months old, were randomly assigned a daily angiotensin receptor blocker (ARB) or a daily angiotensin receptor-neprilysin inhibitor (ARNi) dose (15mg/kg) and were evaluated using a 34-criteria FI over 23 weeks. Hemodynamics was determined by echocardiogram and invasive catheterization.

**RESULTS:** Our FI was found to better predict cardiac dysfunction than chronological age. FI scores and contractility were strongly correlated (dP/dtmax R2=0.31, p=0.01 and dP/dtmin R2=0.13, p=0.015). FI scores negatively correlated with hypertension (LVPmax R2=0.242, p=0.045).

**CONCLUSIONS:** Our results demonstrate that FI is an effective prognostic tool for determining cardiac dysfunction. FI usage during treatment may assist in the monitoring of the effectiveness of both the direct target of intervention and overall treatment efficacy.

**52. Alissa Moore****ANDROCENTRIC CANCER POLICIES SHAPE WOMEN FIREFIGHTERS' PERCEIVED OCCUPATIONAL CANCER RISK AND COPING STRATEGIES**

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**BACKGROUND:** Firefighting may increase one's risk for cancer (International Agency for Research on Cancer, 2010). Recent research has examined firefighters' cancer risk perceptions and findings should help shape health promotion strategies (Anderson et al., 2017; Schaefer Solle et al., 2018). Schaefer Solle and colleagues (2018) highlight the need conduct such research with diverse groups of firefighters given the powerful influence that firehouse culture exerts on individual firefighter's actions and habits. However, women are frequently excluded from studies on firefighter health (Dow, Kunz, Garis, & Thomas, 2015; Jahnke et al., 2012). A review of the literature reveals that there is no previous research examining women firefighters' perceptions of occupational cancer risks.

**OBJECTIVE:** To understand Canadian women firefighters' perceptions of their occupational cancer risks.

**METHODS:** Semi-structured interviews were conducted with Canadian women firefighters (N=113) from 2011-2015. Data were thematically coded and analysed using the Psycho-Social Ethnography of the Commonplace (P-SEC) methodology.

**RESULTS:** A lack of information on cancer risk for women firefighters maintains androcentric cancer policies in the Canadian Fire Services. Associated complications for women are: facing unknown risks; having less access to compensation; and increased stress around revealing cancer to co-workers. Women tried to make sense of the current situation by drawing on schemata such as: just not enough women, cancer is unavoidable, and individual responsibility. Coping strategies participants employed were: rationalised avoidance, hyper vigilance, and informal support.

**CONCLUSIONS:** Consistent with findings by Anderson and colleagues (2017), many women in the study expected to develop cancer due to their professional work, while simultaneously highlighting the importance of safety. Social institutional practices and policy changes that could make cancer policies in the fire services more equitable include adding breast and cervical cancer to presumptive firefighter legislation as well as epidemiological and mechanistic studies on women firefighters.

**53. Tyler Savoy****AN IN VITRO MODEL FOR MONITORING DISEASE PROGRESSION IN HEMATOLOGICAL MALIGNANCIES**

1 SAVOY, Tyler, 2, 5 GRIEVE, Stacy, 2 RUSSELL, Kevin, 2, 3 PUVVADA, Nagaprasad, 6 BOONSUE, Suporn, 2,5 RAY, Bithika, 2, 3 MELVILLE, Sarah, 2, 4 KIENESBERGER, Petra, 2, 4 PULINILKUNNIL, Thomas, 2, 5, 8 REIMAN, Anthony, 2, 3, 7 BRUNT, Keith R

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**INTRODUCTION:** Multiple myeloma (MM) is an incurable hematological cancer of the plasma cells. Treatments include various chemotherapeutics such as the proteasome inhibitor bortezomib. However, patients inevitably relapse and there is still a need to develop a better tool to monitor disease progression. Monitoring cancer cell metabolites during disease progression is a novel approach to monitor treatment response. We have shown that surface-enhanced Raman spectroscopy (SERS) may serve as a non-invasive clinical tool that can identify cancer patients.

**OBJECTIVE:** Preliminary clinical results with human plasma samples show differences in peak intensity between healthy, cardiovascular, and cancer groups. To validate this approach, in vitro analysis of Raman spectra from MM cell lines models will be compared with clinical samples.

**METHODS:** In vitro, the human MM cell line KMM-1 was treated with empirically validated concentrations of bortezomib to determine drug sensitivity. Media was isolated and collected from cells treated with bortezomib and a series of controls. Gold nanoparticles were synthesized and combined with the media for SERS analysis.

**RESULTS:** In KMM-1 cells, bortezomib has an averaged EC50 value of 4 nM. Spectroscopic analysis of the media is currently being conducted.

**CONCLUSIONS:** Raman could be utilized to detect metabolite differences between healthy patients or cells and sick patients or dying cells. By incorporating an in vitro model of drug treatment, we aim to identify specific Raman spectra that correspond to treatment response in MM patients. We can use this information to develop a theranostic tool.

**54. Titus, Allison****SYNTHESIS OF A PH-SENSITIVE LIPID NANOCARRIER FOR POST-MYOCARDIAL INFARCTION DRUG DELIVERY**

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**INTRODUCTION** Current interventional strategies for the treatment of acute myocardial infarction (heart attacks) are limited. Existing therapies assist myocardial recovery by restoring blood flow to the heart via the coronary arteries and reducing the risk of reinfarction, but do not directly target the pathological cardiac remodeling or progressive cell loss contributing to heart failure. We have designed a novel nanodrug targeting heme metabolism (Niohemin) to reduce potential off-target effects of hemin by increasing cardiac-specific targeting.

**OBJECTIVES** To successfully and consistently synthesize Niohemin, quantify drug (hemin) loading into the nanoparticle, confirm cellular uptake and pH-sensitive drug release, and determine bioequivalency between Niohemin and raw hemin by their ability to induce the cytoprotective enzyme heme oxygenase 1 (HMOX1).

**METHODS** To determine nanoparticle size, we employed dynamic light scattering (DLS). Ultraviolet spectral scanning was used to confirm hemin encapsulation into the nanoparticles. To determine raw hemin and Niohemin bioequivalency, H9C2 cardiomyotubules were incubated with either drug for 24 hours, and the heme-inducible cytoprotective enzyme HMOX1 was quantified via western blot. To determine pH-sensitive drug release, media pH was adjusted to 7.52, 6.80 or 6.16 before Niohemin was administered to H9C2 cardiomyotubules for 24h and HMOX1 levels were quantified by western blot.

**RESULTS** Niohemin was consistently synthesized with a hydrodynamic size of 200 - 250nm and a hemin concentration of 2.808mM. Niohemin was successfully internalized by H9C2 cells and showed bioequivalent HMOX1 induction with raw hemin after 24h incubation (drug concentration of 2.5 µM). This induction was significant compared to cells incubated with empty nanoparticles. When incubated with cells at different media pH, Niohemin-dependent HMOX1 induction was significantly increased at pH 6.80, compared to pH 7.52.

**CONCLUSIONS** Here we show that Niohemin is a promising new hemin delivery system for the targeting of HMOX1 induction with increased specificity to the lowered pH characteristic of the microenvironment surrounding the infarcted heart, potentially resulting in improved outcomes and quality of life for patients.

**55. Doucet, Marco****DEVELOPED POLICIES AND PROCEDURES FOR MANAGING CONCUSSIONS IN CHILDREN AND ADOLESCENTS**

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**BACKGROUND:** Concussions are common for children and adolescents, and while they potentially result in severe and permanent brain damage, symptoms are often neglected. Hence, there is a need for adequate policies and procedures to minimize brain injury and promote a safe recovery environment in the Francophone South School District (FSSD) of NB. Here we describe developed policies and procedures for children and adolescents in schools for proper management of confirmed concussions. Collectively, the health, education and community sectors developed clear and uniform evidence-based concussion management policies and procedures to foster appropriate and timely intervention, and adequate management.

**OBJECTIVE:** This study aims to establish policies and procedures to minimize the impact of brain injuries among children and adolescents and to reduce associated risk factors.

**METHODS:** Consensus-based policies and procedures were developed based on existing guidelines and its efficacy on children and adolescents attending schools of the FSSD (New Brunswick, Canada) was determined. Subsequent to a pilot project consisting of 3 schools, a total 37 schools implemented the policies and procedures and were evaluated. Data is being collected in a database (e.g., incidence, context, compliance) and analyzed.

**RESULTS:** The policies and procedures establish standards for prevention and management of concussions in schools of the FSSD. They describe the recovery strategy for students with a confirmed concussion. Tools were also developed to help involved individuals and health professionals better identify concussions and then adequately manage them during recovery. While preliminary results show that 75% of suspected children and adolescents suffered a confirmed concussion, compliance with the procedures was 39%.

**CONCLUSION:** These policies and procedures are crucial to minimize further detriment caused by concussions in children and adolescents in the schools of the FSSD of NB. They provide adequate situational policies and procedures during vulnerable periods to potentially promote recovery and reduce secondary injury. Furthermore, in regards to concussions, these policies hold schools accountable for collecting data to identify risk factors and promote a safe learning and healing environment.

**56. Azadeh Naimi****LES CONDITIONS ET INTERVENTIONS EN LIEN AVEC LA SANTE DES CONDUCTEURS DE POIDS LOURDS**

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**INTRODUCTION** Le métier de conducteur de poids lourd est associé à des risques multiples pour la santé (e.g. maladies cardiovasculaires, obésité, maladies mentales) et représente un coût immense pour la société. D'autant plus que le milieu de travail presque exclusivement masculin, et le manque d'accès facile aux soins, rendent cette population particulièrement vulnérable aux risques pour la santé. Il est urgent de proposer des programmes de soins adaptés pour cette population. Au Nouveau-Brunswick, il y a un manque de connaissances des conditions de travail des conducteurs de poids lourd et un manque d'accès à des ressources en santé. C'est pourquoi notre étude propose une revue de littérature afin d'analyser les publications sur les besoins, les attentes en santé des conducteurs de poids lourds.

**HYPOTHÈSE (Objectifs ou Buts)** Nos objectifs sont d'identifier les conditions de santé, les comportements et la culture associés à la conduite de poids lourds mais aussi les interventions proposées pour améliorer la santé des conducteurs de poids lourds.

**MÉTHODES** Une recherche des bases de données CINAHL, PsycINFO et PubMed a été faite avec des séries de mots de clés. Les articles en anglais et publiés entre 2014 et 2018 ont été inclus.

**RÉSULTATS** La recherche a permis de sélectionner 25 articles ainsi que trois revues de littérature. Parmi cette sélection, sept études seulement évaluent des interventions préventives et curatives pour la population des conducteurs de poids lourds.

**CONCLUSION** Il y a un manque de connaissances des problématiques de santé des conducteurs de poids lourds au Canada, mais aussi un manque d'études sur des interventions préventives et curatives pour cette population. Les études recommandent que les futures études se basent sur une approche holistique qui intègre non seulement les facteurs individuels (changement de comportement) mais également les facteurs organisationnels de l'environnement du transport routier (accès à des services, nourriture saine, etc.) pour proposer des interventions adaptées aux besoins et attentes des conducteurs.

**57. Elassady, Hassan****CELLS' NUCLEI DEEP SEMANTIC SEGMENTATION TO SPEED UP THE ANALYTICAL PROCESS AND NEW DRUGS DEVELOPMENT**

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**INTRODUCTION:** This work study the performance of using artificial intelligence and deep learning semantic segmentation techniques to identify different types of cells' nuclei and speed up new drugs development

**OBJECTIVE:** Determine the performance of using new deep learning techniques to identify different types of cells' nuclei

**METHODS:** This work proposes three deep learning techniques to segment medical images and identify the cells' nuclei. Modified architectures based on semantic segmentation networks such as UNet, SegNet and FCN were developed for this work. 75% of the images were used for training and 25% for testing. Multiple tests were conducted, the best results are presented below. Hyper-parameter optimization was conducted on the training set and the best working parameters were selected. The 3 networks share the main parameters. Adam optimizer was used and the learning rate was fixed to 0.00001. Dice coefficient was used as a loss function and 500 epochs were used for training. Batch size was set to 2 for FCN and SegNet. For UNet the batch size was fixed to 1.

**RESULTS:** For this work we used a dataset provided by the Kaggle Data Science Bowl 2018 competition. The data is composed of 670 training images with corresponding masks. The obtained results are very interesting with F1-Scores ranging from 94% for FCN to 96% for UNet. SegNet follows closely UNet with a F1-Score of 95%. The main advantage of FCN architecture is its speed. In term of accuracy the three networks achieved an accuracy above 97% (with UNET the best performing with 97.75% accuracy)

**CONCLUSIONS:** This work shows that the proposed three modified deep learning networks for image segmentation achieved high performances for segmenting cell's nuclei. Further analysis of the relationships between the size of the model, its memory footprint and the impact on its performance will be conducted. Additional developments and testing with other semantic segmentation models are also planned.

**59. Robert Paul Joseph Cormier****FAT FLIES AS A MODEL TO STUDY METABOLIC DISEASES**

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**INTRODUCTION AND OBJECTIVES:** Metabolic diseases such as obesity and type 2 diabetes are an increasingly common problem in Canada. New Brunswick is no exception, with patients' rates well above the national average. Drosophila melanogaster, the fruit fly, is an animal model that has gained popularity in the scientific community to study these metabolic diseases. It has been shown that when feeding drosophila a high fat diet (HFD), phenotypes resembling the development of type 2 diabetes occurs (Morris et al. 2012). Considering that type 2 diabetes is often characterized by mitochondrial dysfunctions, it is surprising that no studies have verified whether and how the duration of the exposure to the HFD affects the mitochondria in this animal model.

**METHODS:** Drosophila were fed a standard diet (SD) or a standard diet supplemented with 20% (w/v) coconut oil as a source of saturated fats. Samples were collected at numerous time points following the exposure to either diets (D0, D1, D2, D4, D10). ATP content, mitochondrial respiration, climbing activity and longevity were determined.

**RESULTS:** Drosophila lifespan was significantly shortened under the HFD and the flies had reduced locomotive capabilities. Following two days of exposure to the HFD, mitochondrial respiration rates and ATP content were increased compared to drosophila fed a SD. However, ATP levels and mitochondrial functions were decreased at D4 and D10. This decreased oxygen consumption was linked to complex I of the electron transport system (ETS), ultimately leading to decreased overall oxygen consumption at D4 and D10. These dysfunctions were partially compensated by increased oxygen consumption linked to glycerol-3-phosphate dehydrogenase (mG3PdH), an underinvestigated complex of the ETS.

**CONCLUSIONS:** Our results show that mitochondria undergo multiple changes during the development of metabolic diseases with HFD feeding. A better understanding of the role of the secondary complexes of the ETS such as mG3PdH could lead to the development of pharmaceutical products to treat metabolic diseases such as type 2 diabetes and obesity.

**58. Kaine D Black****UTILIZING A RANDOM FOREST CLASSIFIER TO PREDICT FALLS USING WEARABLE HEALTH MONITORING DEVICES**

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**INTRODUCTION:** Accidental falls are among the most common incidents reported in hospitals complicating approximately 2% of hospital stays.

**OBJECTIVE:** To create a new predictive model capable of predicting falls based on data collected from wearable health monitoring devices.

**METHODS:** The data was collected by 14 volunteers (7 male, 7 female, aged 23 ± 3) who wore health sensors and performed activities including standing, walking, running, sitting, and falling. The variables collected by the sensors were heart rate, sugar level, EEG, blood pressure, circulation, and time. The dataset contains 16,382 instances. The data was imported and separated based on activity. The mean of each variable for each activity was calculated, as well as the covariance of the variables for each activity. These values were used to produce more synthetic data, using a function that takes a normal multivariate distribution and produces randomized data points. Using this method 3,000 additional data points were generated for each activity. We then simplified the classes to only falls and non-falls. To class imbalance input weights of 3 and 1 were associated with the 0, and 1 labels respectively. The data was then randomly split into a training set (75%) and a test set (25%). We then compiled the random forest classifier and tested it. The model was run 100 times. The average results were taken.

**RESULTS:** Our predictive model was implemented in Python. The results show a 92.92% accuracy of classifying falls using data wearable health monitoring devices. Moreover, approximately 6.18% of non-falls were labelled as falls, and 12.67% of falls were labelled as non-falls.

**CONCLUSIONS:** For many applications, the high accuracy obtained from our predictive model would be acceptable. However, even higher accuracy is needed when dealing with human lives. Ways to further improve our results would be by acquiring more data, searching for other factors known to be associated with falling (e.g. age, mental status, illness severity), as well as performing hyper parameter tuning of our model.

**60. Murray, Ryan****HIGH USE OF PRIMARY CARE AMONG CANADIAN ARMED FORCES VETERANS IS ASSOCIATED WITH POOR HEALTH AND WELL-BEING**

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**INTRODUCTION:** High users of healthcare are the small proportion of the population who account for a disproportionately large amount of costs and utilization. High users of healthcare among Canadian Armed Forces (CAF) Veterans were examined using Veterans Affairs Canada (VAC) health expenditures, but they have not been examined in the provincial healthcare systems.

**OBJECTIVES:** This study examines the well-being characteristics associated with high use of primary healthcare services among CAF Veterans. It also examines the impact of these high users on other healthcare services.

**METHODS:** Characteristics of high users of primary healthcare services, measured as 10 or more self-reported family doctor visits in the previous 12 months, were compared with the rest of the sample, the non-high user group, using analysis of the 2016 Life After Service Survey. This nationally representative survey of over 56,000 CAF Regular Force Veterans contains self-reported data on health, disability, and determinants of health using questions from Canadian population health surveys. Variables were selected from a composite well-being framework that examines health and well-being in seven subordinate domains. Univariate analysis included frequencies, chi-square goodness of fit tests, and univariate odds ratios. Subsequently, multiple logistic regression modeling will identify the most significant indicators associated with being a high user of primary care.

**RESULTS:** Univariate analysis revealed that high users of primary care were significantly more likely to be female, report fair or poor self-rated general or mental health, have multimorbid chronic conditions, have severe mental health problems, be disabled, report dissatisfaction with their main activity and finances, have low social support, and experience a difficult adjustment to civilian life. They are also more likely to use other healthcare services and to be a VAC client.

**CONCLUSIONS:** High users of primary care services among CAF Regular Force Veterans have significantly worse health and well-being characteristics than non-high users and use more healthcare services outside of primary care. This suggests that targeted multidisciplinary approaches are needed to provide care for this population.

**61. Courtni Soucy****VARIABILITY IN PHYSICAL FUNCTION IMPROVEMENTS FOR PATIENTS LIVING WITH BREAST CANCER DURING A 12-WEEK EXERCISE PROGRAM**

1,2 BOUCHARD, Danielle, 1,2 SENECHAL, Martin, 3 HAMILTON, Ryan, 3 OLTHUIS, Janine, 1,2 SOUCY, Courtni.

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**INTRODUCTION:** Exercise is known to improve physical function for patients affected by breast cancer engaging in exercise during and after treatment. However, it is hypothesized that physical function improvement is highly variable depending on the timing of testing. It is thus possible that the improvement observed might not be true change

**OBJECTIVE:** Describe the variability in the weekly performance on common physical function tests in patients engaged in a 12-week exercise program.

**METHODS:** A total of 13 patients who received a diagnosis of breast cancer were recruited in an exercise program with two sessions a week for twelve weeks in a community-based fitness facility. Baseline characteristics such as physical activity level (Actigraph), and age were recorded. The 6-minute walk test, the one-leg stance test and the chair stance test were administered weekly.

**RESULTS:** The average age of participants was  $53 \pm 7$  averaging  $72.5 \pm 55.0$  minutes of exercise at moderate or vigorous intensity at baseline. A variation of 93%, 182.5% and 25% in the 6-minute walk test, the one-leg stance and the chair stance from baseline to week 12 respectively. At pre-post measurement, only a significant improvement was observed in the one-leg balance test ( $p=0.037$ ).

**CONCLUSIONS:** Further study is required to better understand the daily variability of exercise improvement and if that variability surpasses the minimum clinical difference in physical function tests when patients are being treated with breast cancer.

**62. Denise Amirault****THE ROLE OF THE FAMILY PHYSICIAN IN PROVIDING PATIENT-CENTRED ONCOLOGY CARE TO THEIR PATIENTS WITH BREAST CANCER**

1 AMIRAULT\_Denise, 2 FREDERICKS\_Dr. Erin  
1 Dalhousie Medical School, Saint John, New Brunswick; 2 St. Thomas University, Fredericton, New Brunswick

**INTRODUCTION:** Breast cancer is the most common cancer in Canada (excluding non-melanoma skin cancers) and it is the second leading cause of cancer death in Canadian women. Given the pervasiveness of the disease in the Canadian population, most family physicians will treat patients with breast cancer at some point in their careers. It is therefore important to determine how to provide quality breast cancer care and treatment plans that involve patients as decision-makers, also known as patient-centred care. Patient-centered care emphasizes patient empowerment through shared decision-making, the development of care plans that take into consideration patient preferences and values, and tailoring care to meet the specific needs of individual patients.

**OBJECTIVES:** Most research to date has focused on the role of medical oncologists, surgeons and radiation oncologists caring for their patients with breast cancer. The role of the family physician is often overlooked in cancer research. A thematic analysis was done in an attempt to examine the role and importance of family physicians in providing effective patient-centred care to their patients with breast cancer.

**METHODS:** A qualitative secondary data analysis was performed using audio-recordings & transcripts of 13 patient interviews previously collected at the SJRH and DECH.

**RESULTS:** Certain roles of the family physician on the oncology care team were communicated by multiple study participants and were therefore identified as major themes. According to interview participants, the main roles of family physicians were navigating the healthcare system, aiding patients in understanding their treatment plans, managing their pain, and allowing time for discussion during regular appointments.

**CONCLUSIONS:** A breast cancer diagnosis is a very overwhelming time for women and their families. Having a dependable family physician who is familiar with their medical history and able to assist them was seen as an asset to most study participants.

**63. Khaldoun Mousa Aldiabat****BARRIERS THAT HINDER NURSING STUDENTS AT UNIVERSITY OF NEW BRUNSWICK FROM PROVIDING A COMPREHENSIVE SMOKING CESSATION AND PREVENTION INTERVENTION FOR THEIR CLIENTS**

1 ALDIABAT, Khaldoun, 2 ALSRAYHEEN, Enam, 1 AQUINO-RUSSELL, Catherine

1 University of New Brunswick – Faculty of Nursing – Moncton, 2 University of New Brunswick- Applied Health Services Research Program

**INTRODUCTION:** Smoking is ranked as one of the most prioritized health issue all around the world that leads to many adverse health outcomes and death. Provincial smoking rates in New Brunswick, Canada were ranked higher than the national average for females with 19.9 %, and approximately equal smoking rates for male smokers (21.8%) (Statistics Canada, 2014). There is a dearth in knowledge and lacking literature about nursing students' role in New Brunswick regarding smoking cessation and prevention, their attitudes and beliefs about smoking, and their perceived barriers to providing comprehensive smoking cessation and prevention interventions.

**OBJECTIVE:** To explore the barriers that hinder nursing students from providing comprehensive nursing care for cessation and preventing smoking for their clients.

**METHODS:** A descriptive quantitative research design was used to collect quantitative data from 152 nursing students in their final year at three campuses of the University of New Brunswick (UNB) using the reliable/valid Tobacco Prevention in Primary Healthcare Questionnaire. Data was analyzed statistically using SPSS version 24.

**RESULTS:** The response rate was 63.3%. 58% of participants do not ask clients about smoking status, 75.4% asked clients about their smoking status only if the clients showed symptoms related to smoking. 97.1% believed that smoking is a major health problem, 59.4% indicated they never engaged in helping clients to quit smoking; however, 53.8% indicated that they lack knowledge of smoking cessation in general, 53.6 % of participants lack the knowledge regarding the benefits of quitting smoking, 55.1% indicated that they lacked knowledge and training on how to support clients throughout the quitting process, 52.2% indicated that they lacked knowledge on the subject of the hazards of exposing children to tobacco smoke.

**CONCLUSIONS:** Knowledge deficit regarding smoking cessation assessment and intervention is a major barrier that hinders nursing students at University of New Brunswick from providing comprehensive smoking cessation and prevention interventions for their clients in clinical settings. Education strategies related to smoking cessation are suggested for the nursing curriculum.

**64. Alsrayhean, Enam****THE LIVED EXPERIENCE OF SYRIAN REFUGEES IN NEW BRUNSWICK-CANADA: A DESCRIPTIVE PHENOMENOLOGICAL STUDY**

1 ALDIABAT, Khaldoun, 2 ALSRAYHEEN, Enam, 1 AQUINO-RUSSELL, Catherine, 3 CLINTON, Michael, 4 RUSSELL, Roger.

1 University of New Brunswick – Faculty of Nursing – Moncton, 2 University of New Brunswick- Health Research Administration Program, 3 American University-Beirut, 4 Crandall University

**INTRODUCTION:** The Canadian Federal Government resettled 25000 Syrian refugees (Government of Canada, n.d.). Between November 2015 and July 2016, 29,413 Syrian refugees arriving in Canada through resettlement programs. Despite resettlement of Syrian refugees in Canada, almost nothing is known about their resettlement experiences. Very little information could be found in literature. To the best of our knowledge, this is the first study of Syrian refugees to be conducted in New Brunswick.

**OBJECTIVE:** To uncover the meaning of the lived experiences of Syrian refugees in Moncton, NB.

**METHODS:** A qualitative descriptive phenomenological method, developed by Giorgi (2009), and viewed through the lens of the social determinants of health model (Mikkonen & Raphael, 2010). Data descriptions were collected using interrogatory statements from eight eligible participants audio recorded in individualized interviews. Situated structural descriptions (SSDs) and a general structural description (GSD) were generated and synthesized to uncover the meaning of the resettlement experience.

**RESULTS:** Social support and accessible government services make the experience of living in Canada 'tolerable'. Living safely in Canada is experienced as a privilege, although resettled refugees struggle with understanding Canadian ways of doing things and learning English. Minimal health insurance coverage, unbearably long wait times for health services, and distress from living in low-socioeconomic areas cause maximum stress. Lack of employment options while living on the edge of poverty due to low income results in uncertainty.

**CONCLUSIONS:** Social determinants of health result in paradoxical health experiences for Syrians living in New Brunswick. Culturally sensitive health interventions and assistance is required. An action research study involving Syrian refugees as co-researchers is needed as the next step.



**65. Gander, Sarah****A PROSPECTIVE ANALYSIS OF THE RATES AND PATTERNS OF AUTISM SPECTRUM DISORDER DIAGNOSIS IN SAINT JOHN, NEW BRUNSWICK**

BAXTER Carly 1

GANDER Sarah 1,2,3

1 Dalhousie University, Faculty of Medicine, 2 Horizon Health Network, 3 Department of Pediatrics

**INTRODUCTION:** This study examined the frequency of Autism Spectrum Disorder (ASD) diagnosis, potential barriers to diagnosis, and wait times.**OBJECTIVE:** To observe the diagnostic frequencies of ASD by Consultant Pediatricians (CPs), Pediatric Subspecialists and Developmental Teams and associated wait times. Potential barriers and clinical comfort with diagnosis were also explored.**METHODS:** The current study was a one-year prospective cohort study. All referrals were received by CPs in the Greater Saint John Area for children <5 years of age. Descriptive statistics calculated included: patient demographics, reason for consultation, referral, consult and diagnosis dates, and diagnosing specialty. To conclude the year-long study, children diagnosed with ASD during the study period and children awaiting further consultation were noted.**RESULTS:** Fifty-two children were diagnosed with ASD. Children were most frequently diagnosed by CPs (59.6%), followed by Developmental Teams (30.8%) and Pediatric Neurologists (9.6%). The mean age at time of diagnosis was 2.79 years, with a mean wait time of 109 days for diagnosis. Wait times in the present sample appeared shorter for children diagnosed by CPs and longer for those referred to a Developmental Team or Pediatric Neurologist. Mean wait times also varied between sexes and geographical locations. Additionally, 55% of CPs reported that they did not feel supplemental ASD diagnosis training was necessary.**CONCLUSIONS:** These findings provide a basis for understanding the various diagnostic pathways and associated wait times for ASD at a local level. Furthermore, our study contributes novel information to the literature surrounding ASD diagnoses regarding the frequencies that General Pediatricians, Pediatric Subspecialists and Developmental Teams are diagnosing ASD. Further research is warranted to understand differences in ASD presentation between males and females, factors influencing wait times, and diagnostic barriers.**66. CAMPBELL, Sarah****PRENATAL SUBSTANCE-USE-DISORDER: UNDERSTANDING THE IMPACT AND EXPLORING INTERVENTIONS**

CAMPBELL, Sarah 1,2,5

GANDER, Sarah 1,2,3,4

1 Horizon Health Network, 2 New Brunswick Social Pediatrics, 3 Dalhousie Medicine New Brunswick, 4 Memorial University of Newfoundland 5 University of New Brunswick

**INTRODUCTION** Last year, at least 1850 babies were born in Canada whose mothers used opioids during pregnancy. Locally, 54 babies were identified that were at high risk for contracting hepatitis-c due to, among other factors, intravenous drug use of the mother during pregnancy. Given these figures, a literature review was conducted to understand the impact this issue has on families and evaluate potential interventions.**OBJECTIVE** To delineate current findings related to the impacts of prenatal alcohol- and substance-use disorder on children and families, and examine the efficacy of a program that has attempted to address this issue, the Parent-Child Assistance Program (PCAP).**METHODS** A literature review was conducted to identify the short and term impacts of alcohol- and substance-use disorder on children, mothers and families, and examine the efficacy of PCAP on mitigating these.**RESULTS** Women who experience poverty are at higher risk for alcohol- and substance-use-disorders which puts both the mother and her baby at risk for a number of social and health-related problems, especially if she is actively using these substances during pregnancy. Among one cohort of pregnant and postpartum women who suffer from addiction 89% came from homes where at least one parent had an alcohol- or substance-use-disorder; 63% had suffered physical/sexual abuse as a child; 23% had spent time in foster care; 58% had run away as a child; and 37% did not finish high school. Interventions targeted at high risk mothers with babies and young children are more likely to disrupt this cycle. PCAP is 3-year-program of tailored, in-home, structured, case management that has been shown to drastically improve the outcomes of mothers and their families in terms of addiction management, stable housing, maintaining or regaining guardianship of their children, reducing reliance on government assistance, and family planning.**CONCLUSIONS** PCAP has been shown to mitigate many of the social factors that perpetuate the cycle of addiction in marginalized families and should be considered in communities where this issue is prevalent.**67. Doucet, Shelley****A LIVING LABORATORY SUPPORTING INDIVIDUALS WITH COMPLEX CARE NEEDS: UNB'S CENTRE FOR RESEARCH IN INTEGRATED CARE**

DOUCET, Shelley1,2,3, LUKE, Alison4, BINNS, Krystal5, SZYMANSKI, Victor6, WOODHALL-MELNIK, Julia7

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**BACKGROUND/OBJECTIVES:** Patients with complex care needs require more and varied health care services than the average population. They also benefit from access to a high degree of coordinated care. Evidence has shown that these individuals and their families have better outcomes if they have access to integrated services across settings and sectors. Although promising research initiatives in this field are underway in New Brunswick, many have been undertaken independently of one another, which results in fragmented efforts to improve health outcomes. It is critical to provide a platform for the integration of these research initiatives to ensure effective collaboration among key stakeholders, hence the development of the 'Centre for Research in Integrated Care' (CRIC).**METHODS:** CRIC is a collaborative living laboratory that develops and evaluates integrated models of care that are patient-centred and meet the unique needs of individuals with complex health and social concerns. A living lab provides researchers, knowledge users, and patients a real life setting where innovative ideas can be explored, evaluated, and modified as needed throughout the research process. It also serves as a venue to make important policy advancements in an efficient manner. CRIC is a transformative teaching centre for research trainees and clinicians and provides training to promote the establishment of a team of highly impactful health researchers across NB.**CONCLUSIONS:** The sustainability of the NB health care system is dependent upon finding new ways to meet the needs of individuals facing complex health concerns. As a living laboratory, CRIC will create an ecosystem where diverse stakeholders can co-create knowledge and solutions to contemporary health and social problems that face this province and support research programs that transcend traditional disciplinary boundaries. The establishment of a formal centre will help attract new research funding, which will support ongoing and future research. There is a critical mass of stakeholders committed to this endeavor, with opportunities to not only foster existing partnerships, but also create new partnerships in our region and beyond.**68. Kate Ellis****GETTING HURT IN NEW BRUNSWICK NURSING HOMES: STAFF INCIDENTS RELATED TO LOCATION AND CARE ROLES.**

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**INTRODUCTION** Health care institutions are considered high risk for injury places of employment by the association of Worker's Compensation Boards of Canada (2016), The risk for injury is particularly high for those working in nursing homes due to the physical demands associated with resident handling, including lifting and transferring residents and maneuvering equipment in small confined space. Although injuries and injury prevention have been widely studied, the work has generally focused on incident rates and the impact of specific assistive devices on worker safety.**OBJECTIVE** The purpose of this study was to examine reported staff incidents in relation to staff activities.**METHODS** A multi-center cross sectional exploratory study used retrospective data from reported staff incidents and prospective data from 360 hours of staff observations in nursing homes. Descriptive statistics were used to analyze data. A total of 898 staff incidents were reviewed from the facilities.**RESULTS** Incidents were most likely to occur in resident rooms. Resident aides were more likely to have engaged in high risk activities than other care providers. Times when staff incidents were reported to have occurred were not associated with periods of high staff to resident contact.**CONCLUSIONS** Safe handling during low and moderate risk activities should be promoted. Education on what constitutes a reportable incident and strategies to ensure compliance with reporting policies and procedures may be needed to ensure accuracy and completeness of incident data.

**69. Éric Forgue et Carole Tranchant****LES DIMENSIONS DE L'INSÉCURITÉ ALIMENTAIRE CHEZ DES FRANCOPHONES DES MARITIMES – DES LEVIERS IMPORTANTS POUR AMÉLIORER LA SÉCURITÉ ALIMENTAIRE**

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**INTRODUCTION :** L'insécurité alimentaire (IA) est reconnue comme un problème de santé publique. Au Canada, elle touchait environ 13% des ménages en 2014 et plus de 15% dans les provinces maritimes. Peu d'études se sont intéressées à l'IA dans les communautés francophones en situation minoritaire.

**OBJECTIFS :** Cette étude visait à comprendre les réalités et les expériences de francophones vivant une IA dans les Maritimes, ainsi que leurs stratégies pour y faire face.

**MÉTHODES :** Analyse qualitative d'entrevues semi-dirigées effectuées auprès de 28 personnes comprenant le français et ayant connu au moins un épisode d'IA, résidant au Nouveau-Brunswick (17), en Nouvelle-Écosse (10) ou à l'Île-du-Prince-Édouard (1), en milieu rural (16) ou urbain (12). Les répondants (19F/9H) étaient âgés de 30 à 69 ans. Le revenu annuel du ménage (1 à 6 personnes) allait de moins de 5000\$ à 20000-25000\$.

**RÉSULTATS :** La situation vécue par les répondants met souvent en relation plusieurs dimensions qui contribuent à accentuer ou à diminuer leur IA. Ces principales dimensions sont la précarité économique du ménage, l'état de santé des membres du ménage, les réseaux d'entraide (amis, parents, organismes d'aide alimentaire), l'autoproduction alimentaire, ainsi que les moyens de transport. La plupart des répondants sont conscients des interrelations existant entre ces dimensions. Ils/elles adoptent diverses stratégies pour faire face à l'IA mais n'ont souvent qu'un contrôle limité pour amoindrir ses méfaits sur leur santé. Plusieurs souffrent de problèmes de santé chroniques. La langue des services d'aide alimentaire ne semble pas être un enjeu pour les répondants.

**CONCLUSIONS :** À la lumière des résultats, les intervenants et les décideurs peuvent renforcer l'équilibre entre les conditions économiques et de santé (physique, psychologique et sociale) afin de consolider la sécurité alimentaire des membres parmi les plus vulnérables de la société. Pour réduire l'IA et ses méfaits, il semble important de renforcer l'aide au logement et au transport et d'améliorer l'accès à une aide alimentaire de qualité tenant compte de l'état de santé des bénéficiaires.

**71. Neeru Gupta****Feminization of Primary Care Medical Workforces is Overlooked in Assessments of Pay-for-performance: Results of a Systematic Review through a Sex and Gender lens**

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**CONTEXT:** The prevalence of diabetes mellitus and other chronic diseases is increasing across New Brunswick, Canada and worldwide. To address this growing clinical and public health challenge, pay-for-performance (P4P) for patient-centred care is increasingly common in many health organizations. Studies suggest that feminization of the primary care physician workforce contributes to changes in practice patterns. However, there has been no comprehensive investigation of the effectiveness and equity of P4P through a gender lens.

**OBJECTIVE:** To collect and critically analyze the evidence on whether gendered practices in primary care delivery mediate the effects of P4P on diabetes outcomes.

**METHODS:** Systematic review of the literature on impacts of P4P for diabetes care in single-payer health insurance systems, using a PICOS (Population, Intervention, Comparison, Outcomes, Study type) framework. Searches of 10 bibliographic databases and additional grey literature sources. Appraisal and synthesis of the evidence concentrating on whether: (i) the study's design considers sex and/or gender; (ii) the results include sex-disaggregated data; (iii) the study's narrative explicitly considers the gender perspective of the provider as part of the P4P assessment.

**RESULTS:** The searches yielded 2,218 records. After applying predetermined inclusion and exclusion criteria, 39 studies were retained. They covered 8 unique P4P schemes in 7 countries. Most studies (80%) controlled statistically for the patient's sex, but few (15%) considered the provider's sex. Two studies narratively synthesized sex-disaggregated data for providers, with inconsistent findings in the significance of physician's gender as a predictor of patients' avoidable hospitalizations. None of the studies highlighted the effects of gender differences in P4P uptake or workforce feminization.

**CONCLUSIONS:** An important void in the health systems and financing policy literature is consideration of feminization of primary care medical workforces that may drive change in practice patterns without performance incentives. Despite the growing popularity of P4P across health organizations, the evidence base on optimal payment structures – and how they may contribute to gender gaps in occupational earnings – is surprisingly weak.

**70. Flood, Kathryn****MAKING A CASE FOR THE IMPLEMENTATION OF COMMUNITY SOCIAL PEDIATRICS IN NEW BRUNSWICK.**

GANDER, Sarah 1,2,3,4; CAMPBELL, Sarah 1,2,5; FLOOD, Kathryn 1,2,5  
1 Horizon Health Network; 2 New Brunswick Social Pediatrics; 3 Dalhousie Medicine New Brunswick; 4 Memorial University of Newfoundland  
5 University of New Brunswick

**INTRODUCTION:** Community Social Pediatric (CSP) models highlight the importance of both psychosocial and physical components in child development and health. This includes the social determinants of health (e.g., poverty), and the voice of the child. This model unites the expertise of family, medicine, law and social sciences to identify and effectively reduce or eliminate sources of toxic stresses that affect the development of marginalized children.

**OBJECTIVE:** This review examined the outcomes of current CSP programs to determine the appropriateness of implementing this model in New Brunswick, given the unique and challenging socio-economic issues in our province.

**METHODS:** A thorough literature scan was conducted to investigate the outcomes of CSP programs. Both quantitative and qualitative studies were reviewed.

**RESULTS:** Multiple studies have outlined positive CSP outcomes. A Vancouver CSP program showed better outcomes through its ability to facilitate better access to both health care and other social services for at-risk youth. Factors impeding child development (i.e., poverty, lack of support services, and family discord) may be mediated through CSP practitioners encouraging optimal development (i.e., emotional well-being, early reading, appropriate discipline, and preschool participation). Quebec's Centers for Social Pediatrics report a positive impact on school dropout, mental health disorders, suicide, addiction and chronic diseases. These interventions with children and families improve the socio-emotional development of children, the parent-child relationship and the parents' feeling of social support. This model can positively mitigate the effects of childhood trauma and toxic stress.

**CONCLUSIONS:** Based on the success of CSP programs throughout Canada, there is evidence that CSP would benefit New Brunswick families. Previous research in this region has indicated that 51% of children receiving pediatrician referrals related to behaviour, attention and academic issues come from Saint John's lowest income neighbourhoods. New Brunswick Social Pediatrics (NBSP) is seeking to build a model of integrated, community-centered social medicine for children in vulnerable situations. NBSP focuses on the strengths of the child, the family and the community.

**72. Hodgins, Marilyn****FOUR PATTERNS OF POST-DISCHARGE COPING: FINDINGS FROM A LONGITUDINAL INVESTIGATION OF THE TRANSITION FROM HOSPITAL TO HOME**

1 HODGINS, Marilyn; 1 FILIATREAU, Sarah; 2 LOGAN, Susan; 3 KEEPING-BURKE, Lisa; 4 MOORE, Nicole; 5 FRASER, Jacqueline; 5 STACK, Bridget; 6 LOW, Jacqueline

1 University of New Brunswick (UNB) Fredericton, Nursing; 2 Horizon Health Network, Extra-Mural Program, Saint John Area; 3 UNB Saint John, Nursing & Health Sciences; 4 Dr. Everett Chalmers Regional Hospital; 5 Saint John Regional Hospital; 6 UNB Fredericton, Sociology  
Funding: University of New Brunswick Research Fund

**INTRODUCTION:** Many patients and their families view the prospect of hospital discharge and of assuming responsibility for ongoing care needs with trepidation. Difficulties encountered during early post-discharge period increase the risk for adverse events, dissatisfaction, poorer health outcomes, and unplanned re-entry into acute care system.

**OBJECTIVE:** The purpose of this pilot study was to establish feasibility of a longitudinal investigation of patient experiences during hospital discharge and the early post-discharge period.

**METHODS:** Participant recruitment was conducted on an inpatient medical and a surgical orthopaedic unit. Demographic information plus measures of readmission risk and perceived readiness for discharge were collected prior to discharge. Measures of post-discharge coping and the use and perceived adequacy of healthcare and supportive services (unpaid, paid, publicly-funded) were collected on first day post-discharge, end of first week, and during weeks 3 and 5. During final interview, information was collected on clarity and relevance of survey items and an overall measure of discharge difficulty. Descriptive and correlational analyses were conducted to examine internal consistency of measurement instruments and identify patterns in coping over time.

**RESULTS:** Forty-four participants were recruited with 95% retention (n = 42). Participants ranged in age from 38 to 98 years (Mdn = 69), 57% were female, 50% lived in rural area, 60% were planned admissions, and 81% were surgical cases. Measurement instruments demonstrated acceptable reliability (alpha >.80). Considerable variability was observed in participants' scores for Readiness for Discharge and Post-Discharge Coping and not all exhibited improvement over time. Six visited an emergency department with four resulting in readmission (14.3% unplanned use acute care services). Four patterns of post-discharge coping were identified and labelled: Steady Improvement; Initial Shock; Bumpy Road; and Gradual Decline.

**CONCLUSION:** Project reinforced belief in value of pilot studies. Recruitment was more difficult than anticipated with several potential participants opting out as feeling over-whelmed by their impending discharge. A clearer understanding of factors associated with transition success, or its failure, is required for development of targeted interventions.

**73. IANCU, Horia-Daniel****ASSESSMENT OF FUNDAMENTAL MOTOR SKILLS FOR ELEMENTARY AND MIDDLE SCHOOL STUDENTS: VALIDATION OF A NEW PHYSICAL EDUCATION CRITERIA-BASED TEST BATTERY**

1 IANCU\_Horia-Daniel, 1 PICARD\_Yvan, 2 BÉLANGER\_Mathieu, 3 RICHARD\_Jacques, 4 SAVOIE\_Raphaël, 4 RICHARD\_Jean-François  
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**INTRODUCTION:** A key role of quality school physical education (PE) is to enable children to learn and master motor skills. The assessment of fundamental motor skills (FMS) therefore becomes essential. Limitations of existing measurement tools include being designed for clinical contexts, having age restrictions and not emphasizing pedagogical purposes of PE learnings. Accordingly, we developed a 24 tests battery for their evaluation.

**OBJECTIVE:** To assess feasibility, validity and reliability of 20 fundamental psychomotor skills tests of this battery.

**METHODS:** The evaluation parameters were developed by focusing on the performance process (quality) rather than the product (quantity). Other experts evaluated the face and content validity of this battery. Pilot testing took place in 7 schools (N=1356 students). Each test was administered to targeted age groups students (2nd, 5th and 8th grade) to assess the test's feasibility and to refine evaluation parameters. This process was repeated following modifications of testing procedures aimed at improving psychometric properties. Inter-rater reliability and construct validity were assessed with Pearson correlations, Kappa statistics, Pearson's chi-squared statistics and Cramer's V symmetric measurements.

**RESULTS:** Subsequent to the first test administration and the first feedback from PE teachers on test parameters, we modified instructions to improve clarity and adjusted the estimated time of administration for some grade levels and the training of raters. Following the 2nd and 3rd school's visits and modifications of testing procedures, acceptable to good indices of inter-rater reliability (Pearson = 0,61-0,87; Kappa = 0,55-0,83) and construct validity (Pearson's chi-squared  $\chi^2 = 98,942-124,732$ ; Cramer's V symmetric = 0,696-0,827) were found for final versions of the tests.

**CONCLUSIONS:** Our study shows that the development of this criteria-based test battery following a rigorous methodological process is complex and time intensive (over 4 years). Nevertheless, the statistical analyses led to an appropriate validity and intra-rater reliability. We are continuing to investigate the ability of this criteria-based test battery to identify known group differences. Also, a process of establishing standardized measuring procedures is already in place.

**74. Jose, Caroline****CLINICAL, SOCIAL AND FINANCIAL FACTORS LINKED WITH UNMET PRIORITY SERVICE NEEDS FOR ADULTS WITH AUTISM SPECTRUM DISORDER**

1 JOSE Caroline, 2 GEORGE-ZWICKER Patricia, 1 GAUDET Jeffrey, 1 ROBICHAUD Marc, and the CONNECT team  
 1 Maritime Strategy for Patient Oriented Research Support Unit, Université de Moncton, Moncton, NB, Canada, 2 Autistics Aloud, Halifax, NS, Canada

**INTRODUCTION:** Autism is a large spectrum of conditions characterized by a variety of communication and social disabilities which lead to important challenges in day-to-day activities. A shortage of programs and services tailored to adults with autism spectrum disorder (ASD) exists worldwide and the gap between needs and services is likely to worsen as the growing number of children being diagnosed with ASD reach adulthood.

**OBJECTIVES:** This research sought to determine priorities in terms of health and social service needs for adults with ASD and examine factors influencing whether or not these services were being received.

**METHODS:** In total, 260 respondents from across the three Maritime Provinces completed the needs assessment survey: 77 self-reporting adults with ASD (aged 19-55 years), 87 adults with ASD (aged 18-63 years) whose information was provided by their caregivers, and 96 professionals working in the field of autism. Unmet priority services was calculated individually as a ratio between how many services were listed as wanted but not received among those identified as their top 5 service needs.

**RESULTS:** Adult respondents reported a mean of 2.5 ( $\pm 2.9$ ) services wanted but not received, mainly in the areas of employment counselling, post-secondary education programs, housing and residential options, and life and social skills training. Poisson regression showed that adults who were either unemployed, had a higher number of mental health and neurodevelopmental conditions, perceived themselves as having a poor mental health status, or found government support to be insufficient, had significantly more unmet priority services.

**CONCLUSIONS:** Overall, the results of this study highlight the heterogeneous landscape of service provision for adults with autism of varying health status and level of autonomy. The empirical data generated by the CONNECT project survey on the health and service needs of adults with ASD, and the knowledge exchange initiatives between the diverse autism stakeholder groups will help tailor policies and service implementation to their priority needs.

**75. LAYES, Audrey****THE HEALTH INEQUALITIES DATA TOOL STRENGTHENS CANADA'S CAPACITY TO MEASURE AND MONITOR HEALTH INEQUALITIES**

1, LAYES, Audrey  
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**INTRODUCTION:** At the World Health Assembly in 2012, Canada, along with other World Health Organization Member States, endorsed the Rio Political Declaration on the Social Determinants of Health, pledging in part to strengthen monitoring and reporting on health inequalities. This prompted collaboration between the Pan-Canadian Public Health Network, the Public Health Agency of Canada, Statistics Canada, and the Canadian Institute for Health Information to undertake the Pan-Canadian Health Inequalities Reporting Initiative and the creation of the Health Inequalities Data Tool.

**OBJECTIVES:** To strengthen monitoring, reporting, and action on health inequalities in Canada through improved data infrastructure and capacity.

**METHODS:** The Health Inequalities Data Tool consists of indicator data drawn from multiple national databases. The magnitude of inequalities was estimated for over 60 indicators of health status, health behaviours and structural determinants, based on 13 social stratification variables meaningful to health equity (i.e., age, sex, income, education, employment status, occupational category, cultural/racial background, indigeneity, immigrant status, province/territory, urban/rural, disability, and sexual orientation).

**RESULTS:** The easy-to-generate statistical tables and figures, available in both English and French via the Data Tool, can be customized to highlight inequalities for national or provincial/territorial-level data for multiple sub-populations. This provides a snapshot of health inequalities in Canada, which allows researchers and policy makers to identify areas of vulnerability. In most cases, the data in the Data Tool can be stratified on sex, province or territory, and at least one additional social stratification variable, which can be customized to highlight disparities across multiple social groups of interest.

**CONCLUSIONS:** The Health Inequalities Data Tool facilitates access to inter-sectional results for a large number of health indicators at the national and provincial/territorial levels. It showcases the distribution, concentration, and magnitude of health inequalities, and can help to generate new research questions and influence policy.

**76. Victor Szymanski****A LOGIC MODEL TO GUIDE THE IMPLEMENTATION AND EVALUATION OF NAVICARE/SOINSNAVI: A NEW BRUNSWICK NAVIGATION CENTRE FOR CHILDREN AND YOUTH WITH COMPLEX CARE NEEDS**

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**BACKGROUND:** Approximately 15%-18% of North American children have a chronic condition that impacts their health and causes limitations in their lives. While these children are only a small percentage of the pediatric population, they comprise a cohort of patients who are high users of health, social and educational care systems. This requires coordination by the family as well as the care team. In addition, these children and their families experience many care transitions over their lifespan which also makes them vulnerable to discontinuity or gaps in care that can occur. The aim of NaviCare/SoinsNavi is to help facilitate more convenient and integrated care to support the physical, mental, emotional, social, cultural and spiritual needs of children/youth and their families using a patient navigator to offer personalized family-centred care.

**AIM:** The aim of this project was to develop a logic model to guide implementation and evaluation of the NaviCare/SoinsNavi patient navigation program.

**METHODS:** A linear format logic model was used to guide and structure the implementation process. Intended outcomes informed the identification of inputs, activities, and outputs deemed critical for successful program execution and for the eventual process and program evaluation.

**RESULTS:** A visual representation of the assumed cause-and-effect connections between program components and desired outcomes was created. This provided a safeguard to ensure critical processes were not overlooked, allowed the comparison of the ideal versus the realities of the program, enhanced communication, and highlighted data and resources that may be needed for implementation and evaluation.

**CONCLUSIONS:** The NaviCare/SoinsNavi logic model will help guide the development of the program as well as identify variables to be evaluated. This in turn will support achieving NaviCare/SoinsNavi's vision that every child and youth with complex care needs has access to the health, social, and education services that he or she requires in a timely manner.

**77. LUKE, Alison****EXPERIENCES OF FAMILIES USING NAVICARE/SOINSNAVI: A PATIENT NAVIGATION CENTRE FOR CHILDREN WITH COMPLEX CARE NEEDS IN NB**

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**Background:** NaviCare/SoinsNavi, a patient navigation centre for children with complex care needs in New Brunswick, was launched January 2017. The patient navigators help coordinate patient care; improve transitions in care; connect both families and care providers to services and programs; help families better understand health, education, and social services; and serve as a resource for the care team.

**Objectives:** The objective of this poster presentation is to present findings from the implementation of NaviCare/SoinsNavi.

**Methods:** A mixed method approach was used to explore parents' experiences with NaviCare/SoinsNavi. Fourteen participants who received services from NaviCare/SoinsNavi participated in semi-structured interviews, which were conducted either face-to-face or over the phone. Thirteen participants also responded to a satisfaction survey that was emailed to all NaviCare/SoinsNavi clients once their file was closed. Additional demographic information was collected to provide context. Interview data was analyzed using inductive thematic analysis, which is a research method for identifying, analyzing, and reporting themes within the data. Survey data was analyzed using descriptive statistics.

**Results:** Although children served by the centre vary by condition, age, and gender, the 'typical' child is: male, between the ages of 6 and 11, and diagnosed with autism spectrum disorder (ASD) or Attention Deficit Hyperactivity Disorder (ADHD). Most common reasons for calling the centre include seeking support for service referrals, care coordination, and funding. Findings demonstrate that families have substantial needs reflecting gaps and barriers in care delivery across the province. Overall, families were extremely satisfied with the centre. Emerging themes include a relief to find someone who would listen, reduced feelings of stress, improved care coordination, and increased knowledge of programs and services.

**Conclusion:** This study demonstrates that patient navigation programs are an innovative service delivery approach to improve the integration of care for individuals with complex care needs. Future research is needed to measure the impact of patient navigation programs on care coordination, return on investment, and health outcomes to inform policy and practice.

**79. Thibault, Véronique****PHYSICIANS' LEVEL OF COMFORT WITH A NEW TOOL TO GUIDE CEREBRAL CONCUSSION CARE IN CHILDREN**

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**INTRODUCTION:** Cerebral concussions, while frequently seen, remain unclear in terms of management, as many clinicians are not aware of the existence of management guidelines or do not use them enough. To provide better chances of healing in young people, the District scolaire francophone Sud has developed guidelines (7002) for the assessment and management of children with concussions in schools.

**OBJECTIVES:** i) Document clinicians' comfort level in managing pediatric concussions; ii) Identify tools or protocols used by clinicians to ensure adequate management; iii) Evaluate the applicability of the 7002 Guideline.

**METHODS:** Descriptive quantitative cross-sectional study through a survey with 17 questions distributed to health professionals practicing in two emergency departments and three clinics in Southeastern New Brunswick. Participants' responses are then classified and analyzed. Fisher's exact test was used to evaluate the differences between two groups ( $\alpha = 5\%$ ).

**RESULTS:** 63% of responders are at least comfortable in managing concussions (87% of physicians, 54% of residents with a statistically significant difference between these two groups ( $p = 0.046$ )). 53% of the responders use diagnostic tools. While exposure has a statistically significant impact on the comfort level, the use of diagnostic tools does not. The current practice of clinicians is substantially similar to the 7002 guidelines.

**CONCLUSIONS:** In summary, more exposure increases the comfort level in managing concussions. The use of a tool does not correlate with clinician's level of confidence, despite their desire to have one for this purpose. Most physicians approve the 7002 guidelines, thus increasing its applicability.

**78. MacLeod, Jeff****INCREASED DISTANCE FROM THE TERTIARY CARDIAC CARE CENTRE PROLONGS WAIT TIMES BUT DOES NOT AFFECT LONG-TERM OUTCOMES IN PATIENTS UNDERGOING CARDIAC CATHETERIZATION IN NEW BRUNSWICK**

1 YIP\_Alexandra\_M, 1 MACLEOD\_Jeffrey\_B, 2 LEONARD\_Philip, 1 LUTCHMEDIAL\_Sohrab, 1 LÉGARÉ\_Jean\_François, 1 HASSAN\_Ansar  
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**BACKGROUND:** Previous studies have demonstrated the harmful effect of remote geographic place of residence on access to cardiac catheterization across Canada. However, little is known regarding the impact of these disparities in access to cardiac catheterization on long-term clinical outcomes.

**OBJECTIVE:** To examine the effect of geographic factors on access to and long-term outcomes following cardiac catheterization in New Brunswick.

**METHODS:** All patients undergoing inpatient and outpatient cardiac catheterization between January 2006 and June 2011 at the New Brunswick Heart Centre (NBHC) were identified. A patient's geographic place of residence was defined as the driving distance from the patient's home to the NBHC (A:0–50km, B:50–100km, C:100–150km, D:150–200km, E:>200km). Access to cardiac catheterization was defined as wait time from the date of referral to the date of procedure, while the long-term outcome of interest was a composite of all-cause mortality, readmission for any cardiac cause, and repeat cardiac procedure. The impact of distance on access to and long-term outcomes following cardiac catheterization was determined using multiple linear regression and Cox proportional hazards modeling.

**RESULTS:** 17,397 patients formed the final study population (inpatient: n=10,530; outpatient: n=6,867). The median length of follow-up was 1156 days for inpatients and 1203 days for outpatients. Following risk adjustment, patients who lived farthest from the NBHC were most likely to experience the longest wait times for cardiac catheterization, whether it was as an inpatient (risk ratio: A:1.00, B:1.43, C:1.83, D:1.84, E:1.99;  $p < 0.0001$ ) or as an outpatient (A:1.00, B:1.12, C:1.21, D:1.25, E:1.24,  $p < 0.05$ ). However, distance did not emerge as an independent predictor of the composite long-term outcome of interest for either group.

**CONCLUSION:** While increased distance from the tertiary care facility was found to be independently associated with longer wait times for cardiac catheterization in New Brunswick, it had no effect on long-term adverse outcomes. This suggests that geographic place of residence, and by extension prolonged wait times, are of minimal long-term clinical consequence in patients undergoing cardiac catheterization.

**80. Ward, Stephanie****PLUS DE LÉGUMES ET DE MEILLEURS COMPORTEMENTS ALIMENTAIRES CHEZ LES JEUNES DE 8 À 12 ANS PARTICIPANT AU CAMP CULINAIRE CHEF JUNIOR À MONCTON : UN PROJET PILOTE**

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**INTRODUCTION :** Le manque de savoir culinaire est un facteur important dans les choix alimentaires d'un individu, favorisant une dépendance pour les aliments transformés. Le développement du savoir culinaire des jeunes pourrait donc avoir des impacts sur leurs habitudes alimentaires.

**OBJECTIFS :** Ce projet pilote évaluait l'efficacité du camp d'été culinaire Chef Junior sur la consommation de fruits et légumes, les compétences culinaires, les comportements alimentaires, les attitudes envers l'alimentation et l'environnement alimentaire des jeunes de 8 à 12 ans de la région de Moncton.

**MÉTHODES :** Chef Junior est un camp d'été d'une durée d'une semaine qui a été offert sur une période de 4 semaines à l'été 2018. Il incluait un avant-midi de cours de cuisine avec un chef cuisinier et un après-midi de visites éducatives dans la région de Moncton en présence d'une étudiante en nutrition de l'Université de Moncton. Quarante-deux jeunes ont participé au camp et tous ces jeunes ont été invité à participer à l'étude. La consommation de fruits et légumes, les compétences culinaires, les comportements alimentaires, les attitudes envers l'alimentation et l'environnement alimentaire ont été mesurés à l'aide d'un questionnaire auto-rapporté. Un premier questionnaire a été rempli avant le camp, et un deuxième lors de la dernière journée. Des tests t appariés ont été effectués pour analyser l'efficacité du camp.

**RÉSULTATS :** Un total de 10 filles et 2 garçons (11.1 ans  $\pm$  1,4) ont complété le questionnaire avant et après le camp. Les résultats suggèrent une amélioration significative du nombre de légumes consommés ( $p = 0.049$ ) et des comportements alimentaires sains ( $p = 0.004$ ) (p.ex. aider à préparer le souper et à faire les épiceries, manger avec sa famille lors des repas, ne pas manger devant la télévision). Aucune autre amélioration significative n'a été notée.

**CONCLUSIONS :** Malgré la petite taille d'échantillon et la courte durée de l'intervention, les résultats suggèrent que des programmes d'éducation culinaire pourrait améliorer l'apport en légumes et les comportements alimentaires des jeunes.

**81. Étienne HÉBERT CHATELAIN****THE ALTERING EFFECTS OF AMYLOID  $\beta$  ON MITOCHONDRIAL PROTEIN KINASE A ACTIVITY AND MITOCHONDRIAL FUNCTIONS IN J20 MOUSE MODEL OF ALZHEIMER'S DISEASE.**

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**INTRODUCTION:** Alterations in mitochondrial functions produce important neurological diseases. Therefore, mitochondrial functions must be finely regulated, and protein phosphorylation is a critical mechanism in their tuning. Among kinases, Protein kinase A (PKA) regulates mitochondrial functions in neuronal development, synaptic plasticity and memory performances. In fact, a decrease in PKA-dependent signaling contributes to the etiology of several neurodegenerative diseases, particularly Alzheimer's disease (AD), which is partly characterized by the accumulation of neurotoxic amyloid  $\beta$  peptides (A $\beta$ ). These A $\beta$  contribute in increasing rates of oxidative stress and neuronal loss in AD-affected brain regions, causing deficits in memory and neurodegeneration. However, little is known about the influence of A $\beta$  on the activity of the mitochondrially localized PKA (mtPKA) and its role in tuning mitochondrial functions.

**OBJECTIVES:** A $\beta$  alter mitochondrial functions and mtPKA activity. First, we intend to characterize the role of mtPKA and mitochondrial dysfunctions in the A $\beta$ -overproducing J20 mouse model. Second, we aim to identify the protein targets of mtPKA and test their ability to restore the altered functions mediated by A $\beta$ .

**METHODS and RESULTS:** Mitochondrial respiration, hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) production, as well as the monitoring of mtPKA activity experiments were performed on purified brain mitochondria from WT and J20 mice at 2 and 6 months of age. We found that in J20 mice, mitochondrial respiration is lower and H<sub>2</sub>O<sub>2</sub> rates are significantly higher than in the WT age-mate controls. We investigated the activity of mtPKA by western blot and found that the phosphorylation level of mtPKA targets is globally reduced in J20 mice. Besides, after using a proximity-dependent biotin identification method on HEK cells over-expressing mtPKA, we identified 16 potential protein targets of mtPKA.

**CONCLUSIONS:** Mitochondrial functions and mtPKA activity are altered in J20 mice. Further experiments are required to characterize the impact of mtPKA and its targets on mitochondrial functions. Next, we will test the potential restoration of physiologic mitochondrial functions and cognitive faculties by over-expressing mtPKA or its targets in this mouse model.

**82. Ankona Banerjee****Likelihood of long-term disability can be predicted using machine learning and demographic data**

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**INTRODUCTION:** Individuals receiving long-term disability (LTD) or high-cost support require most resources at Work-safe NB. If these individuals are identified early in the process, a separate workflow may be designed to decrease the chance that they end up with LTD and increase the chance that they can return to work. The benefits of such an early intervention, if possible, would have benefits for all claimants.

**OBJECTIVES:** The goal of this study is to use machine learning algorithms to predict and find the predictive features of LTD and individuals requiring high-cost support using the available data before such an outcome occurs (up to 5 years in advance).

**METHODOLOGY:** The data is explored to find candidate features to be included in a model using Microsoft team data science process (TDSP) life cycle. Several classification models are created to predict the LTD. For prediction, a range of classification approaches is used. Random Forests, Gradient Boosting, Neural Networks, Naive Bayes, and support vector machines are used and compared. From the above list, some approaches (random forests and gradient boosting) provide feature ranking which provides more information regarding the relative predictive power of features, which could be used for the further analysis of the causes.

**RESULTS:** The data being used is the anonymized demographics information of 113,900 claimants, their claims, and whether they ended up with LTD or not, and the list of all billing expenses authorized for each claim. Naive Bayes model could predict LTD with 81.0% accuracy while Neural Networks achieved %86.5 in accuracy. The study using demographics as independent variables and claimant status as the dependent variable indicate that LTD could be predicted using the information that is currently in demographics table.

**CONCLUSION:** The study using demographics as independent variables and opening data type as the dependent variable indicate that LTD could be predicted using the information that is currently in demographics tables. Further improvements to the prediction accuracy are likely using additional models and data.

**83. TRAORÉ, Abdarahmane****APPRENTISSAGE PROFOND ET RÉSEAUX DE NEURONES CONVOLUTIFS POUR LA DETECTION EFFICACE DES TUMEURS CANCERUSES DU POU MON**

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**INTRODUCTION:** Le cancer du poumon est considéré comme le plus mortel dans le monde avec plus de 1.6 millions de morts chaque année. Pour augmenter la chance de survie des patients, la détection précoce de tumeurs cancéreuses à partir des images médicales est primordiale. L'utilisation des techniques actuelles d'apprentissage machine peut aider grandement à analyser une grande quantité d'images et supporter les radiologistes dans leur analyse.

**OBJECTIF:** Déterminer la performance de l'utilisation des techniques d'apprentissage profond (deep learning) pour détecter des tumeurs et identifier s'ils sont malignes ou bénignes.

**MÉTHODES:** Ce travail propose l'utilisation des réseaux convolutifs profonds pour détecter les tumeurs cancéreuses à partir des images CT-Scans du poumon. Deux architectures originales Nodule-Net 1 et 2 utilisant respectivement 3 et 4 couches convolutifs sont développées. Les images des scans ont été divisée en patchs de taille 50x50 pixels pour l'apprentissage et la validation. 75% des images ont été utilisés pour l'apprentissage et 25% pour la validation.

**RESULTS:** Pour ce travail la base de données LUNA16 contenant 888 CT-scans annotés est utilisée. Plusieurs tests ont été effectués avec et sans techniques d'augmentation des données (différentes rotations de la région de tumeur). Les deux architectures proposées ont obtenu des résultats dépassant ceux de l'architecture VGG16. Le plus performant a été Nodule-Net 2 avec l'augmentation des données (rotations de +90 deg et + 20 deg). Cette architecture obtient un score d'AUC (Area Under ROC Curve) de 94% et un F1 score de 93%. Nodule-Net 1 avec la même augmentation suit de proche avec un AUC de 91% et un F1 score de 93%.

**CONCLUSIONS :** Ce travail montre que les deux architectures convolutives profondes proposées atteignent des performances supérieures, permettant ainsi de voir la possibilité de détecter efficacement des tumeurs cancéreuses à partir d'images médicales du poumon. Les travaux futurs visent l'analyse de la relation entre taille des patchs et la performance des architectures proposées. Leurs performances sera évaluée sur d'autres types de tumeurs.

**84. Maxim F. Landry****COMBINING BORON AND HOT PEPPERS: A RECIPE FOR POTENTIAL BIOACTIVITY**

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**INTRODUCTION:** Capsaicin is the spicy and active ingredient in hot chili peppers. While the various bioactivities of capsaicin (i.e. anti-microbial, anti-inflammatory, etc) have been known for centuries, it wasn't until fairly recently that the anti-cancer properties of the capsaicinoids, capsaicin and dihydrocapsaicin (the saturated analogue), were first reported. Although only a few naturally-occurring anti-biotics containing the element boron are known, there has been remarkable recent interest in the pharmaceutical chemistry of small-molecule boron-containing compounds. However, compounds containing both capsaicin and boron structural motifs have not yet been prepared and studied. This project deals with the potential of combining both of these biologically-active species.

**OBJECTIVE:** This work deals with fundamental synthetic chemistry that incorporates boron groups in an effort to improve anti-cancer activity. Short term goals include preparing a focused library of capsaicin analogues and examining their anti-fungal, anti-bacterial and anti-cancer properties. Long term goals include the design of a safe capsaicin derivative for the treatment of breast cancer.

**METHODS:** The first stage of any pharmacological study involves the chemical synthesis of unique molecules. We have used established methodologies to make capsaicinoid derivatives starting from 3,4-dimethoxybenzaldehyde and a number of substituted aniline derivatives. Reduction of the resulting imine using NaBH<sub>4</sub> in methanol to give the corresponding amine followed by addition of a readily available acyl chloride gave the desired products. Varying the R substituents in aniline and the acyl chlorides allowed us to generate compounds with different physicochemical properties. **RESULTS:** We have prepared a number of novel boron-containing capsaicinoid derivatives and found that the longer chain aliphatic derivatives show enhanced anti-microbial and anti-cancer activities compared to the shorter chain analogues and even of capsaicin itself.

**CONCLUSIONS:** Results are remarkably promising as we continue to design boron capsaicin compounds as promising drug candidates.