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**ABSTRACT BOOKLET**

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## **WALK N' TALK FOR YOUR LIFE: AN INNOVATIVE INTERVENTION TARGETING SOCIAL ISOLATION AND LONELINESS IN A SAMPLE OF BC OLDER ADULTS**

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Keywords: social isolation, loneliness, seniors, community-based, exercise

**Introduction:** Social isolation (SI), the quantifiable measure of a reduced social network, and loneliness (L), the subjective measure of negative feelings, are increasingly prevalent, particularly in low-income seniors. SI and L are associated with increased risk of physical, cognitive and mental decline. To date, interventions that have reduced SI and L and improved health outcomes are community-driven, involve small social groups, and educate participants on healthy lifestyle behaviours including exercise. However, these interventions have not targeted low-income, low-education seniors who are at increased risk of SI and L. To address this discrepancy we developed Walk N' Talk for Your Life, a low-cost social health education program.

**Methods:** The 10-week program was held in the common room of a local seniors' residence building in West Kelowna, BC. Seniors 65 and older were invited to attend the program free of charge. Baseline measures of functional fitness, cognition, and perceived SI and L were performed. Student volunteers ran two-hour biweekly sessions which included a thirty minute Otago fitness program, thirty minutes of group walking and a hour of interactive health discussion on a topic of the participants' choice. At the end of the program all baseline measures were reassessed and participants completed questionnaires reporting perceived changes in health knowledge and behaviors, fitness and overall program satisfaction. Questionnaire data was analyzed by a statistician.

**Results:** 30/32 participants enjoyed the program and were very satisfied (84.4%) or satisfied with being involved in the program. A majority of participants agreed that they learned more about diet (93.8%) and physical activity (93.8%). Most reported increased physical activity (75%), strength (59.4%), stamina or endurance (56.3%) and balance (68.8%). 78.1% believed the program increased their socialization and 87.5% reported improved mental and emotional well-being. Data from functional testing and cognitive assessments is under review.

**Conclusion:** The Walk N' Talk for your Life program was highly acceptable and appeared to improve participants' self-reported knowledge of health behaviours, their physical activity and fitness, socialization and mental and emotional well-being. The major limitation of this preliminary data is that it is self-reported; analyses of functional fitness and cognition are underway

## EVALUATING THE INSTRUCTION OF TRANSGENDER HEALTH IN CANADIAN MEDICAL SCHOOL CURRICULA

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Keywords: Canadian, Medical School, Curricula, Evaluation, Transgender

**Background:** Transgender individuals have been identified as being underserved by the current health care system. This problem is exacerbated by the fact that transgender individuals are an at risk population, shown to have poorer general health and more likely to be depressed and attempt suicide.

**Purpose:** This study aims to examine the adequacy of the current instruction of transgender health in medical schools across Canada.

**Methods:** Curricular information was collected from program administrators to detail the current delivery of transgender health. Medical students in all years of study were surveyed to evaluate their knowledge and attitudes concerning the topic as well their experiences within the curricula. Survey responses were then separated into two groups: those from students who have not yet encountered the transgender-related curricula (1<sup>st</sup> years) and those from students who have (2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> years).

**Results:** A total of 245 UBC medical students were surveyed; 84 were from 1<sup>st</sup> year and 161 were from 2<sup>nd</sup> through 4<sup>th</sup> year. The majority acknowledged that transgender individuals have unique health risks (92%), and agreed that it is important for a physician to know if his/her patients are struggling with their gender identity (98%). However, over three-quarters (78%) of students reported that they would not feel comfortable treating either a transgender male or female. Furthermore, comparing the students from 1<sup>st</sup> year to those in 2<sup>nd</sup> through 4<sup>th</sup> year, there was no significant difference ( $p > 0.12$ ) between their knowledge of the topic. Of those who received the transgender-related curricula, only 18% felt that the topic was proficiently taught and 86% would like to know more.

**Conclusion:** These preliminary results indicate that the majority of students recognize that transgender health is an important topic and needs to be addressed by healthcare professionals. The current curricula does not appear to sufficiently address the topic as many students report feeling uncomfortable and ill-prepared to work with transgender individuals in the future. Our data further suggests that a majority of students recognize and support the notion of reassessing the current instruction of transgender health within the curricula.

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## THE INCIDENCE OF NON-OBSTRUCTIVE CORONARY ARTERY DISEASE IN WOMEN AND MEN WITH STABLE ANGINA AND A RECENT POSITIVE STRESS TEST

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**Keywords:** Coronary artery disease, stable angina, positive stress test, chest pain, coronary angiogram

**Background:** A subset of patients present to Vancouver General Hospital (VGH) with persistent chest pain and ischemia on stress testing but no obstructive coronary artery disease (CAD) on coronary angiogram. We sought to characterize these patients by determining the incidence of non-obstructive CAD (NOCAD) in a cohort of patients with stable angina and a positive stress test who had undergone cardiac catheterization. Further, we sought to compare their cardiac risk factor profile to patients with obstructive CAD.

**Methods:** We retrospectively evaluated 588 patients who presented to the cardiac catheterization unit at VGH between January and June of 2014 with stable angina and a positive cardiac functional test. NOCAD was defined as epicardial stenosis <50% with no previous history of stents or revascularization. Baseline cardiac risk factors were compared between patients with NOCAD and patients with obstructive CAD.

**Results:** NOCAD was found in 126 (21.4%) patients. Of the 169 (28.7%) women, 66 (39.1%) had NOCAD, compared to only 60 (14.3%) of the 419 men. Patients in the NOCAD group were significantly younger than those in the obstructive CAD group ( $61.6 \pm 10.6$  vs.  $66.9 \pm 10.2$ ), and had a lower prevalence of the common cardiac risk factors.

**Conclusion:** Twenty percent of patients that present with stable angina and a positive stress test have NOCAD on coronary angiography. Females have a threefold higher risk of exhibiting NOCAD on angiography than men. Traditional cardiac risk factors are still common in patients with NOCAD. Future studies of these patients should focus on optimal management of risk factors and angina control.

## THE IMPACT OF SMALL KIDNEYS

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Keywords: Renal hypodysplasia, pediatric, outcomes, end stage renal disease

**Purpose:** Up to 60-70% of children with chronic kidney disease (CKD) have congenital anomalies of the kidney and urinary tract (CAKUT). CAKUT is a group of heterogeneous diseases, with different causes, natural histories, and rates of progression. Children with small and/or dysplastic kidneys have a form of CAKUT, collectively referred to as renal hypodysplasia (RHD). Most children with CKD experience a progressive decline in kidney function over time. The different forms of CKD progress at different rates, with CKD due to glomerulonephritis progressing more rapidly than that caused by congenital anomalies of the kidney. The rate of decline of kidney function among patients with RHD is highly variable and the factors that determine outcome are still poorly understood.

The primary objective of this study therefore was to define the clinical variables that determine long-term renal outcome in RHD, and in particular whether kidney size at the time of initial diagnosis predicts end-stage renal disease (ESRD) risk.

**Methods:** This was a single center retrospective cohort analysis. The primary outcome was the development of ESRD (starting dialysis or receiving a preemptive kidney transplant) and the secondary outcome was the development of pre-ESRD chronic kidney disease (eGFR 15-59 ml/min/1.73 m<sup>2</sup>). We identified 202 cases of RHD, with 25 cases (12%) reaching ESRD at a mean age of 8.9 ( $\pm$ 6.6) yrs.

**Results:** Cases with a known genetic syndrome (12%) had the smallest kidneys while those with posterior urethral valves (PUV) (31%) had the largest kidneys at diagnosis. Cases with PUV, and those with bilateral RHD, were most likely to develop ESRD. Younger gestational age (OR .85, CI .74-.99,  $p=.03$ ), smaller kidney size at diagnosis (OR .32, CI .14-.72,  $p=.006$ ), proteinuria (OR 1.02, CI 1.01-1.04,  $p<.001$ ), and hypertension (OR 1.02, CI 1.00-1.03,  $p=.03$ ) were associated with the development of ESRD, while small kidney size at diagnosis was independently associated with ESRD by multivariate analysis (HR 37.78, CI 1.20-1193.76,  $p=.04$ ).

**Conclusions:** Having a small kidney is not a benign condition. Kidney size at diagnosis can predict the likelihood of developing ESRD.

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## EFFECTIVENESS OF INTENSIVE INTERDISCIPLINARY OUTPATIENT REHABILITATION AS A MODEL OF REHABILITATION SERVICE DELIVERY

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Keywords: Outpatient, rehabilitation, service delivery, functional outcome

**Background:** Rehabilitation for patients who have sustained significant neurological and/or musculoskeletal injuries is an essential component of successful recovery. The intensity of rehabilitation is directly related to better functional outcomes however; current outpatient rehabilitation services are usually less intense compared to traditional inpatient rehabilitation where patients receive therapies 5 days per week from an interdisciplinary team. The Intensive Rehab Day Program (IRDP) at GF Strong Rehab Centre was established to address the needs of patients who require rapid access to intensive rehabilitation but are well enough to stay at home. The IRDP also helps to reduce inpatient rehabilitation length of stay by allowing patients to be discharged home earlier and transitioned to the IRDP without sacrificing therapy intensity.

**Hypothesis:** An intensive interdisciplinary outpatient rehabilitation program is an effective model for delivering rehab services to acute and sub-acute patients.

**Methods:** A retrospective chart review of patients who have completed the IRDP program since its inception in 2012 was performed and used to generate an excel database to facilitate data tracking and statistical analysis. Demographic and diagnosis information as well as functional outcome measures including the Functional Independence Measure (FIM), PHQ-9 for depression and Goal Attainment Scale were collected.

**Results:** Since 2012, 145 patients have completed the IRDP program. Of these 70 were male and 75 were female, with a mean age of 45 (Age range: 15-80). The majority of patients were from the Vancouver Coastal Health Authority (84.7%). The most likely referral source to the program was internal referrals from GF Strong (44.29%) and Vancouver General Hospital (29.29%). The most common IRDP diagnoses were Stroke (36.55%), traumatic brain injury (16.55%) and incomplete spine injury (6.9%). Various outcomes measures were recorded at admission, at discharge and at 3 months follow up and statistical analysis of this data is still being conducted.

**Conclusions:** Data on outpatient rehabilitation programs have been scarce. If this project can successfully demonstrate the effectiveness of this rehab service delivery model, it can serve as the basis for setting up similar programs in British Columbia and help patients achieve better functional outcomes and coping strategies following various health events.

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## IMPLEMENTATION AND UTILIZATION OF A STANDARDIZED TRANSIENT ISCHEMIC ATTACK ORDER SET REDUCES THE LIKELIHOOD OF PROGRESSION TO ISCHEMIC STROKE.

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Keywords: TIA, Stroke, Standardized Order sets

**Background:** Stroke is the third most common cause of death in Canada and the leading cause of adult disability with over 315,000 Canadians living with the consequences of stroke. A transient ischemic attack (TIA) is a warning sign of a future stroke with the highest risk being within the first 72 hours after the event. The risk of stroke after TIA can be as high as 20% at 90 days. The Heart and Stroke Foundation has asserted that there are quality control studies whose results support the value of adopting evidence-based best practices in the management and treatment of TIA with the goal of preventing progression to stroke. In 2006 the Campbell River hospital implemented the use of standardized TIA order sets based on the Canadian Stroke Best Practice Recommendations.

**Objective:** The goal of the study is to determine if the order sets are being effectively utilized and to determine if their use translates to improved patient outcomes.

**Methods:** This project was a retrospective chart analysis of all TIAs to present to the Campbell River Emergency Department in 2013. For each patient reviewed, 80 data points were collected including, but not limited to, risk factors, time from admission to the ER to imaging and laboratory investigations, and progression to stroke within six months. Data was collected from the paper charts on site in medical records at Campbell River Hospital as well as Island Health's electronic health records. The data was entered into a spreadsheet that contained binary and continuous variables. The Fisher's Exact Test was performed to determine if use of the standardized TIA order set decreased the likelihood that a TIA progressed to stroke within six months.

**Results and Conclusions:** TIAs were found to progress to stroke more frequently when a TIA order set was not utilized ( $p= 0.03$ ). The implementation and utilization of standardized TIA order sets reduces progression of TIA to stroke within six months.

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## THE VALUE OF PHOSPHORUS MAGNETIC RESONANCE SPECTROSCOPY IN EVALUATING HETEROPLASMY AND RESPONSE TO EXERCISE IN A FAMILY WITH MELAS

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Keywords: phosphorus magnetic resonance spectroscopy, MELAS, mitochondrial disease, exercise

**Background:** Certain mitochondrial DNA mutations can lead to a genetic disorder called mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episodes (MELAS). A hallmark feature of this disease is muscle weakness and fatigue, the severity of which depends on the cellular mutation load, or heteroplasmy. This study evaluates the utility of 31-phosphorus magnetic resonance spectroscopy (MRS) in assessing heteroplasmy amongst family members with MELAS, as well as changes to muscle bioenergetics in response to an exercise program.

**Methods:** Three family members aged 20, 23, and 50 affected with MELAS were recruited for this study, along with two controls aged 14 and 21. The mutation loads for affected members as measured by genetic testing were 90, 30, and 45% respectively. Baseline MR spectra was obtained from the calf muscles at rest, during and after a two minute foot pedal exercise and in the immediate 6 minute post-exercise recovery phase. The same protocol was performed with a blood pressure (BP) cuff inflated above the knee to represent ischemic conditions. Muscle energy production was inferred by measuring phosphocreatine (PCr), inorganic phosphate (Pi) and adenosine triphosphate (ATP) peaks. The following year the two most affected family members completed a one-month exercise program, after which muscle MRS was repeated and compared to baseline.

**Results:** The 23-year-old (30% mutation load) had similar MR spectra to control. The oldest patient (45% mutation load) had the lowest ATP production and PCr post-exercise recovery, lower than the 20 year old with 90% mutation load. Baseline MRS measurements declined after one year showing an underlying deterioration in muscle energy homeostasis. Exercise intervention in the 20 and 50 year old resulted in some clinical improvements, and minor improvements in muscle bioenergetics.

**Conclusion:** Muscle MRS is an effective tool to assess severity of muscle disease in MELAS, and shows that genetic mutation load correlates with MR spectra in an age-dependent manner. Exercise intervention can result in clinical improvement in mitochondrial disease, however the duration of the exercise program in this study was likely not long enough to produce significant improvements in the MR spectra.

## EMERGENCY DEPARTMENT VISITS OF OLDER DRIVERS FOR MOTOR VEHICLE COLLISIONS

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Keywords: motor vehicle collision, emergency department, older

**Background:** Canadians are living longer with more active lifestyles, and many are continuing to drive later in life. Older drivers are therefore an increasing presence on the road. Previous studies have shown that older drivers are more likely to be involved in minor crashes; however, older drivers tend to be frailer than their younger counterparts and tend to suffer injury, despite similar crash circumstances. Older drivers are also at greater risk of mortality from motor vehicle collisions than younger drivers. In light of the aging Canadian population, we seek to examine the outcomes of crashes involving older drivers by identifying differences in injuries and emergency care resource utilization between different age groups. We hypothesize that older drivers (ages 70+ for the purpose of this study) will utilize more health care resources after a similar crash than their younger counterparts.

**Methods:** This pilot project is a retrospective cross-sectional study. Data were obtained by conducting chart reviews of motor vehicle crash related emergency department (ED) visits at Vancouver General Hospital from 2008 to May 2014. For each older driver (aged 70+), we selected 2 younger injured drivers from the same day as a comparison group. We extracted detailed crash information, mode of arrival to ED, and crash circumstances, as well as medical data including demographic information, pre-crash health status, injury and ED care utilization.

**Results:** In our study population, we have identified 266 older drivers and 529 younger drivers. To date, we have reviewed 159 older drivers (mean age=78) and 363 younger drivers with a mean age of 40. Preliminary results indicate that older drivers are more likely to be admitted and more likely to require CT imaging and bloodwork. Older drivers are also more likely to be involved in single-vehicle motor collisions but are less likely to self-report injury. We will present the latest findings.

**Conclusion:** This study has the potential to impact emergency department management of injured older drivers. This will aid in determining resource usage by older injured drivers, and improve outcomes in this population through well-informed and focused care.

## DEVELOPMENT AND IMPLEMENTATION OF CHECKLISTS FOR QUALITY CONTROL AT STEM CELL DRIVES

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Keywords: Quality Improvement; Checklist; Stem Cell Drive; Donor Recruitment; Quality Control

**Background:** Checklists are important tools in error management, and their use improves best practice adherence. Checklists are being increasingly implemented to multiple domains of healthcare; however, to the knowledge of this author, no published checklists exist which outline a process for stem cell donor recruitment onto donor-databases at stem cell drives.

The UBC Stem Cell Club is a community partner of OneMatch Stem Cell and Marrow Network, and includes five active chapters. To date, we have coordinated 37 stem cell drives, signing up a total of 2905 new stem cell donors. We have previously described a model of stem cell drive design including five stations: prescreening, informed consent, registration, swabbing, and reconciliation (Fingrut, 2015). Here, we describe the design and implementation of a checklist-based approach to ensuring quality control and securing informed consent at our stem cell drives.

**Checklist Design:** We have constructed checklists for each station of the stem cell drive, striving to include relevant quality control aspects as well as all recommendations from the World Marrow Donor Association's (2003) suggested procedures for securing informed consent in stem cell donors at time of registration.

**Checklist Utility:** These checklists provide recruiters and supervisors with a memory recall tool, allowing them to review information they need to deliver to registrants as well as common errors to screen for. Further, they allow for standardization across stem cell drives organized and staffed by different coordinators and recruiters. They could also be used as a rubric to train stem cell drive recruiters and supervisors, and to assess their competency.

**Implementation:** Since 01/01/2015, checklists are brought to each UBC Stem Cell Club drive and placed on tables of their respective stations. Volunteers are instructed to refer to their checklists for guidance during their shifts. All training materials have been updated to incorporate the checklists, so that new volunteer recruiters are familiar with them prior to their first volunteer shift.

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## ON-SITE MEDICAL EXPERIENCE DURING AN ANNUAL 5-DAY ELECTRONIC DANCE MUSIC EVENT WITH HARM REDUCTION SERVICES

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Keywords: music festival, mass gathering, harm reduction, emergency response, prehospital.

**Background:** With increasing attendance and media attention, large-scale electronic dance music events are a subset of mass gatherings that have a unique risk profile for attendees and promoters. Shambhala Music Festival is a multi-day event in a remote setting with a recognized history of providing harm reduction services alongside medical care.

**Study/Objective:** This manuscript describes the medical response at a multi-day electronic music festival where on-site harm reduction interventions and dedicated medical care are delivered as parallel public health measures.

**Methods:** This study is a descriptive case report. Medical encounters and event-related data were documented using an established event registry database.

**Results:** In 2014, Shambhala Music Festival had 67,120 cumulative attendee days, with a peak daily attendance of 15,380 people (range 2859 – 15380) during the 7-day period in which medical and harm reduction services were active. There were 1,393 patient encounters and the patient presentation rate was 20.8 per thousand cumulative attendee days. The majority of these (90.9%) were for non-urgent complaints. The ambulance transfer rate was 0.194 per thousand cumulative attendee days and 0.93% of patient encounters were transferred by ambulance. No patients required intubation and there were no fatalities. Harm reduction services included mobile outreach teams, educational materials and drug testing facilities for safe partying, a dedicated women's space, and a "Sanctuary" area that provided non-medical peer support for overwhelmed guests. More than 10,000 encounters were performed by mobile and booth-based preventive and educational services, and 2786 drug tests were done with a 7% discard rate.

**Conclusion:** Dedicated medical and harm reduction services represent two complementary public health strategies to minimize risk at a multi-day electronic music festival. The specific extent to which harm reduction strategies reduce the need for medical care is not well understood. Incorporation of harm reduction practices when planning on-site medical care has the potential to inform patient management, reduce presentation rates and acuity, and decrease utilization and cost for local health services.

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## **GOING BEYOND THE CLASSROOM: WALK N' TALK FOR YOUR LIFE**

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Keywords: Leadership, Education, Collaboration, Community-based Research, Health Advocacy

Throughout their medical education, students are required to develop the CanMed competencies: expert, communicator, collaborator, manager, health advocate, scholar and professional. In order for these competencies to be sufficiently developed, the current medical curriculum needs to evolve outside the context of the traditional classroom by providing interactive learning opportunities. Walk N' Talk for Your Life provides an opportunity students of different health care backgrounds to work as an interdisciplinary health team while prioritizing a key health issue in the community. In Kelowna, prior community consultation has revealed that social isolation (SI) and loneliness (L) are of particular concern in low-income elderly populations. Throughout their role as an interdisciplinary health team, medical students, nursing students and health science students created a structured weekly intervention targeted specifically for low-income seniors. These weekly sessions integrated socialization opportunities, health education and exercise intervention for the participants. Students collaborated with study participants to select relevant health topics for each session, and then led the selected health presentation the following week. Students promoted awareness and advocated for healthy lifestyle choices in the elderly. Students facilitated all sessions by creating a safe atmosphere for group discussion. Based on student program evaluation forms and required weekly personal reflections, all students reported a better understanding and interest in community-based research, a better understanding of how to collaborate with students from other health disciplines and felt valued by the research team. During team meetings, students sought ways for program improvement and initiated these changes. Further data analysis of other CanMed competencies is pending. Walk N' Talk for Your Life provided an opportunity for leadership, collaboration within an interdisciplinary team, integration of clinical knowledge, and the establishment of a community based research program. Students were able to impart valuable knowledge of basic health behaviours during each session. Furthermore, the supportive environment created by the students allowed study participants to build new support networks that helped reduce SI and L. Walk N' Talk for Your Life is a program that could be incorporated into the medical school curriculum.

## AN OBSERVATIONAL CROSS-SECTIONAL SURVEY OF POLYPHARMACY FOR FRAIL ELDERS LIVING IN RESIDENTIAL CARE FACILITIES IN BRITISH COLUMBIA

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Keywords: Polypharmacy, Frail Elders, Aging, Residential Care

**Objective:** Elderly nursing home (residential care) patients often present with complex medical conditions and may be prescribed numerous medications. Taking a high number of medications (polypharmacy) has been associated with increased incidences of adverse drug events, drug-drug interactions, and hospitalizations. A recent assessment of nursing home prescribing in British Columbia suggests that 4% of patients age 85 or older take more than 10 drugs and 31% take more than 5. This confirms that polypharmacy likely affects a significant number of frail elders in BC, but was unable to provide many specifics in terms of prescribing patterns. This study will more accurately describe the prevalence of polypharmacy and medication characteristics of a random sample of nursing home patients.

**Design:** Cross sectional, retrospective chart review, observational study.

**Setting/Participants:** 214 randomly selected residents from 6 nursing homes in the lower BC mainland.

**Interventions:** Electronic pharmacy data was used to enumerate and categorize the medications prescribed. Medications were grouped according to type and frequency of administration. Physical chart reviews were also performed in order to obtain additional patient condition details.

**Main Outcomes Measured:** Mean total medications, mean regular medications, mean medications meeting the same strict definition of “medication” used by the recent BC study, mean medications of six specific drug categories

**Results:** On average, patients were taking 13.8 (Min = 3, Max = 32, SD = 5.0) total prescription medications and of those 8.7 (Min = 0, Max = 21, SD = 3.8) were regularly prescribed. According to the definition of “medication” outlined in the recent BC study, our group was taking on average 5.9 (Min = 0, Max = 16, SD = 3.1) medications.

**Conclusion:** The results of this study provide a first look into the specifics of polypharmacy in nursing homes in the lower mainland of BC. With this data, an intervention for a randomized control trial may be designed to improve prescribing to nursing home patients.

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## **CHRONIC HEPATITIS C CARE CASCADE, FROM SCREENING TO CLEARANCE, IN A LARGELY ABORIGINAL INNER CITY MEDICAL CLINIC IN VANCOUVER**

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Keywords: Hepatitis C, Aboriginal

**Background:** Chronic hepatitis C virus (HCV) infections remain a significant health burden in Canada, affecting nearly 1% of the population, and 60 - 80% of those with a history of injection drug use. While HCV infection is a “curable” condition, uptake of treatment continues to be low, with estimates only around 1% and even fewer cases of sustained virologic response among the inner city population in Vancouver.

**Objectives:** The purpose of this research is to analyze the chronic HCV care cascade at Vancouver Native Health Society Medical Clinic (VNHS), which serves a largely Aboriginal inner city population and has a dedicated hepatitis C treatment program integrated into primary care. The objectives are to identify deficiencies and strengths and to provide a baseline for further interventions.

**Methods:** A retrospective review of VNHS electronic medical records from 2009 to 2013 was undertaken to establish a cross-sectional analysis of the HCV care cascade, including the following: screening, diagnosis, referral, initiation of treatment, and sustained virologic response.

**Results:** Of the 4456 active patients at VNHS over this time period, 2325 (52%) have been screened for HCV infection. 1283 patients (55%) were serology positive and 713 of them (68%) had chronic HCV infection. 337 chronic HCV infection patients (47%) were referred for treatment consideration, and 118 (35%) underwent treatment to the success rate of approximately 70%.

**Conclusions:** Although access to treatment was higher than with comparable clinical populations in Vancouver, further improvement in HCV care cascade, including screening and referral, can be made.

**Implications on practice or policy:** Can applying a chronic disease management approach to chronic HCV infection further increase screening and initiation of treatment?

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## ASSESSING AND COMPARING PERCEPTION OF ANXIETY BETWEEN NEPALI AND CANADIAN MEDICAL SCHOOL STUDENTS

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Keywords: Anxiety, culture, Medical Students, Nepal, Canada

**Background:** Although it is known that the prevalence of Anxiety disorders is markedly different between independent and interdependent cultures, especially among the student population (12% vs 1%), the reason behind this phenomenon has not been determined. Anxiety disorders are the most prevalent psychiatric disorders in Canada and are often screened at family practice offices using simple surveys, such as the -General Anxiety Disorder 7 -item scale (GAD-7). This study aims to assess the perception on anxiety in Nepalese students, a demographic that is rarely studied, compared to Canadian students. We hope to answer whether anxiety is less prevalent in Nepal due to differences in how the culture views anxiety.

**Hypothesis:** We hypothesize that students from both countries will have similar levels of anxiety, but that their perceptions on anxiety will differ.

**Methods:** Medical students from UBC and Nepal were asked to fill out a survey containing the quantitative screening test for anxiety – GAD7 as a proxy and estimation for anxiety levels and questions inquiring on their perception on anxiety.

**Results:** We found that there were no significant difference between scores on the GAD7 between the two populations ( $5.72 \pm 0.68$  and  $6.42 \pm 0.87$ ) and that students who score higher on the test have a tendency to perceive themselves to be more anxious than what they think their peers would rate their own anxiety levels. Interestingly, results indicated that for Canadian students, those who score higher on the GAD7 tend to view their anxiety levels as a disadvantage when it comes to their performance in school and relations with peers, while Nepalese students perceived their anxiety as an advantage for the two domains mentioned.

**Conclusion:** Although there are no significant differences between anxiety levels between the two cohorts, Nepali students appear to perceive their anxiety as an advantage for school and relationships compared to Canadian medical students. This could potentially help to explain the discrepancy in anxiety disorders seen in different types of culture. Research in future years will aim to try to assess more cultural perceptual differences.

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## CHARACTERISTICS OF ENTEROVIRUS D-68 PRESENTATION AND MANAGEMENT AT BC CHILDREN'S HOSPITAL – A RETROSPECTIVE CASE SERIES

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Keywords: pediatrics, Enterovirus D-68, respiratory illness,

**Background:** Enterovirus D-68 is a non-polio human enterovirus that shares biologic resemblance with rhinovirus and is known to be almost exclusively associated with respiratory illness. Over the past decade, there have been several reports of Enterovirus D-68 associated with clusters of respiratory illnesses from the United States, Asia and Europe. Evidence from several of these reports suggests that Enterovirus D-68 may be associated with severe respiratory illness in the pediatric population. In the fall of 2014, an outbreak of Enterovirus D-68 occurred in North America resulting in a high number of pediatric hospital admissions for respiratory illness throughout Canada and the United States. During this time, physicians at BC Children's hospital observed that many patients with confirmed Enterovirus D-68 presented with unusually severe respiratory distress with wheeze and did not respond as expected to conventional therapy.

**Methods:** We conducted a retrospective chart review on patients from 0-18 years admitted to BC Children's hospital with confirmed Enterovirus D-68 positive nasopharyngeal sputum samples from September 11, 2014 to December 1, 2014. Data was collected from patient's hospital charts. We received approval for this study by the Children & Women's Research Ethics Board on January 14th, 2014.

**Results:** From September 15 – December 1 2014 a total of 47 pediatric patients were confirmed to have Enterovirus D-68. A total of 42 patients met the criteria for inclusion, while the remaining 5 patients were discharged from the ED. We will be summarizing detailed information about all cases including past medical history, presenting symptoms, objective findings on presentation to hospital and course in hospital with documented response to treatment.

**Conclusions:** This case series will help characterize the clinical phenotype of Enterovirus D-68 respiratory infections including the spectrum and severity of illness, the children that are most predisposed to experiencing severe disease as well as the predicted course of disease and its usual response to treatment.

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## **TUMOR-INFILTRATING CD4+ KILLER T CELLS ARE ASSOCIATED WITH INCREASED PATIENT SURVIVAL IN HIGH-GRADE SEROUS OVARIAN CANCER**

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Keywords: ovarian cancer, T cells, prognosis, immunotherapy

**Background:** High-grade serous ovarian cancer (HGSC) is the deadliest gynecologic cancer, with a five-year survival rate of approximately 30%. Despite the poor outcomes associated with HGSC, patients who mount an immune response to their tumor (particularly those with tumor-infiltrating “killer” T cells) typically have a much better prognosis. A subset of T cells have been documented in HGSC, with cell-surface expression of both the protein CD4, associated with “helper” T cells, and a protein found in killer T cells (TIA-1, associated with granules active in targeted cell-killing). This subset of immune cells, termed here CD4+ killer T cells, appears to have combined functional properties of both killer and helper T cells, and appears to be capable of not only killing cancer cells directly, but also of organizing and amplifying the anti-tumor immune response.

**Objective:** We sought to determine whether CD4+ killer T cells are associated with increased patient survival in HGSC.

**Methods:** An immunohistochemical staining protocol was developed to allow detection and discrimination of CD4+ killer T cells. This staining protocol was applied to a set of tissue microarrays, consisting of a series of tissue cores taken from post-operative ovarian cancer specimens collected during primary surgery, prior to any other treatment. CD4+ killer T cells within the tumor epithelium and in the surrounding connective tissue matrix were quantified by visual scoring, and associated clinical data were used in survival analysis.

**Results:** The presence of tumor-infiltrating CD4+ killer T cells is associated with a significant ( $P < 0.05$ ) increase in patient survival in HGSC. Notably, these cells are associated with further improvements in survival in patients with CD8-expressing (a marker of classical killer T cells, among other cell types) tumor-infiltrating immune cells, a subpopulation of patients previously associated with better outcomes.

**Conclusion:** CD4+ killer T cells within the tumor epithelium are associated with increased survival in women with HGSC. This suggests that these dually-functioning T cells might be a good candidate for targeted enhancement to improve the patient's immune response to HGSC, thus improving patient outcomes.

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## **SOCIAL MEDICINE NETWORK: ENGAGING STUDENTS TO IMPROVE HEALTH OUTCOMES AND REDUCE HEALTH INEQUITIES IN BC COMMUNITIES**

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Keywords: determinants of health, health equity, DPAS, social accountability

**Background:** Medical students in their first year of studies at UBC take: DPAS 410 Doctor, Patient and Society. Much of this multidisciplinary course focuses on specific areas of health for marginalized populations and other critical issues unique to our province. However, students find difficulty in applying their newfound knowledge in tangible and practical ways for the community while balancing their increasing time commitments with school. Our vision is to be more effective in responding to the social determinants of health through the development of a centralized network that will increase efficiency and allow busy students to engage the community in key areas of need. We wish to foster the habit of social accountability among healthcare workers at an early stage of their career by uniting individuals and organizations passionate about health and human dignity.

**Methods:** Our team has designed a website that can unite healthcare workers, students, and individuals of all fields by calling them to work together around a common area of passion. Currently, the website allows users to explore various categories in social medicine, such as Aboriginal Health, Mental Health, Addictions Health, LGBT Health, Prison Health, Newcomer Health, and Maternal or neonatal health. Within each of these categories, there are three divisions: Organizations, Events and Opportunities, and Champions of the Field. Under these headings, visitors to the site can find contact information for relevant organizations, keep track of when and where events are happening, seek out volunteer, research, and elective opportunities, and get in touch with prominent individuals working in the field.

**Results:** We have presented at conferences held in McGill, UBC and Yale University. Students at McGill University and the University of Toronto also want to establish provincial Social Medicine Network chapters, and we have been granted funding from The Special Populations Fund, Faculty of Medicine of UBC.

**Conclusion:** The Social Medicine Network recruits students in BC to become advocates for health equity and gives them the tools needed to effect change, particularly within the areas of social medicine.

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## INTERNET-ADMINISTERED HEALTH RELATED QUALITY OF LIFE QUESTIONNAIRES COMPARED TO PEN AND PAPER IN AN ADOLESCENT SCOLIOSIS POPULATION: A RANDOMIZED CROSSOVER STUDY

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Keywords: Paper vs. Internet, Health-Related Quality of Life, Adolescent Idiopathic Scoliosis, Questionnaire administration

**Purpose:** Modern technology puts into question the effectiveness of using pen and paper as a means of collecting information from web-enabled patients. This study aimed to validate and test the reliability of using the Internet as a method of administering health related quality of life (HRQoL) questionnaires in a pediatric spine population.

**Methods:** A prospective randomized crossover study was conducted. Patients aged 11-18 with idiopathic scoliosis were invited to participate and informed consent was obtained from a scoliosis outpatient clinic setting. Participants were randomized to one of four groups determining the method of questionnaire administration (SRS-30 and PODCI). Both questionnaires were completed at two separate time points, two weeks apart to prevent recall bias. Groups included: Paper/Paper, Paper/Internet, Internet/Paper, and Internet/Internet. Paired sample T-tests were used to determine the test-retest reliability of each group. Analysis was stratified for surveys returned within or outside of the allotted four week time frame following enrollment.

**Results:** 96 participants completed and returned both sets of questionnaires. 26 participants were allocated to the Paper/Paper group (27%), 20 to the Paper/Internet group (21%), 26 to the Internet/Paper group (27%), and 24 to the Internet/Internet group (25%). Overall, no differences were observed between Internet-administered compared to pen and paper administered questionnaires ( $p = 0.206$ ). No differences were observed within any group individually for the SRS-30 or PODCI questionnaire. Additionally, no significant differences were observed within groups for surveys returned within or outside of the four week time frame. 84% of the participants who completed both paper and Internet versions of the questionnaires reported a preference for the Internet.

**Conclusion:** Internet-administration of both the SRS-30 and PODCI questionnaires is a valid and reliable method of acquiring health related quality of life information in this population.

**Significance:** The ability to use the Internet as a method of questionnaire administration can increase the efficiency of data collection, and reduce any problems associated with pen and paper questionnaires, including; postage and stationary costs, and time required for data input and analysis. Among a technology-enabled population, consideration should be given to Internet-administered questionnaires instead of the traditional pen and paper method.

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## RETROSPECTIVE REVIEW OF CLINICAL AND GENETIC CHARACTERISTICS OF NEUROMUSCULAR CONDITIONS ASSOCIATED WITH MALIGNANT HYPERTHERMIA REACTIONS IN PAEDIATRIC PATIENTS

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Keywords: Neuromuscular disease, malignant hyperthermia, anaesthesiology, genetics, pharmacology

**Background:** Malignant hyperthermia (MH) is a life-threatening adverse reaction to the volatile anaesthetics with or without administration of the depolarizing muscle relaxant, succinylcholine. Neuromuscular diseases are a group of conditions characterized by impairment of muscle function secondary to pathology at the level of muscle, nerve or the neuromuscular junction. The link between susceptibility to MH and neuromuscular disease is clear in some disease subtypes, such as central core disease. However, beyond these select subtypes, it remains unclear whether individuals with neuromuscular disease can truly be considered to be at elevated risk for MH reactions. Despite this, numerous anaesthesiologists avoid the use of volatile anaesthetics in this patient population. For paediatric patients, the use of volatile anaesthetics can be both practical for the administrator and psychosocially beneficial for the patient. Therefore, clarifying the relationship between neuromuscular diseases and MH will have clinical benefit for these patients.

**Objective:** To delineate the relationship between neuromuscular diseases and MH susceptibility using retrospective data.

**Methods:** Patients with neuromuscular disease were ascertained from two databases at the Hospital for Sick Children; a neurogenetics clinic database, and a neuropathology database. Individuals who met inclusion criteria had either a neuromuscular disease as confirmed by genetic testing, or a myopathic biopsy of skeletal muscle as determined by a pathologist. Patient anaesthetic charts were then reviewed for the presence of an MH event as defined by the MH clinical grading scale outlined by Larach *et al.* Individuals with an MH rank of 4/6 or greater were considered to be MH susceptible.

**Results:** From our cohort, we ascertained 105 subjects with genetically confirmed neuromuscular disease, and another 42 cases with abnormal biopsies. From these cases, 70 were exposed to a volatile anaesthetic, of which 3 had an MH reaction. Of the 3 MH positive individuals, 1 was identified to have a dystrophinopathy, while two were identified to possess separate subtypes of congenital myopathies.

**Conclusion:** Our study provides preliminary evidence that MHS may not be a feature of all neuromuscular diseases, given that many cases were MH reaction negative. Instead, MH may be specific to a limited number of neuromuscular disease subtypes.

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## **GANGLIOSIDE GD2 EXPRESSION IS MAINTAINED UPON RECURRENCE IN PATIENTS WITH OSTEOSARCOMA**

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Keywords: osteosarcoma, ganglioside GD2, immunotherapy, antibody

**Background:** Osteosarcoma is the most common primary malignant bone tumor in children and young adults. Ganglioside GD2 has been previously described to be found on the cell surface on a wide variety of tumors, including osteosarcomas. In this study, we examined whether GD-2 expression in osteosarcoma is maintained upon recurrence.

**Methods:** A tissue microarray was constructed from the tumors of 14 osteosarcoma patients using sections from the primary biopsy, from biopsies of metastases at diagnosis, the treated resection, and from biopsies at recurrence. These samples were subsequently assessed via immunohistochemistry.

**Results:** Forty-nine osteosarcoma samples were assessed for GD2 expression via immunohistochemistry, of which 47 samples were found to express GD2. In matched samples from patients, GD2 expression was found to persist in 100% of tissues taken at recurrence.

**Conclusion:** Ganglioside GD2 is expressed in a large proportion of osteosarcoma patients, and this expression continues even upon recurrence. These results suggest a phase 2 trial in children with recurrent osteosarcoma should provide an appropriate read out on the efficacy of an anti-GD2 antibody.

## EVALUATING ADULT CYSTIC FIBROSIS CARE IN BRITISH COLUMBIA: DISPARITIES IN ACCESS TO A MULTIDISCIPLINARY TREATMENT CENTRE

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Keywords: cystic fibrosis, quality improvement, rural health

**Introduction:** Cystic fibrosis (CF) is a genetic disorder that affects the lungs, gastrointestinal system and other organ systems. Due to the complex nature of CF care, guidelines recommend that individuals with CF be seen at a dedicated CF care centre on a quarterly basis. At these centres, a multidisciplinary team of doctors, nurses, dieticians, social workers, pharmacists, and physiotherapists assesses patients. Care delivered through CF centres is believed to be partly responsible for improvements in CF survival observed over the past two decades.

**Methods:** We performed a retrospective chart review of individuals registered with the St. Paul's Hospital Adult CF Clinic. Excluded were individuals whose primary CF care was provided by a different clinic, individuals without a confirmed diagnosis of CF, individuals who were either transplanted or deceased during the study period, and individuals who joined the clinic after the start of the study period. Subjects were assigned to one of four groups based on their estimated travel time to St. Paul's Hospital: 0-45 minutes (0-51st percentile), 45-150 minutes (51st to 67th percentile), 150-360 minutes (67th to 92nd percentile) and more than 360 minutes (>92nd percentile). We collected information pertaining to functional outcomes (e.g. FEV1 % predicted, BMI), access to CF specific care (e.g. routine clinic visits and diagnostic tests), and adherence to treatment recommendations.

**Results:** Half of all individuals with CF receiving care at the St. Paul's Hospital Adult CF Clinic commuted more than 45 minutes to the clinic. Demographic data and functional outcomes did not differ significantly between the four groups. Individuals who lived furthest (>150 min) from St. Paul's Hospital were less likely to attend the recommended four routine clinic visits annually (average of 2.1 visits vs. 3.8 visits,  $p < 0.05$ ).

**Conclusions:** Travel time is a substantial barrier for access to routine CF specific care. It is essential for individuals with CF across the province to remain connected with a dedicated CF care centre at all disease stages. Additional satellite outreach clinics and telehealth initiatives may help to detect earlier disease exacerbations and help slow disease progression.

## EXTERNAL VALIDITY OF CLINICAL TRIALS IN METASTATIC MELANOMA

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Keywords: melanoma, eligibility, vemurafenib, ipilimumab

**Background:** Results from clinical trials of novel therapeutics are not always generalized to real world patients (pts) by adhering to the studies' original inclusion and exclusion criteria, due in part to physician and pt discretion as well as institutional differences in treatment policies. We aimed to determine the pattern in which clinical trial findings are applied in a population-based setting and the treatment outcomes of these pts.

**Methods:** We focused on melanoma as several new therapies have been recently introduced. Pts with unresectable or metastatic disease from 2013 to 2014 and referred to any 1 of 5 cancer centers in British Columbia (BC) were reviewed. Based solely on eligibility criteria as described in registration trials of vemurafenib (Vem) and ipilimumab (Ipi), we classified pts into trial eligible (TE) and ineligible (TI) and those treated and untreated with these agents. During the study period, Vem was approved for 1st line use in BRAF mutant pts and Ipi was funded for 2nd line use.

**Results:** We identified 185 pts with known BRAF status for the Vem analysis and 114 pts for the Ipi analysis: median ages 64 and 59 years, 57% and 61% men, and 89% and 88% ECOG 0 to 1, respectively. For Vem, BRAF wild type was the most common reason for being TI. Of the remaining 86 BRAF mutant pts, 59 (69%) were considered TE of whom 51 (86%) received treatment. For Ipi, poor ECOG including rapidly progressive disease was a prevalent factor for being TI. In the Ipi cohort, 96 (84%) cases were deemed TE of whom 63 (66%) received therapy. Factors most frequently associated with non-treatment in both Vem and Ipi TE pts included comorbidities (41%), pt refusal (23%), and toxicities from prior treatments (14%). Compared to TI pts as well as those considered TE but did not receive treatment, pts deemed TE and received treatment achieved the best survival (HR 0.53, 95% CI 0.28-1.00 for Vem and HR 0.33, 95% CI 0.13-0.83 for Ipi, adjusted for age, gender and ECOG).

**Conclusions:** There was favorable uptake of new melanoma treatments, but a fair number of pts were considered TI. Non-use of novel agents in TE pts was infrequent and mainly due to physician factors, pt preferences, and concerns about toxicities, highlighting further opportunities to optimize real world effectiveness of these new therapies.

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## NEEDS ASSESSMENT OF BRITISH COLUMBIAN VETERINARIANS FOR RABIES PROGRAM CHANGES

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Keywords: Public Health, Zoonotic Disease, Rabies, Veterinarians

All mammals, including humans, are at risk of developing rabies if they are bitten or scratched by a rabid animal. Rabies policy has recently undergone major changes throughout Canada. In British Columbia (BC), Veterinarians now play a much larger role in rabies case management. The BC Center for Disease Control (BCCDC) conducted a needs assessment with BC veterinarians to facilitate rabies program changes. The purpose of the assessment was first to determine the knowledge needs of veterinarians with regards to rabies, second to determine the most effective guideline information delivery method to veterinarians, and third to build partnerships between veterinarians and the BCCDC. Twenty-four BC veterinarians participated in the survey (2% of the target population). Ninety-six percent of veterinarians reported having prior knowledge of rabies program changes. The majority of veterinarians (58%) said they had found out through notifications from the College of Veterinarians of BC. Four main concerns arose regarding the rabies program changes. Firstly, veterinarians were unclear of their new role; secondly, they were unsure who to report to; Thirdly, they were concerned about the legal implications of working more extensively with rabies; Finally, they wanted to know who was covering the cost of the new procedures. In terms of information delivery, the majority (88%) of veterinarians reported quick references, such as tables, flowcharts and cheat sheets as their preferred information source. Most veterinarians (71%) would prefer to access information online. The survey provided insight into the opinion of BC veterinarians about updated rabies policies. Although the prevalence of rabies in BC is low, it is a fatal disease. If an animal or a person is potentially exposed to rabies, precautions must be taken immediately to prevent infection and transmission. It is thus crucial to have clear guidelines for all health practitioners, including veterinarians. Guided by the results of this survey, the BCCDC is in the process of developing easy-to-follow rabies assessment and management guidelines for BC veterinarians.

## ENGINEERING GUT CELLS TO PRODUCE INSULIN AS DIABETES THERAPY

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Keywords: Diabetes mellitus, insulin, GIP, K-cells, transgene

Diabetes results from insufficient production of the hormone insulin from pancreatic-cells. A major goal of diabetes research is to find a source of endogenous insulin replacement. Our research group has developed an approach whereby insulin production is targeted to meal-responsive endocrine cells in the gut, called K-cells. These cells release glucose-dependent insulinotropic peptide (GIP) in proportion to the amount of glucose consumed. Mice harboring a transgene consisting of the insulin gene linked to the GIP promoter (GIP-INS) were protected from diabetes when K-cells were killed with the toxin streptocytocin. However, K-cells typically possess only one of two enzymes required for optimal processing of proinsulin to mature insulin. This is an impediment to the clinical translation of this approach since partially processed proinsulin has less biological activity than mature insulin. In an attempt to improve proinsulin processing in K-cells, we generated a new GIP-INS transgene (GIP-INSmut) with modified enzyme cleavage sites to enhance processing in K-cells.

We evaluated insulin release and processing differences between mouse K-cells expressing GIP-INS and GIP-INSmut transgenes. Isolated intestine of transgenic mice was preserved for analysis using immunohistochemistry, which involved incubation with various fluorescent-labelled antibodies. This revealed that GIP-INSmut K-cells tended to have more processed, mature insulin compared to GIP-INS K-cells. To facilitate characterization of insulin secretion from engineered K-cells, transgenic mice were crossed to mice with the fluorescent protein DsRed targeted to K-cells. Intestinal epithelium was removed from these double transgenic mice, dispersed to single cells, and K-cells were purified by fluorescence-activated cell sorting (FACS). The purified K-cells were then exposed to various secretagogues in a custom perfusion system and the flow-through media was collected for insulin assay. Preliminary analysis suggests that GIP-INSmut K-cells released more insulin than GIP-INS K-cells. Our findings indicate that the modified cleavage sites in the GIP-INSmut transgene can indeed improve proinsulin processing and supports the continued study of engineered endocrine cells in the gut as potential surrogates for insulin release.

## DATA VISUALIZATION OF DISEASE AND TREATMENT OUTCOMES: A CLINICAL DECISION SUPPORT TOOL

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Keywords: Cancer, Population Health, Data Visualization, Clinical Tool

**Background:** Some cancer patients present with an uncommon set of disease characteristics, making it difficult to compare their disease progression and treatment outcomes to published cases. However, with the increased electronic collection of demographic, disease, and outcomes data through health-data registries, it is possible to build simplistic data visualization tools which give clinicians and researchers the ability to examine trends in oncologic outcomes for specific sub-populations of interest.

**Methods:** Following institutional REB approval for a large multi-year cancer modeling initiative, personal, diagnostic, treatment, and outcomes data were extracted from British Columbia Cancer Agency Registries for individuals diagnosed with breast cancer between the years 2001 and 2005 (N=14,056). Disease status, vital status, and cause of death data elements, collected to the year 2012, were also acquired. A computer web-based data visualization dashboard was developed to query and display this data hosted within the study database. The platform was developed to facilitate comparison between patient cohorts based on one or more characteristics; the Log-Rank Test is used to compare the survival differences between the two patient cohorts.

**Results:** The platform functions as a query tool that enables physicians to compare separate cohorts of patients based on specified demographic, diagnostic, prognostic, and treatment data. The output includes Kaplan-Meier 10-year survival curves based on overall and disease-specific mortality data for each specified cohort. Additional visualization graphics are being added to improve the platform. Input from clinical oncologists has also been incorporated to design a user-friendly platform making this tool a useful aid in decision-making. For example, an ideal use of this clinical decision support tool would be during interdisciplinary oncology rounds, where treatment decisions are made for patients with challenging clinical profiles.

**Conclusions:** This platform serves as a proof-of-principal that data visualization platforms can be developed to contribute to clinical decision making. Its ability to estimate differences in survival for patients is limited in that outcomes are based on treatment regimens used in the 2000s, many of which are outdated. Future work will include direct connection to data registries in order to provide up-to-date outcomes comparisons.

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## DEFICIENT AUTOPHAGY DRIVES HEMATOPOIETIC STEM CELL DYSFUNCTION AND MYELOID LEUKEMIC PROLIFERATION

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Keywords: Autophagy, Hematopoietic Stem Cell, Hematopoiesis, Acute Myeloid Leukemia, Metabolism

Acute myeloid leukemia (AML) is a cancer of the myeloid lineage of white blood cells. It develops following oncogenic alterations to hematopoietic (meaning blood-cell forming) stem cells (HSCs) and progenitor cells (HSPCs) in the bone marrow. These changes result in the dysregulated proliferation of immature progenitors that interferes with blood cell formation. Understanding the mechanisms by which HSPCs are protected against damage and excessive division, as well as how these pathways are altered during leukemic progression, is vital for establishing effective therapies. We examined the importance of autophagy, a lysosomal degradation pathway and key method of cytoplasmic content removal, in both healthy and transformed (oncogene transduced) immature hematopoietic cells. Loss of autophagy following deletion of key gene *Atg5* resulted in increased HSC proliferation, leading to HSC exhaustion and bone marrow failure. Deletion of *Atg5* in an AML model resulted in increased proliferation under metabolic stress. Finally, primary AML cells displayed multiple markers of decreased autophagy. These data suggest a role for autophagy in preserving HSC function, partially through suppression of HSPC proliferation, and indicate that decreased autophagy may benefit AML cells. We postulate that modulation of autophagy could help maintain stem cell function, for example during transplantation, and aid AML therapy in a setting-specific manner.

## DOES PULSE DOSING OF METHYLPREDNISOLONE HAVE AN ACUTE EFFECT ON SERUM CREATININE CONCENTRATIONS?

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Keywords: methylprednisolone, corticosteroid, pulse therapy, serum creatinine

**Background:** Pulse intravenous (IV) methylprednisolone therapy for inflammation has been suggested to potentially cause an acute rise in serum creatinine (SCr), which can be misinterpreted clinically as worsening renal function. However, the relationship between pulse dosing and a rising SCr is not well-defined from current literature. Clarifying the acute effect of pulse methylprednisolone dosing on SCr will limit unnecessary diagnostic tests or alterations in concomitant drug therapy.

**Objective:** To determine whether the measured SCr rises within the 1-2 day period following the administration of methylprednisolone between 500-1000 mg IV daily for 2-4 consecutive days, as compared to the SCr prior to drug administration.

**Methods:** A retrospective chart review was conducted of patients at St. Paul's Hospital and Mount Saint Joseph Hospital between July 1, 2009 to July 1, 2013. Patients receiving methylprednisolone at the specified dose and duration were screened for eligibility. The exclusion criteria were established renal impairment (SCr > 110 µmol/L or estimated glomerular filtration rate < 50 mL/min prior to the first dose of methylprednisolone; shock requiring administration of vasoactive inotropes; dehydration (negative fluid balance > 3 L in between the pre- and post-methylprednisolone SCr measurements); receipt of dialysis or renal replacement therapy; or concomitant nephrotoxic medications (i.e., systemic aminoglycosides, IV acyclovir, or amphotericin B). The mean pre- and post- therapy SCr measurements were compared using a two-tailed paired t-test for normal distribution ( $p < 0.05$  for statistical significance).

**Results:** Overall, 57 patients were included in this chart review (mean age  $54 \pm 17$ ). Methylprednisolone was most commonly prescribed at a dose of 1000 mg (72%) for a duration of 3 days (54%). The mean SCr pre-therapy was  $68 \pm 21$  µmol/L and post-therapy was  $68 \pm 30$  µmol/L ( $p = 0.98$ ).

**Conclusion:** There is no apparent acute effect on SCr within the 1-2 day period following administration of methylprednisolone 500-1000 mg IV daily for 2-4 consecutive days, as compared to the SCr prior to drug therapy. Clinicians using pulse doses over such short duration do not need to be concerned with causing acute changes in SCr.

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## A PILOT PROJECT ON A PAPERLESS CURRICULUM USING TABLET COMPUTERS IN AN UNDERGRADUATE MEDICAL PROGRAM

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Keywords: Paperless, curriculum, undergraduate, preclinical

**Background:** Students in the UBC Faculty of Medicine MD Undergraduate Program receive paper copies of lecture notes and worksheets for problem-based learning (PBL) tutorials in their preclinical curriculum, while using an online database exclusively for other parts of the curriculum. Transitioning to a fully paperless curriculum may improve student experience and better prepare students for practice in the future electronic offices.

**Methods:** We offered the 1st and 2nd year medical students in the UBC Southern Medical Program a quality improvement pilot using tablet computers and a novel method for distributing electronic learning materials. At the conclusion of the pilot, feedback from students and tutors were solicited by a questionnaire. Performance on year-end exams was compared to other distributed sites receiving the same curriculum, paper-based.

**Results:** Over 80% of respondents preferred paperless to paper and nearly everyone found the tablet computers easy to use. Grades were similar from previous years and non-inferior to other paper-based sites.

**Discussion:** The results of this pilot suggest that a paperless curriculum is feasible and worth exploring, having no negative impact on exam performance with preference by most. Transitioning to a paperless curriculum may improve the student experience and offer corollary benefits such as priming students for electronic medical recordkeeping, in addition to cost-savings and easy updates without reprinting and distributing.

## **PATTERNS OF BRAIN METASTASIS IN EPITHELIAL GROWTH FACTOR RECEPTOR (EGFR) WILD-TYPE AND MUTATION POSITIVE NON SMALL CELL LUNG CANCER**

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Keywords: lung, cancer, brain, metastasis

**Background:** The management of lung cancer has advanced towards specifying treatment strategies to target specific histological subtypes and mutations. An area of development involves EGFR mutation positive NSCLC. Within this sub classification, two common mutations, an exon19 deletion and an exon21 mutation, have been shown to have different prognosis and response to systemic therapy. Brain metastases (BM) in NSCLC have been associated with a poor prognosis with median survival of about 6 months, however, this poor outcome is not observed in EGFR mutation positive disease. In this study, we propose to study radiological and patient characteristic patterns of individuals diagnosed with stage IV non-squamous NSCLC with BM.

**Methods:** A retrospective chart review was conducted of all patients referred for molecular testing to the BCCA between March 2010 and December 2012. Data was abstracted using the Outcome and Surveillance Integrated System (OaSIS) and patient charts. Data regarding patient characteristics and radiological features were collected and compared between patient groups.

**Results:** In this study, 430 patients were identified. There were 327 wild type (WT), 65 exon19 and 38 exon21 patients. Baseline characteristics for WT vs. exon 19 vs. exon 21: Asian 11% vs. 40% vs. 61% ( $p<0.001$ ) and non-smokers (13%, 66%, 71% ( $p<0.001$ )). The patterns of BM differed between the groups with number of BM 1/2-3/4-9/>10 lesions: WT 38%/30%/22%/10% vs. exon19 15%/26%/39%/20% vs. exon21 32%,18%,37%,13% ( $p=0.001$ ), cerebral edema yes/no/unable to assess: 90%/1%/9% vs. 80%/0%/20% vs. 71%/3%/12% ( $p=0.004$ ), and leptomeningeal disease yes/no/unable to assess: 4%/95%/1% vs. 12%/85%/3% vs. 8%/92%/0% ( $p=0.0.34$ ). Overall survival of the different groups was significantly different with WT 12.4m, exon19 22.1m and exon21 17.5m ( $p=0.006$ ).

**Conclusions:** The patient characteristics, radiological presentation of BM and median survival differs for individuals diagnosed with non-squamous NSCLC, depending on their EGFR status. Asians and non-smokers are more likely to have EGFR mutations. EGFR mutation positive patients are also more likely to have more diffuse BM and leptomeningeal disease, but have less cerebral edema. Those with EGFR mutations have better survival outcomes.

## PREVALENCE AND ETHNIC VARIATION OF PRE-AURICULAR SINUSES IN CHILDREN.

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Keywords: Pre-auricular sinus, congenital malformation, ethnicity, prevalence, pediatric

**Background:** Pre-auricular sinus describes a congenital ear malformation, sometimes requiring medical and/or surgical treatment. Limited prevalence data on pre-auricular sinuses exists from adult studies and anecdotal evidence suggests a potential ethnic variation, but this has not been specifically investigated. Additionally there is a lack of robust evidence to support a potential genetic basis for pre-auricular sinuses.

**Objective:** This study is the first to investigate the prevalence and ethnic variation of pre-auricular sinuses using pediatric population level data.

**Methods:** In this prospective cross-sectional study, we enrolled 1106 healthy volunteers aged under 18 years. Recruitment took place between June and September 2014 from high pedestrian traffic areas in the BC Children's Hospital. Subjects attending the hospital for issues related to pre-auricular sinuses were excluded. Participants were visually inspected for the presence of pre-auricular sinuses followed by a questionnaire (demographics, self-identified ethnicity, family history of pre-auricular sinuses, chronic medical conditions).

**Results:** Of 1106 participants enrolled (mean age=6.8, 592 males), we identified 26 children with a pre-auricular sinus (2.4%), of which 7 were bilateral. Using Chi-Square statistics, a statistically significant ethnic variation was identified ( $p < 0.001$ ), with Asians having the highest prevalence (6.6%), followed by African Americans (4.5%), Middle Eastern (3.4%), First Nations (2.0%) and Caucasians (1.2%). No pre-auricular sinuses were found in South Asians ( $n=124$ ) or Latin Americans ( $n=18$ ). Participants with a positive family history had a higher chance of having a pre-auricular sinus (Odds Ratio [OR]=16.7, 95% Confidence Interval [CI] 7.3-38.5,  $p < 0.001$ ). There was also a stronger association between positive family history and bilateral pre-auricular sinuses (OR=26.5, 95% CI: 5.8-121.7,  $p < 0.001$ ) compared to unilateral (OR=12.2, 95% CI: 4.6-32.5,  $p < 0.001$ ).

**Conclusions:** The prevalence of pre-auricular sinuses was 2.4% in this pediatric population, whose ethnic diversity was found to be representative of the community. A significant ethnic variation existed and the association between family history and pre-auricular sinuses suggested a potential genetic basis, particularly with the bilateral form.

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## WHAT IS THE BEST WAY TO TRACK SURGICAL COMPLICATIONS? COMPARING THE NATIONAL SURGICAL QUALITY IMPROVEMENT PROJECT VERSUS TRADITIONAL MORBIDITY AND MORTALITY ROUNDS.

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Keywords: Pediatric plastic surgery, ACS NSQIP, M&M rounds, quality improvement.

**Purpose:** Morbidity and Mortality (M&M) rounds have played a traditional role in tracking complications. In recent years, the American College of Surgeons (ACS) National Surgical Quality Improvement Project (NSQIP) Pediatrics (or ACS NSQIP-P) has gained popularity as a risk-adjusted means to address quality assurance/improvement. Herein, we report an analysis of the two methodologies for plastic surgery to determine the best way to manage quality.

**Methods:** With IRB approval, ACS NSQIP-P and M&M data were extracted for 2012 and 2013 at a quaternary care institution. We analyzed raw complication rates and an equivalent comparison of rates after removing ACS NSQIP-P-ineligible cases. We determined the concordance and discordance rate of both methodologies and classified complications by severity and type. Statistical analysis was performed on all samples.

**Results:** 1261 plastic surgery procedures were performed in the study period. Only 51.4% of cases were ACS NSQIP-P-eligible. The overall complication rates of ACS NSQIP-P (6.62%) and M&M (6.11%) were similar ( $p = 0.662$ ). Comparing the two systems for ACS NSQIP-P-eligible cases also yielded a similar rate (6.62% vs. 5.71%,  $p = 0.503$ ). Although ACS NSQIP and M&M track different types of occurrences, the concordance rate for M&M and ACS NSQIP-P was 35.1% and 32.5% respectively and consisted mostly of major complications.

**Conclusions:** ACS NSQIP-P is able to accurately track complications at a similar rate to M&M, although it samples only half of all procedures. Differences in definitions and purpose exist for each system, leading to low concordance rates. Although both systems offer value, both also have limitations. Due to the rigor of ACS NSQIP-P, we recommend expansion of ACS NSQIP-P to include currently excluded cases and an extension of the ACS NSQIP-P study interval.

## **PREDICTORS OF LOW APGAR SCORE FOLLOWING EMERGENCY CESAREAN OBSTETRICAL CARE AT A REGIONAL REFERRAL HOSPITAL IN RURAL UGANDA.**

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Keywords: Obstetric, Cesarean, Uganda, Emergency, APGAR

**Background:** Regional initiatives have been implemented to improve maternal and neonatal delivery outcomes in Uganda. Few studies have analyzed obstetric surgical care and potential predictors of poor outcomes. This study analyzed demographic, socioeconomic and surgical data to identify predictors of low APGAR scores and poor outcomes.

**Purpose:** To determine predictors of low APGAR score following emergency cesarean surgical care in a Ugandan regional referral hospital.

**Methods:** Prospective data collected between June 23–July 15, 2014. All obstetric emergencies requiring cesarean obstetrical care at Soroti Hospital were included. Multiparous women were excluded. Chi-squared test used for categorical predictors of low APGAR score. T-test used for continuous predictors, comparing mean value of risk factor between case and controls. Logistic regression analysis used to assess interactions and joint effects of predictors.

**Results:** Patients (n=64) were recruited to the study with mean age of 25.8yrs (SD 6.53). Patients were separated based on low APGAR (<7; n=9) and normal APGAR (7-10; n=55) scores following emergency cesarean obstetrical care. Low APGAR scores (<7) were found to be associated with mechanism of transport (p-value=0.029), distance travelled (p-value<0.01) and residence (p-value=0.019). No relationship was found between low APGAR scores and obstetrical procedure length, indication, delay or use of general anesthesia.

**Conclusions:** Women living in rural Uganda may face an increased risk for poor neonatal outcomes following obstetrical care. Our study suggests that rural residence has a higher probability for lower APGAR scores following surgical care compared to urban residence beyond time and distance factors.