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ABSTRACT BOOKLET

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Department of Psychiatry

Dr. Evelyn Stewart is an Associate Professor in the Department of Psychiatry, University of British Columbia and is the founding director of the Pediatric Obsessive-Compulsive Disorder Clinic and Research Program at B.C. Children and Women's Health Centre. She is a clinical, genetic and neuroscience researcher, as well as a child and adult psychiatrist. Her research focuses on genomic, phenotypic, and treatment aspects of childhood-onset neuropsychiatric disorders, such as obsessive-compulsive disorder (OCD). Dr. Stewart has authored over 50 original papers, reviews and chapters on genetic, clinical, and treatment aspects of OCD, Tourette's Disorder, and related illnesses. She sits on the Scientific Advisory Board of the International OCD Foundation, on the Medical Advisory Board of the Tourette Syndrome Association and is Co-director of the International OCD Foundation Genetics Collaborative.

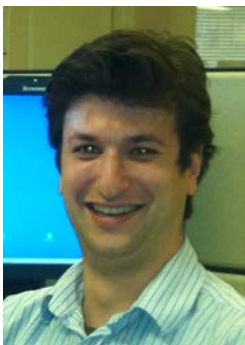


Dr. Michael Fernando
Resident Physician in
Family Medicine

Dr. Michael Fernando attained his Medical Degree (MBBS) and Bachelors Degree (BSc) in Neurosciences from Queen Mary, University of London, England. He also holds a Masters in Public Health (MPH) from Imperial College London.

Dr. Fernando did his Foundation Medical Training at Barts and the London NHS trust and two years of Specialty Training at Guys' and St Thomas' NHS Foundation Trust in Emergency Medicine. He has worked as an Emergency Physician at hospitals throughout southern England. He is currently completing his Canadian Residency in Family Medicine at the University of British Columbia in Fort St John.

During his training and practice, Michael has undertaken research projects in a variety of domains including cell biology, clinical medicine and public health. He is currently undertaking a qualitative research project as part of his residency. Research also forms an integral part of his work with his start up medical design company Fernando Kerr Design Inc.



Dr. Brandon Sheffield
Resident Physician in
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Dr. Sheffield started his post-secondary studies in genetics at the University of Western Ontario. While an undergraduate student, he worked part time in a Drosophila behavioural genetics laboratory at the University of Toronto Mississauga. While still interested in genetics and research, Dr. Sheffield switched his focus to medicine, obtaining his MD from the University of Toronto in 2011. Currently, Dr. Sheffield is midway through his third year of residency in the Anatomical Pathology program at the University of British Columbia. He has been actively involved in research at both the clinical and basic science levels. His current research is focused on cancer biology, specifically investigating biomarkers, their use in diagnosis, prognosis and prediction of therapeutic outcomes. In the future, Dr. Sheffield hopes to practice clinical anatomical pathology, actively participate in research, and use his expertise in molecular biology to improve patient care.

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USE-DEPENDENT ACTIVATION OF KV1.2 CHANNEL COMPLEXES

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Keywords: Potassium channel, epilepsy, voltage-dependent gating, use-dependent gating

In excitable cells, ion channels are challenged by repetitive stimuli. Their responses to patterned stimuli shape cellular behavior by regulating the duration and termination of bursts of action potentials. We have investigated the behavior of voltage-gated potassium (Kv) channels subjected to repetitive stimuli, with a particular focus on the delayed rectifier Kv1.2. In this study, we demonstrate that this property enables Kv1.2 channels to exhibit use-dependent activation, with trains of brief depolarizations causing dramatic increases in elicited current. This property arises from stabilization of the open state, reflecting both a shift in channel activation to more hyperpolarized potentials and an acceleration of opening kinetics. Importantly, Kv subunits can assemble into heteromeric channels, generating diversity of function and sensitivity to signaling mechanisms. We demonstrate that other Kv1 channel types do not exhibit use-dependent activation, but this property is conferred when they co-assemble with Kv1.2. Our observations suggest a unique role for Kv1.2 subunits as suppressive components of heteromeric Kv1 channels, highlighting a mechanism that may influence channel function during bursts of electrical activity in some cells. These findings illustrate that the functional output of heteromeric Kv channel complexes can integrate the signaling sensitivities of diverse subunits.

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CANDIDATE GENES ASSOCIATED WITH PRIMARY RESISTANCE TO PANITUMUMAB IN A PHASE II STUDY OF PATIENTS WITH KRAS WILD-TYPE METASTATIC COLORECTAL CANCER

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Keywords: Colorectal cancer, gene expression, cancer resistance

Panitumumab (Pmab) therapy targeting Epidermal Growth Factor Receptor results in improved progression-free survival in previously treated KRAS wild-type metastatic colorectal cancer (mCRC) patients, but not all patients benefit. We sought to identify gene expression patterns associated with resistance to Pmab in these patients. Gene expression profiles of over 100 literature-reported genes associated with BRAF mutation and cetuximab response in mCRC were acquired for primary tumour samples and matched metastatic tumour samples, when available, using the Nanostring nCounter® system. Data was normalized with a large public CRC expression database. Two-class Significance Analysis of Microarrays compared expression profiles of tumours with a best response of progressive disease (PD) to those with stable disease (SD) or partial response (PR) to Pmab. Genes identified with a false discovery rate of 0% were considered highly associated with Pmab resistance and are being used in an ongoing project to develop a predictive gene signature for resistance in mCRC patients. Finally, immunohistochemistry of the top ranked gene associated with resistance was performed and scored by a pathologist. Best response to Pmab therapy among 37 enrolled patients was PD in 12, SD in 17, and PR in 8. Preliminary analysis of the expression data indicated that matched primary and metastatic tumour samples were closely related, so subsequent analyses used metastatic tumour samples in place of primary, when available. Gene expression analysis identified nine highly ranked genes, with a false discovery rate of 0%, associated with Pmab resistance. We developed an eight gene weighted signature with a statistically significant association with Pmab resistance (p -value=0.041). Additionally, immunohistochemical analysis of the top candidate gene, with scores grouped binomially as zero/underexpression or overexpression, showed a significant association between protein expression and Pmab response (P -value=0.014). In conclusion, we identified a gene expression signature that is highly associated with Pmab resistance in previously treated mCRC patients. Future validation studies will be performed with hopes that this signature could be performed in a clinical oncology setting.

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ASSESSING EARLY CHILDHOOD NUTRITIONAL PRACTICES IN RURAL UGANDA

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Keywords: Nutrition, Health Literacy, Global Health, Community-based Education

Purpose of Study: According to the 2011 Uganda Nutrition Action Plan, 40% of children under 5 are malnourished. Local healthcare leaders identified childhood malnutrition as an ongoing problem in the rural village of Nakaseke, Uganda. This study was aimed at assessing early childhood nutritional practices in Nakaseke, and identifying barriers to healthy nutritional practices in order to create sustainable interventions.

Methods: Data was collected using 7 focus groups with a total of 46 participants including community health workers, village health teams, and community members. The interviews were conducted in Luganda using a translator, audio recorded, transcribed, and analyzed for common themes.

Summary of results: General poverty and lack of knowledge were identified as two major barriers to healthy nutritional practices in the community. Poverty lead to an inability to afford certain nutrition-rich foods and was compounded by lack of family planning resulting in large families. Additionally, early cessation of breastfeeding was common among working mothers, who were often away from their children. A general lack of knowledge contributed to the inappropriate cessation of breastfeeding and the improper introduction of complementary foods, and was due in part to a lack of education on nutrition. Focus group discussion generated ideas to improve nutritional practices included increasing accessibility to nutrition seminars, as well as the use of drummer groups to generate interest and educate the community.

Conclusion: This study identified a continued need for education on nutrition among the community. With a better understanding of current practices and beliefs, we can now collaborate with the community to create sustainable interventions to address their specific needs while taking into account their financial restraints. This represents a first step to improve nutritional practices in the community leading to better childhood developmental and health outcomes.

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SUBSTANCE DEPENDENCE AND HEALTH SERVICE USE AMONG HOMELESS ADULTS WITH MENTAL DISORDERS IN A HOUSING FIRST TRIAL

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Keywords: substance dependence, homelessness, health service use, mental illness, Housing First

Objective: To examine the relationship between substance dependence and health service use among adults who were homeless with mental disorders two years after randomization to Housing First (HF) and different psychosocial interventions or “Treatment as Usual” (no additional housing or support).

Design: The Vancouver At Home study consists of two randomized controlled trials (RCT) addressing high and moderate need mental illness among homeless. Substance dependence was determined at baseline using the MINI 6.0. To assess health service use, we reviewed the number of emergency department (ED) visits and the number of hospital admissions based on administrative data for 6 urban hospitals.

Statistics: Negative binomial regression modeling was used to test the independent association between substance dependence and health service use, adjusting for HF intervention, age, gender, ethnicity, education, length of lifetime homelessness, mental disorders, chronic health conditions, and other variables that were selected a priori to be potentially associated with use of health services.

Sample: 497 homeless adults with mental disorders were recruited, of whom 58% (N=288) met criteria for substance dependence. We included 381 participants in our analyses who had at least one year of follow-up and had a personal health number that could be linked to comprehensive administrative data from all regional hospitals. Of this group, 59% (N=223) met criteria for substance dependence.

Results: We found no independent association between substance dependence and health service use in the form of ED visits and hospital admissions (RR=0.85; 95% CI: 0.62-1.17 and RR=1.21; 95% CI: 0.83-1.77, respectively). The most responsible diagnosis for hospital admission was one of schizoaffective disorder, schizophrenia-related disorder, or bipolar affective disorder in 48% (N=263) of hospital admissions. Fifteen percent (N=84) of hospital admissions listed substance dependence as the most responsible diagnosis.

Conclusions: Substance dependence was not independently associated with health service use in homeless adults with mental disorders participating in a HF trial. Hospital admissions among this cohort were primarily associated with severe mental disorder diagnoses.

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FUNCTIONAL ANALYSIS OF DEATH-ASSOCIATED PROTEIN 5 (DAP5) N- AND C-TERMINAL CLEAVAGE PRODUCTS DURING COXSACKIEVIRUS B3 INFECTION

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Keywords: coxsackievirus, myocarditis, internal ribosome entry site, death-associated protein 5

Background: Coxsackievirus B3 (CVB3) is a major cause of viral myocarditis. The CVB3 genome is positive, single-stranded RNA that is translated using an internal ribosome entry site (IRES)-mediated mechanism rather than cap-dependent translation. Upon infection, CVB3 shuts down global cap-dependent translation and promotes IRES-mediated translation. It was previously determined that death-associated protein 5 (DAP5), an IRES-translation initiation factor and homolog of eukaryotic translation initiation factor 4G (eIF4G), is cleaved by a viral protease into 45 kDa N-terminal and 52 kDa C-terminal truncated forms. The function and cellular distribution of these two cleavage products remains unknown. The experimental aim is two-fold: to determine the cellular localization of N- and C-terminal truncated forms after cleavage; and to determine the effect of cleavage products on the translation of IRES-containing target genes.

Hypothesis: Cleavage of DAP5 by viral 2A protease will alter its distribution in the cell and function on translation initiation of IRES-containing mRNAs.

Methods: NUCLEAR EXTRACTION: HeLa cells were transfected with Flag-tagged full-length DAP5, Flag-tagged N-terminal, or HA-tagged C-terminal gene constructs for 48 hours. Nuclear and cytoplasmic proteins were isolated from cell lysates. The proteins were analyzed by western blot using anti-Flag and anti-HA antibodies. CONFOCAL: Confocal microscopy was used to visualize the cellular localization of DAP5 and its cleavage products after immunocytochemistry staining.

Results: NUCLEAR EXTRACTION: Nuclear extraction results demonstrate that full-length DAP5 is mainly localized to the cytoplasm; N-terminal DAP5 is present in similar levels in both the nucleus and cytoplasm; C-terminal DAP5 is largely localized to the cytoplasm. CONFOCAL: Confocal imaging confirmed the data from western blot analysis.

Conclusion: The cleavage products of DAP5 show differing localization compared to full-length DAP5. Particularly, N-terminal DAP5 shows translocation to the nucleus. To determine the effect of the cleavage products on target gene translation, bicistronic luciferase reporter assays will be performed using plasmids containing the IRES of DAP5 translational target genes after co-transfection with a plasmid overexpressing either the N- or C-terminal fragments. Finally, the experiments will be conducted in human cardiomyocytes.

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CHRONIC BLOCKADE OF EXTRASYNAPTIC N-METHYL-D-ASPARTATE RECEPTORS AMELIORATES SYNAPTIC DYSFUNCTION AND PRO-DEATH SIGNALING IN HUNTINGTON DISEASE TRANSGENIC MICE

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Keywords: Huntington disease, NMDA Receptor, Calcium signaling, Striatum, Memantine

In the YAC128 mouse model of Huntington disease (HD), elevated extrasynaptic N-methyl-D-aspartate receptor (Ex-NMDAR) expression contributes to the onset of striatal dysfunction and atrophy. A shift in the balance of synaptic-extrasynaptic NMDAR signaling and localization is paralleled by early stage dysregulation of intracellular calcium signaling pathways that couple to pro-death cascades, including activation of the protease calpain and the p38 mitogen activated protein kinase (MAPK). However, whether aberrant calcium signaling is a consequence of elevated Ex-NMDAR expression in HD is unknown. Here, we aimed to identify calcium-dependent pathways downstream of Ex-NMDARs in HD. Chronic (2-month) treatment of YAC128 and wildtype mice with memantine (1 and 10mg/kg/d), which at a low dose selectively blocks Ex-NMDARs, reduced striatal Ex-NMDAR expression and current in 4-month old YAC128 mice without altering synaptic NMDAR levels. In contrast, calpain activity was not affected by memantine treatment, and was elevated in untreated YAC128 mice at 1.5 months but not 4 months of age. In YAC128 mice, memantine at 1mg/kg/d rescued shut-off of the cAMP response element binding protein (CREB), while both doses suppressed p38 MAPK activation to wildtype levels. Taken together, our results indicate that Ex-NMDAR activity perpetuates increased extrasynaptic NMDAR expression and drives dysregulated p38 MAPK and CREB signaling in YAC128 mice. Elucidation of the pathways downstream of Ex-NMDARs in HD could help provide novel therapeutic targets for this disease.

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THE UBC STEM CELL CLUB: ENGAGING UNIVERSITY STUDENTS TO BECOME STEM CELL DONORS

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Keywords: Stem Cell, Bone Marrow, Donor Recruitment, University Students

Background: Many patients with blood diseases require a stem-cell transplant as part of their treatment. These patients need to find a donor that is a genetic match, and they frequently rely on unrelated donors. Canada's stem-cell donor database is used to match potential donors to patients in need. Individuals age 17-35 can register to join this database online or at stem-cell drives, where they provide consent and swab their cheeks to provide a tissue sample. It is challenging to secure a match for a stem cell transplant; currently, over 1000 Canadians cannot find a match.

Patients are more likely to match to a donor in their own ethnic group. Additionally, males are the preferred donors, as female donors increase the risk of the recipients developing chronic graft-versus-host disease. However, males under age 35 only represent 12% of the current Canadian donor-database (5% ethnic males).

The UBC Stem Cell Club was founded two years ago, aiming to increase membership in the stem-cell donor-database and address the need for ethnically-diverse male registrants. We operate at all four distributed sites of the UBC medical program. Our club is a community partner of OneMatch: we are certified to run drives independently. We aim to recruit over 1500 donors each year and to target the most-needed demographics: ethnically-diverse males under age 35.

Methods: We run stem-cell drives targeting ethnically diverse and male university students. Prior to the drives, all volunteers complete training emphasizing our target demographics. Results were compiled from post-event reports.

Results: We have coordinated 18 stem-cell drives (15 at university campuses), and recruited 2080 potential stem-cell donors. Collectively, our campus drives in Metro Vancouver, Victoria, and Kelowna have signed up 1180, 434, and 87 registrants respectively. From November 2012 – November 2013, 75.9% of the 1060 registrants recruited at our university drives were male, and 100% were under 35. The vast majority of recruited registrants were 18-25 years old.

Conclusion: The UBC Stem Cell Club recruits students in BC to become stem-cell donors. Our drives improve the quantity and quality of membership on Canada's stem-cell donor database.

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CHOICE OF SMOKING CESSATION COUNSELLING VIA PHONE, TEXT, OR EMAIL IN EMERGENCY DEPARTMENT PATIENTS

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Keywords: Health Promotion, Primary Prevention, and Smoking Cessation

Introduction: Tobacco smoke is the leading cause of preventable deaths in Canada. In British Columbia, QuitNow Services is a government-funded smoking-cessation service that offers smoking-cessation counseling via phone, text, or email. At our tertiary care academic Emergency Department (ED), approximately 60% of smokers accept referral to our provincial smoking cessation service. However, it is unclear whether certain patient factors affect patient choice of phone, text, or email. In this study, we seek to determine whether age, gender, or motivation to quit affect a patient's choice of service modality. These results will help refine our smoking cessation counseling services.

Methods: All adults ≥ 18 years of age who had used tobacco within the last 30 days prior to their ED visit and who accepted referral to QuitNow Services from November 2011 to February 2013 as part of a randomized controlled trial indicated their preference of receiving smoking-cessation counseling via phone, text, or email. We performed chi-squared tests of independence to determine if patient gender or motivation to quit were associated with service modality selection. A one-way ANOVA was used to compare the mean age of patients in each group.

Results: During the study period, 368 patients accepted a referral to QuitNow Services and selected one service modality. The average age of these patients was 41.7 years and 67% were male. 78% of all patients were in the contemplation or preparation stages of change. 44% chose phone, 17% chose text, and 40% chose email services.

There was a significant association between age and choice of service modality. The average age for patients preferring text services (mean=33.6 years) was significantly lower than both the email (mean=41.3 years) and phone (mean=45.1 years) groups ($p < 0.001$). Gender and stage of change were not associated with choice of service modality.

Conclusions: Over 80% of ED smokers who accepted a referral to QuitNow Services chose the phone or email modality. The lesser chosen text referral modality was more popular with younger patients. Further research is needed to refine smoking cessation strategies: counseling services that rely on texting should be aware that they may attract a younger population.

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FEASIBILITY OF USING SUNLIGHT EXPOSURE TO OBTAIN THE RECOMMENDED LEVEL OF VITAMIN D IN CANADA

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Keywords: Vitamin D, sunlight exposure, ultraviolet radiation, Canada

Deficiencies of vitamin D have been linked with osteoporosis, breast cancer, depression, and cardiovascular disease - emphasizing the importance of maintaining adequate levels of this hormone in the body. This study aims to assess the feasibility of just using sunlight exposure in Canada to meet the daily recommended level of vitamin D given differences in average ultraviolet radiation (UVR) levels, skin colour, amount of skin exposed, and adherence to sun protection guidelines. Ultraviolet index (UVI) data for 13 Canadian sites from the early 1990s to the early 2000s was obtained from Environment Canada. Using Holick's rule, sun exposure times required to synthesize 1000 IU of vitamin D for type II and type V skinned individuals exposing either 1/4th or 1/8th of their body surface area to the sun were calculated for each hour of the year. These times were put into tabular format and classified according to whether the UVI was ≥ 3 (when sun protection guidelines are advised) or < 3 and whether the required sun exposure time was ≤ 30 minutes, 31-60 minutes, or > 60 minutes.

It was found that during the fall and winter months and in sites located more north, UVR levels are too low for it to be possible for individuals to use sun exposure alone to obtain enough vitamin D within one time period. This holds true even for fair skinned individuals exposing 1/4th of their skin surface area, who were generally found to require the shortest exposure times. With a reduction in body surface area exposed, required exposure times became longer. For darker skinned individuals, it can be difficult even in the summer to find opportunities outside of those covered by sun protection guidelines to use sunlight to obtain the recommended vitamin D doses. This study stresses that while sun exposure is an important source of vitamin D, Canadians should look to other safe sources, such as supplements and vitamin D rich foods, to meet the body's vitamin D requirements year-round.

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OUTCOMES OF SCLEROTHERAPY FOR THE TREATMENT OF VENOUS VASCULAR MALFORMATIONS

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Keywords: chart review, plastic surgery, sclerotherapy, vascular malformation

Background: Venous vascular malformations (VMs) are the second most common vascular anomaly, with a prevalence of approximately 1.5% in the general population. VMs are congenital, low-flow lesions which grow in proportion to the patient and do not spontaneously involute. The natural history of these lesions is degenerative. The preferred treatment of VMs is sclerotherapy, commonly utilizing detergents or ethanol. This study reviews the outcomes and complications of sclerotherapy for the treatment of VMs in patients managed by the Vascular Anomalies Clinic at BC Children's Hospital.

Methods: A 10 year retrospective chart review with minimum 2 year follow-up was conducted for patients with VMs who presented to the Vascular Anomalies Clinic at British Columbia Children's Hospital (BCCH) since May 1, 2001. Data collected included demographic data, VM characteristics, sclerotherapy treatment details, outcomes, re-expansion rates, and follow-up course.

Results: Of the 65 separate lesions examined in this study, the most common location of the VM was the head and neck (48%) and the most common presenting complaint was swelling or the presence of a mass (85%). VMs were categorized as either complex or simple based on the extent and invasiveness of the lesion; complex VMs were treated with fluoroscopic guidance and simple VMs were treated as minor surgery. Simple VMs were more likely to present on the head and neck ($p < 0.01$) and were more likely to be treated for cosmetic purposes ($p < 0.01$). Complex VMs were more likely to present symptomatically ($p < 0.01$). The complication rates for the treatment of complex and simple VMs were 29% and 9% per procedure, respectively ($p < 0.01$). The majority of lesions treated had a successful treatment outcome with no complications, for both complex (52%) and simple (81%) VMs.

Conclusions: This study demonstrated that both simple and complex VMs have been successfully treated with sclerotherapy at BCCH. Furthermore, patients with simple VMs can attain the benefits of sclerotherapy as minor surgery while avoiding the anesthetic and radiation dose typically associated with treatment in the interventional radiology suite.

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A NOVEL WAY OF DETECTING INTRATHECAL BACLOFEN WITHDRAWAL IN POST-OPERATIVE PATIENTS: A PILOT STUDY

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Keywords: Baclofen, substance withdrawal syndrome, postoperative care

Background: Intrathecal baclofen (ITB) is an effective long-term therapy for patients with spasticity resulting from central nervous system insults. The drug is administered through a pump placed subcutaneously in the abdominal wall with an indwelling spinal catheter. However, issues with the ITB pump can arise. If catheter flow is inadvertently disrupted during a surgical procedure near the spine, drug delivery may be interrupted and cause ITB withdrawal syndrome, a life-threatening complication if not diagnosed and treated early. However, recognition is difficult because the pharmacopathology of abrupt ITB withdrawal can mimic malignant hyperthermia, sepsis, or the normal post-operative course. No screening tool currently exists and there is a need to improve the detection of ITB withdrawal in patients. **Objective:** To create and test a screening tool for ITB withdrawal that is convenient and usable for a broad range of healthcare providers.

Methods: We consulted the literature and clinicians with expertise in ITB withdrawal syndrome. After compiling this knowledge into a scorecard, we achieved consensus from clinicians. Once IRB approval was obtained, we tested the tool on a retrospective cohort of 33 children with increased risk of ITB withdrawal. The median age was 14 years (range 8 to 21) at the time of surgery, and three (9.1%) had confirmed ITB withdrawal.

Results: The Intrathecal Baclofen Withdrawal Scorecard includes the major signs of ITB withdrawal, including pruritis, hypotension or hypertension, tachycardia, hyperthermia, agitation, hallucinations, insomnia, clonus, and seizures. The pilot scorecard had 100% sensitivity, 82% specificity, 33.3% positive predictive value, and 100% negative predictive value.

Conclusions: We developed a convenient and easy-to-use screening tool that may improve the detection of ITB withdrawal in patients, especially when used by providers with minimal experience in diagnosing this condition. We demonstrated the feasibility of this tool and will further evaluate it in a prospective study.

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EVALUATION OF INTERVENTIONS AIMED AT REDUCING STIGMA AND SOCIAL DISTANCE IN HIGH SCHOOL STUDENTS: COMPARING EFFICACY OF MENTAL HEALTH AND ILLNESS WORKSHOPS BETWEEN TWO AGE GROUPS

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Keywords: Stigma reduction, Adolescent mental health, In-school interventions

Adolescence is a time period when the majority of adult psychiatric illnesses have their roots, and when ideas about mental health are refined and become increasingly entrenched. There is real potential for adolescents to develop hurtful and discriminating attitudes about psychiatric illness and those who suffer from it, due to the extensive misinformation transfer amongst this population. Educational outreach interventions are proven to decrease stigma and thereby barriers to health care access, but timing of when to best administer these interventions has not been clearly elucidated. Grade 8 and 10 students participated in interactive workshops across Vancouver, BC that broadly introduced mental health, provided information on common psychiatric illnesses, and offered resources and guidance regarding how to seek help. 389 student responses were measured by identical pre- and post-intervention surveys containing 25 questions that were rated using a 5-point Likert scale. From this data, we determined the ideal target age group for these interventions. Higher post-intervention scores reflected positive gains in attitudes towards (section A), or willingness to interact with (section B) peers who have psychiatric illness. The final results are still being analyzed, but preliminary figures show no significant difference in gains in either section between the two groups (grade 8: +0.36 and +0.50 points vs grade 10: +0.39 and +0.59 points). However, measured baseline and post-intervention absolute scores were both lower in the grade 10 group despite similar post-intervention gains, suggesting earlier interventions may be more effective in preventing youth from accumulating negative beliefs and attitudes over time. This study's positive results can be extrapolated on a larger scale to support implementation of early programming in a Canada-wide mental health education model. With this approach, we can decrease stigma in high schools by establishing the importance of mental health on one's general well-being, and correct damaging misconceptions about those who suffer from mental illness.

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EVALUATION OF SURGICAL OUTCOMES OF PEDIATRIC RENAL TRANSPLANTS

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Keywords: Renal Transplant, Pediatric, Surgical outcomes, NSQIP

Background: BC Children's Hospital is the first and only Canadian pediatric hospital participating in the Pediatric National Surgical Quality Improvement Program (NSQIP-P) created by the American College of Surgeons. The NSQIP-P program provides risk-adjusted outcomes data that is used to enable targeted surgical quality improvement initiatives in participating hospitals. Solid organ transplants are currently excluded from the surgeries evaluated, thus limiting the applicability of results to all aspects of surgical care.

Purpose: Our aim was to evaluate surgical outcomes of renal transplants and compare these with results from other NSQIP-P risk-adjusted rates at our facility.

Methods: We performed a retrospective chart review of all renal transplants performed at BC Children's Hospital between 2003-2013. At present, 70 charts have been reviewed, with an additional 10 charts pending. Data collection was based on a modified NSQIP-P framework with an extended post-operative follow-up period of 1 year. Study outcomes were determined based on NSQIP-P variable definitions. Pre-operative data included patient demographics, etiology of renal failure, prior dialysis, co-morbid conditions, and medication use. Intra-operative data consisted of procedure duration, complications, vascular anastomotic time and type of donor graft. Post-operative data was collected over a 30-day follow-up as per the NSQIP-P model, consisting of central nervous system, respiratory, cardiac and renal events. Other variables were included based upon previous studies done on outcomes for renal transplant patients. These consisted of ureteric and vascular complications, incidence of lymphocele, acute rejection, delayed graft function and need for dialysis, and were collected over a 1-year follow-up period.

Results: As data collection and analysis is ongoing, preliminary findings suggest an increased incidence of surgical site infections, urinary tract infections, and need for transfusion in renal transplant patients compared to NSQIP-P overall.

Conclusion: Given that NSQIP-P currently excludes solid organ transplants from their surgical evaluation program, it is expected that this study will develop baseline adverse event rates and provide a framework for planning future interventions. It is hoped this study will prompt similar reviews in other centres.

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ETHNIC DIFFERENCES IN THE LIKELIHOOD OF LIVING KIDNEY DONATION AMONG REGISTERED POTENTIAL DONORS

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Keywords: kidney donation, renal transplant, ethnic, living donor

Tonelli et al (KI, 2007) have reported that South Asian and East Asian Canadian ESRD patients are 58% and 73% less likely to receive a living donor kidney transplant, but the reasons for lower living donation among South and East Asian Canadians remains unclear. We identified all n=2,368 individuals who registered as directed potential living kidney donors within our program between 2000-2008 and compared their likelihood of proceeding with kidney donation and reasons for non-donation as a function of ethnicity. All registered potential donors were stratified into the following 3 groups: South Asians (n=225,9%); East Asians (n=156, 7%); Other (n=1987,24%).

Results: Compared to non-Asians, South and East Asian potential donors were younger, included more females, and were more likely to be related to their intended recipients (p<0.001). South Asians were the least likely to proceed to donation (crude donor conversion ratio of 10%), while East Asians were the most likely (19%), followed by non-Asians (17%), (p<0.001). Compared to non-Asians, more South and East Asians were excluded from donating due to ABO/HLA incompatibility, whereas fewer South Asians were found medically or psychologically unsuitable to donate (Table).

Conclusion: South Asians who registered as potential living donors were half as likely to actually donate compared to East Asians and non-Asians. ABO and HLA incompatibility rather than medical suitability appears to be a greater barrier for both South and East Asians, suggesting that initiatives to promote kidney paired donation or ABO incompatible donation may be especially effective in increasing donation in these populations.

Reasons for non-donation	South Asian N=202	East Asian N=126	Non-Asian N=1649	P value
ABO or HLA incompatibility (%)	20	19	14	0.001
Medical or Psychosocial unsuitability (%)	23	29	30	
Donor Withdrawal (%)	35	29	30	
Other donor chosen	14	16	19	
Recipient Issue (%)	8	7	7	

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SUBSENSORY GALVANIC VESTIBULAR STIMULATION IMPROVES MOTOR PERFORMANCE IN PARKINSON'S DISEASE: A TREATMENT WITH DIZZYING POTENTIAL?

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Keywords: Parkinson's disease, galvanic vestibular stimulation

Parkinson's disease is the most common neurodegenerative movement disorder characterized by the progressive loss of dopaminergic neurons in the substantia nigra. Motor deficits include tremor, rigidity, slow movement execution (bradykinesia) as well as greater variability of movements and coordination errors. However, clinical symptoms of Parkinson's disease cannot be fully explained by dopamine loss. Growing evidence demonstrates that the underlying pathophysiology involves the propagation of abnormal neural oscillations throughout basal ganglia and cortical circuits, such that these oscillatory rhythms are functionally "antikinetic". Therefore, modulation of maladaptive subcortical and cortical rhythms may serve as a potential target for clinical intervention, as presently sought by non-invasive brain stimulation techniques. We hypothesized that Galvanic Vestibular Stimulation (GVS) – a technique using non-invasive stimulation of vestibular afferents and cortical projections – would disrupt these pathological oscillations, possibly leading to improved motor performance in Parkinson's patients. We studied 12 Parkinson's patients withdrawn from dopaminergic medication and 12 healthy age-matched control subjects. All participants performed 8 trials of a motor tracking task while randomly receiving either subsensory noisy GVS or sham currents during each trial. To objectively assess kinetics, we utilized a Linear Dynamical Systems analysis approach. We observed an increase in the speed of movements due to GVS delivery in both control and Parkinson's groups ($p < 4.56 \times 10^{-4}$, $p < 0.0095$). Furthermore, GVS significantly reduced variances of both movement speed and dynamics across Parkinson's subjects (F-test, $p < 10 \times 10^{-11}$ and $p < 10 \times 10^{-5}$ respectively), an outcome previously observed with Deep Brain Stimulation (DBS), an established yet invasive surgical therapeutic technique. We propose GVS improved motor performance by way of sensorimotor pathways in order to ameliorate diseased basal ganglia input to the motor cortex. Our results support prior findings suggesting that GVS confers a therapeutic benefit for Parkinson's patients in a novel non-pharmacological, non-invasive approach.

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LONG HEAD BICEPS TENDON HISTOPATHOLOGY AND CORRELATION WITH CLINICAL OUTCOMES AFTER BICEPS TENODESIS

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Keywords: Biceps tenodesis, biceps tendinopathy, tendon histopathology

Long head of biceps (LHB) tendinopathy is a common cause of chronic anterior shoulder pain and loss of function. The necessity for LHB tendon resection is determined via history, physical exam, response to diagnostic injection, and intraoperative evaluation. Biceps tenodesis is the surgical procedure commonly utilized for the treatment of LHB tendinopathy. It involves resection of the intra-articular portion of the tendon and fixation of the proximal portion of the remaining tendon to the humerus. The resected tendon specimen can be examined histopathologically to assess the degree of tendinopathy. The goal of this study was to create a grading system based on the tendon histopathology and to correlate this score to the clinical outcomes in the patient, as it may help guide future practice in the treatment of LHB tendinopathy.

The primary investigator has performed 40 biceps tenodesis operations from 2009 to 2013. These samples were sent for histopathological analysis and assessed based on 5 histologic criteria: fibrosis, mucinous degeneration, vascular infiltration, alteration in tenocyte number and morphology, and inflammation. Each specimen was given a pathology score based on these factors of tendinopathy. A chart review of the patients was also conducted to determine the clinical results of pain and function at 6 months post biceps tenodesis procedure.

The preliminary results showed that resected LHB specimens included components of all 5 tendinopathy criteria, and largely reflected tendinosis rather than tendonitis, as expected. Additionally, the greater pathological scores of the resected tendon were associated with better outcomes in terms of pain and function, whereas the lesser pathological scores were associated with worse outcomes. These pathology scores did not correlate with the macroscopic appearance of the tendon.

From these results, we suggest that histopathological analysis may be utilized as part of routine clinical care to help predict the clinical course for the patient and necessary future interventions. The next steps of this study include collecting additional clinical outcome measures via patient questionnaires and comparing the resected tendon specimens to control LHB specimens from age-matched autopsy material. Additional results of clinical importance may become more apparent following completion of the study.

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RELIABILITY OF CLINICAL TONSIL SIZE GRADING IN CHILDREN

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Keywords: Tonsils, Obstructive Sleep Apnea, Hypertrophy, Reliability, Children

Background: As tonsillar enlargement can have detrimental health effects in the pediatric population, reliable monitoring and documentation of tonsil size is necessary in clinical settings. Tonsil grading systems (or scales) allow clinicians and researchers to precisely record and communicate changes in tonsil size. There is however, significant variability in the use of tonsil grading systems in both clinical practice and research. Furthermore, the reliability of these systems in a 'real-life' clinical setting has never been formally studied. Therefore, there is a need to compare commonly used existing tonsillar grading scales and to assess their reliability and reproducibility in clinical settings.

Objectives: The objectives of this study were to assess the inter-observer and intra-observer reliabilities of the Brodsky, Friedman, and a novel "3-grade scale".

Methods: We recruited 116 children, aged 3-18, attending the Pediatric Otolaryngology outpatient clinic at BC Children's Hospital. For each child, 2 separate tonsil assessments (with a 5 minute interval in between) were conducted by 4 independent observers with different clinical backgrounds. These included: 2 staff Pediatric Otolaryngologists, 1 Fellow/Resident, and 1 Medical Student. Each observer assessed and graded tonsil sizes using 3 different scales. Inter-observer and intra-observer reliabilities were derived using Intra-Class Correlation Coefficients (ICCs) and Pearson Correlation Coefficients (PCCs), respectively. To discount for asymmetric scores, data analysis was conducted on the left tonsil only.

Results: Mean inter-observer reliability (ICC) was highest for the Brodsky Scale (0.721), followed by the Friedman Scale (0.647), and the 3-Grade Scale (0.599). The mean intra-observer reliability (PCC) for the Brodsky, Friedman, and 3-grade scale were 0.954, 0.932, and 0.927, respectively.

Conclusions: The Brodsky grading scale offered the highest inter-observer and intra-observer reliability when compared to the Friedman and novel 3-grade scales. The results of this study would support the uniform usage of the Brodsky scale for future clinical and research work.

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HEALTHCARE CONTINUITY FOR ORPHANED CHILDREN IN KATHMANDU: THE CREATION OF A HEALTH RECORD CARD

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Keywords: health record card, model, healthcare continuity, global health

The healthcare point-of-entry for Nepali orphans is through hospitals rather than primary care physicians. Consequently, there is a lack of continuity and organized documentation of healthcare encounters as well as lack of follow-up with physicians. A concise health record card for each child at Sonrisa Orphanage (Kathmandu) was created to provide for the healthcare continuity that was absent. This novel documentation allows for each child to have a comprehensive history (previous encounters, medical history, and social well-being) that can be brought with them on future hospital visits.

A health record card, physical health screen and adolescent women's health workshop were conducted at Sonrisa Orphanage mid-June 2013 for thirteen children aged 8 to 16. This involved the collaborative effort of UBC medical students, Nepali medical students, a volunteer Nepali physician, and the orphanage staff. Three stations were organized:

- 1: Obtaining the health record card information involved reviewing collected physician notes as well as interviewing the orphanage director.
- 2: A cardiovascular & respiratory exam, head & neck exam, and dermatological screening parts of the health screen on all thirteen children by the volunteer physician with the assistance of UBC medical students.
- 3: UBC medical students measured height and weight of the children and documenting this on growth charts. A social history from the children was also taken with translation assistance from Nepali medical students.

Common physical findings included warts, visual acuity deficits, impacted cerumen, and heart murmurs. Findings were discussed with the orphanage director, and children with significant findings were flagged for further medical treatment. The children's height and weight findings were low compared to WHO standards, but were consistent with previous literature on children in Kathmandu.

In the future, assessing the children's health and updating the health record card may be continued as a partnership between UBC medical students and Nepalese medical students/ faculty. For the promotion of continuity of healthcare, this project could also serve as a model for future endeavours, such as doing a health visit at schools in Nepal, or possibly internationally as part of global health initiative projects.

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USING VIRTUAL PATIENTS AND ONLINE LEARNING MODULES TO ENHANCE ONCOLOGY EDUCATION IN THE UNDERGRADUATE MEDICAL CURRICULUM

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Keywords: Oncology, Education, Medical Curriculum, Virtual Patients, Online Modules

Purpose: The incidence of cancer continues to increase. As a result most practicing physicians, regardless of discipline, will encounter oncology patients. Despite this, oncology education during medical school is sparse and many graduating medical students feel unprepared to care for oncology patients.

To address the significant gaps in oncology undergraduate education, the goals of this project were to develop online learning modules and virtual patients to enhance oncology instruction during undergraduate medical training.

Methods: To develop a curriculum for the online resources, the Kern approach to curriculum development was employed. A needs assessment of third-year medical students at UBC was conducted and development of online resources began in 2009. Medical students scripted online modules and virtual patients. Reviews were conducted by practicing oncologists, and a web-based platform was selected. Kirkpatrick's hierarchy of evaluation has been used as an evaluation framework.

Results: In the initial steps of curriculum development, over half (82/156) of the third year medical students completed the needs assessment. 50% of students had not interacted with cancer patients during their clerkship year and 62% felt their ability to discuss oncology issues with patients was poor or fair. All respondents expressed interest in online oncology modules. Between 2009 and 2013 a core group of ten medical students and one oncologist worked to script, review and publish 10 online modules supported by virtual patient cases. The online learning modules were integrated into the oncology curriculum at UBC in late 2011. Continuing evaluations have demonstrated a high level of satisfaction. The learning module improved the student's perceived knowledge of oncology and comfort dealing with oncology patients. An evaluation of the impact of the modules on learning continues.

Conclusions: While there are internationally recognized gaps in oncology education, this represents a novel intervention to address these deficiencies. Research continues to determine the strengths and limitations of the online modules to improve the design and enhance this robust educational resource. Following ongoing evaluations and improvements, plans are to disseminate this resource to medical students at a national and international level.

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PATIENT KNOWLEDGE AND MEDICATION ADHERENCE IN ADULTS WITH CYSTIC FIBROSIS

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Keywords: Cystic Fibrosis, Medication Adherence, Barriers, Patient Knowledge, Chronic Disease Management

Background: Treatment guidelines for cystic fibrosis (CF) recommend the use of long-term medications to improve lung function and prevent exacerbations. Despite these benefits, medication adherence is low, ranging from 33 to 76%. Self-reported barriers include absence of perceived benefits, doubts about necessity of treatment, treatment burden, and forgetfulness. Patient knowledge has not been evaluated but likely plays an important role because it influences perceived or anticipated benefits.

Hypothesis: Patients with less knowledge of their lung disease severity and medication benefits are less likely to be adherent with prescribed pulmonary maintenance therapies.

Methods: CF patients completed surveys on knowledge and medication adherence during routine outpatient clinic visits at St. Paul's Adult CF clinic. Patients were asked their last measured FEV1% and considered knowledgeable of their lung disease severity if they answered correctly within 5%. Knowledge of medication benefits was determined by multiple choice questions. Patients self-reported their medications and adherence to each. They were considered highly adherent if they self-reported taking more than 80% of their prescribed doses. Statistical analyses were conducted using chi-squared analysis.

Results: 114 patients are currently enrolled. 67% know their FEV1% within 5% and 64% know the benefits of all their medications. 50% self-reported high adherence to hypertonic saline compared with 83% for inhaled antibiotics, 77% for dornase alpha, and 73% for azithromycin.

80% of patients who were knowledgeable of their lung disease severity self-reported high adherence, compared to 70% of those who were not knowledgeable ($p=0.29$). Those who knew their lung disease severity were more likely to self-report high adherence to inhaled antibiotics (89%) than those who did not (63%, $p=0.08$). Patients who knew the benefits of all their medications were more likely to self-report high adherence (79%) than those who did not (63%, $p=0.10$). Those who knew the benefits of dornase alpha were more likely to self-report high adherence (85%) than those who did not (57%, $p=0.03$).

Conclusion: Patient knowledge of lung disease severity and medication benefits may influence self-reported adherence. Providing better patient education, especially on their lung disease severity and the benefits of dornase alpha, may improve medication adherence and clinical outcomes.

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SEMAPHORIN 5B PREVENTS EARLY ENTRY OF SENSORY AFFERENTS IN THE DEVELOPING SPINAL CORD

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Keywords: Semaphorin 5B, spinal cord development, sensory circuit formation, RNA interference

During the development of the vertebrate nervous system, sensory neurons in the dorsal root ganglia send axons both peripherally, to receive signals from the external environment, and centrally, to connect with the central nervous system. When centrally projecting axons arrive at the spinal cord, instead of immediately entering the grey matter, they bifurcate to travel toward the head and tail along the length of the spinal cord to establish the longitudinal axon tracts connecting the brain. The time during which sensory axons are prevented from entering the grey matter is known as the “waiting period”. At the end of the waiting period, secondary axons branch off from the longitudinally projecting primary axons concurrently across multiple spinal segments and project to their appropriate targets within the grey matter. This critical process allows sensory signals to be processed throughout the entire spinal cord and relayed to the brain. However, the precise cues preventing the premature entry of axons into the grey matter during the waiting period still remain to be identified.

This work demonstrates that Semaphorin 5B (Sema5B), a member of the semaphorin family of axon guidance molecules, is expressed throughout the chick spinal cord during the waiting period, but its expression decreases at the same time that secondary axons begin to enter the grey matter. In addition, Sema5B inhibits the growth of dorsal root sensory neurons *in vitro* and that this effect is mediated in part through the cell adhesion molecule, TAG-1. Furthermore, reducing the expression of Sema5B using the technique of RNA interference before the start of the waiting period leads to premature entry of primary axons into the grey matter. Taken together, these results suggest that Sema5B acts as a repulsive barrier *in vivo* for centrally projecting primary sensory axons, forcing them to turn and establish the longitudinal axon tracts by preventing them from prematurely entering the grey matter. Interestingly, the expression of many repulsive guidance molecules like Sema5B is increased after spinal cord injury. Therefore, knowledge regarding their function in development, as well as prevention of their upregulation could lead to better recovery from spinal cord injuries.

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VOICE DISCRIMINATION AND RECOGNITION IN ACQUIRED PROSOPAGNOSIA

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Keywords: prosopagnosia, voice, recognition, discrimination, perception

Background: Right or bilateral anterior temporal damage can impair face recognition with relatively preserved perception and discrimination of faces. However, it has been questioned whether this represents an associative variant of prosopagnosia or a multi-modal disorder of person recognition, because recognition via other sensory modalities has seldom been evaluated in these subjects.

Objective: Our goal was to determine if voice discrimination or voice familiarity was impaired in subjects with impaired face recognition.

Design/Methods: We tested 68 controls and 10 subjects with apperceptive or associative defects in face recognition after various cerebral lesions. Subjects performed a match-to-sample test of voice discrimination and a test of short-term recognition of recently heard voices, as well as a questionnaire about face and voice identification in daily life.

Results: All four subjects with apperceptive prosopagnosia due to lesions limited to fusiform cortex had intact voice discrimination and recognition. One subject with bilateral fusiform and anterior temporal lesions had impaired discrimination for both faces and voices, which we believe is the first described case of combined apperceptive prosopagnosia and apperceptive phonagnosia. The two subjects with bilateral anterior temporal lesions had impaired face and voice recognition but intact face and voice discrimination. All three subjects with right anterior temporal lesions, two with an associative form of prosopagnosia, had normal voice perception and recognition.

Conclusions: Deficits indicating a multi-modal syndrome of person recognition were found in two subjects with bilateral anterior temporal lesions. A modality-specific associative prosopagnosia does exist and can be caused by unilateral right anterior temporal lesions.

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BREAST CANCER STAGE INFLUENCES CELLULAR RESPONSE TO PLANAR CELL POLARITY PATHWAY ACTIVATION

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Keywords: breast cancer progression, ductal carcinoma in situ, invasive mammary carcinoma, planar cell polarity

WNT5A encodes the prototypical ligand for the planar cell polarity (PCP) pathway. The precise role of this pathway in breast cancer progression has yet to be determined, as activation of the pathway has been shown to promote either progression or differentiation. Using a progression series of cell lines derived from a single patient with metastatic breast cancer, we show that WNT5A is expressed at greater levels in the metastatic mammary cell line 21MT-1 and expressed at relatively low levels in both the non-tumorigenic mammary cell line 21PT (atypical ductal hyperplasia (ADH)-like) and the tumorigenic and non-metastatic mammary cell line 21NT (ductal carcinoma in situ (DCIS)-like). Given the differential expression of WNT5A, we used the 21PT(ADH) and 21NT(DCIS) cell lines, representing early non-invasive stages of progression, to assess the effect of WNT5A on measures of cell aggressiveness. Overexpression of WNT5A increased in vitro cell migration of the 21PT(ADH) and 21NT(DCIS) cell lines, but increased in vitro invasion and in vivo extravasation of 21NT(DCIS) cells only. WNT5A overexpression also decreased the proportion of spherical colonies (increased colony dispersion) in 21NT(DCIS) cells grown in a 3D Matrigel system. WNT5A was found to upregulate RHOA expression of both 21PT(ADH) and 21NT(DCIS) cells. RHOA knockdown partially reversed WNT5A-induced invasion of 21NT(DCIS) cells. This was in contrast to the WNT5A-induced cell migration of 21PT(ADH) and 21NT(DCIS) cells which was completely reversed by RHOA knockdown. PCP is known to signal through VANGL1 to modulate MMP3 and PTGS2 expression and induce invasion. VANGL1 knockdown reversed WNT5A-induced invasion of 21NT(DCIS) cells, but had no effect on WNT5A-induced migration of either 21PT(ADH) or 21NT(DCIS) cells. Although PTGS2 expression was induced during WNT5A overexpression in both 21PT(ADH) and 21NT(DCIS) cells, WNT5A-induced MMP3 expression was seen only in 21NT(DCIS) cells, an effect that was VANGL1 dependent, as it was reversed by down-regulation of VANGL1. We thus provide evidence that PCP signaling can act to promote breast cancer progression in a stage dependent manner by modulating RHOA-dependent migration and VANGL1-dependent MMP3 expression and invasion. The changes in VANGL1-dependent MMP3 expression and invasion were seen in a cell line representing DCIS but not ADH.

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CORRELATION STUDY OF MULTIPHOTON MICROSCOPY WITH HISTOLOGY AND MORPHOLOGY OF HUMAN SKIN

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Keywords: biomedical imaging, histology, non-invasive, pigmentation, cancer

The ability to probe biological activity within living organisms by means of optics is desirable due to its non-invasive nature, particularly in the domain of early cancer detection. Multiphoton Microscopy (MPM) and Reflectance Confocal Microscopy (RCM) are two biomedical imaging modalities that are commonly used to image biological samples. In scientific publications, images obtained through MPM and RCM are often presented with histology for comparison and verification. However, the images often do not closely correspond to histology as they are from a similar, but not the same region as histology. We have established a method to accurately correlate MPM images of prominent structures in ex vivo human skin with subsequent histology. We employed this technique to identify highly fluorescent clustered granular features which presented in the epidermis and prevalently in the dermis. It was found that our method is only capable of locating prominent structures in the skin, and not miniscule features that present at subcellular resolution such as granules. Nevertheless, the distribution and morphology of the imaged granules correlated well with stained melanin in histology, and their optical properties were consistent with those of melanin in melanocyte cell cultures. This suggests that the fluorescent clustered granules which had been observed in both in vivo and ex vivo MPM scans were in fact melanin granules. The approaches outlined in this study enable us to non-invasively identify prominent microstructures presented on MPM skin images, and to further study subcellular skin features using their optical properties, which can form the basis for future in vivo skin MPM image interpretation in clinical diagnosis and guide treatment. With the ability of imaging melanin, the non-invasive assessment of skin pigmentation and the monitoring of pigmentation-associated pathologies become immediate clinical possibilities.

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CLINICAL RECOGNITION OF MELANOMA BY DERMATOLOGISTS AND NON-DERMATOLOGISTS

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Keywords: Melanoma, biopsy, diagnostic accuracy

Background: The incidence of melanoma is increasing annually in Canada. Consequently there has been a rise in the number of patients presenting with pigmented skin lesions to dermatologists and non-dermatologists.

Objective: This retrospective study is designed to assess the ability of physicians of different specialties to accurately recognize melanoma.

Methods: Pathology reports of biopsies submitted to Vancouver Coastal Health with a clinical diagnosis of melanoma were reviewed (January - July 2013). The clinical diagnoses made by dermatologists, general practitioners and family physicians (GP/FP), and all other specialists were correlated with the final histopathological diagnosis.

Results: The dermatologists, GP/FP's and all other specialists achieved diagnostic accuracies of 24.75% (50 of 205), 3.52% (9 of 240) and 12.75% (14 of 107), respectively. Dermatologists diagnosed the most melanoma (50) and had the highest diagnostic accuracy (24.75%). The clinical diagnosis rendered by GP/FP's matched the histopathological diagnosis in only 3.52% of biopsies. GP/FP's also diagnosed the lowest number of melanomas (9) and biopsied the most skin lesions (240). All other specialists performed better than GP/FP's in accuracy (12.75%) but only performed half as well as dermatologists.

Conclusion: Although the diagnostic accuracy of dermatologists was significantly better than the other groups, the majority of patients with suspicious skin lesions present to a family or general practitioner first. Thus, there is considerable value in providing more training and education to non-dermatologists as it can have a meaningful impact on patient care.

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SURGEON-OPERATED TRANSABDOMINAL ULTRASOUND FOR DETECTION OF "VISCERAL SLIDE"

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Keywords: Ultrasound, Safety

Intraabdominal adhesions between the viscera and the abdominal wall increase the risk of visceral injury during laparoscopic port placement. These adhesions are common in patients with previous abdominal surgery, but can be caused by peritonitis, pelvic inflammatory disease, endometriosis and radiotherapy to the abdominal cavity. These complications are rare but occur with regularity during port placement and can result in severe morbidity and occasionally mortality.

"Visceral slide" describes the normal longitudinal movement of viscera, freely past the abdominal wall, with breathing as the diaphragm relaxes and contracts. This slide can be restricted by the presence of intraabdominal adhesions. The literature has shown that evaluation of "visceral slide" with ultrasound can reliably predict areas free of adhesions, in the hands of radiologist operators.

Since radiologist administered ultrasounds for adhesions are not part of the standard of care in Canada, a selection of surgeons at the Victoria General Hospital and the Royal Jubilee Hospital have been trained on and utilize this technique. Their accuracy for the detection of adhesions has is measured and compared to the literature accuracy, on a group of patients that have undergone previous abdominal surgery.

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VISUAL CONTRAST IN PARKINSON'S DISEASE: PARTICULAR DEGRADATION WITH MOVING STIMULI

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Keywords: Parkinson's disease, contrast sensitivity, motion

Visual complaints are common in people with Parkinson's disease (PD), and this can have profound effects on their quality of life, such as influencing their ability to drive and increasing their risk of falling (1). The causes of visual deficits are multiple; retinal ganglion cells are dopaminergic, convergence deficits are common, and Lewy body inclusions can be seen in the visual cortex, including area MT, known to be associated with perception of moving images (2). Visual deficits have been previously documented in PD (3–5), but these have been assessed with unrealistic static images. We hypothesized that PD subjects' perception would particularly suffer with moving stimuli, which are more likely to be encountered in common scenarios such as driving or ambulating.

After obtaining informed consent, 10 PD and 10 control subjects performed a visual task involving static and moving stimuli. Subjects were positioned 1 m away from a CRT monitor and shown a series of circular visual stimuli with light and dark bands at different spatial frequencies (0.5, 1, 2, 4, 8 cpd) and velocities (0, 5, 15 deg/sec). 5 trials at each spatial frequency and velocity combination were assessed. For each stimulus, subjects were asked to adjust the contrast with arrow keys until they were just barely able to detect the differences between the light and dark bands. All stimuli were created using Matlab and the Psychtoolbox (6–8). In order to control for eye movements, a remote video-based eye-tracker (EyeLink 1000) was used to track eye movements. Responses were recorded via the EyeLink software and Matlab. Data analysis was performed via the Psignifit toolbox in Matlab (9). The final analysis consisted of estimating contrast sensitivity thresholds at each spatial frequency and velocity combination.

We found PD subjects had particular deficits to motion beyond that previously described for static images. Our results suggest that motion-contrast testing should be included in the evaluation of vision in subjects with PD, such as assessment of suitability for driving. The developed computerized testing method provides a practical, robust and easily disseminated means to assess contrast sensitivity in patients.

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A QUALITATIVE OVERVIEW OF THE SURGICAL SAFETY CHECKLIST COMPLIANCE AND ITS COMMON PITFALLS IN PROVIDENCE HEALTH CARE

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Keywords: Surgical Safety Checklist, BC Patient Safety & Quality Council, Surgical Quality Action Network

Surgical safety checklists employed during perioperative period have shown to provide a platform for better communication amongst team members and reduce the incidence of post-operative complications. Here at Providence Health, a customized checklist comprising of three phases – briefing, timeout, and debriefing- has been developed that incorporates the relevant safety items that are encountered in our surgical suites. To this date, the compliance with the surgical checklist has been very promising; however, there are many criticisms to some phases of the checklist, and it has been a struggle to adopt the checklist in some surgical services.

Our goal in this study was to explore the patterns of compliance throughout the different phases of the checklist, and to identify the major obstacles in completing it. During a seven-week period, we audited 128 surgeries for completion of the safety checklist at the operating rooms of Providence Health. Also, through a series of interviews with different surgical team members, we asked for their feedback and recommendations on how to improve the checklist.

Based on our results, the briefing showed the lowest compliance amongst the three phases of the checklist. Also, many items in the briefing were neglected by the surgical teams. One criticism of the checklist was the degree of overlap between the briefing and the timeout, which made compliance with the checklist cumbersome. We also noted many instances in which some team members, mostly the surgeons, were absent during the checklist completion. In terms of compliance rates among different surgical services, cardiac surgery showed the lowest compliance of all services. By interviewing different cardiac surgery staff members, we suggest that a cardiac-specific safety checklist needs to be developed in the cardiac operating room with the cardiac surgeons' involvement. The timeout phase was routinely done in all surgical suites, showing a near perfect compliance rate. Most surgical teams felt that the timeout process had a favorable impact on the safety attitudes of the team members and enhanced the safety climate within operating rooms.

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TARGETED KNOCK OUT OF THE PUTATIVE NON-RIBOSOMAL PEPTIDE SYNTHETASE-INDEPENDENT SIDEROPHORE (NIS) GENE IN RHIZOPUS ORYZAE

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Keywords: Mucormycosis, opportunistic infection, iron-acquisition

Mucormycosis is a deadly fungal infection caused by members of the order Mucorales. There are many different forms of mucormycosis including rhinocerebral, gastrointestinal, pulmonary, disseminated, cutaneous and chronic subcutaneous. The most commonly isolated etiological agent is *Rhizopus oryzae* (*Rhizopus arrhizus* var. *delemar*). It has been determined that iron acquisition is a virulence factor for many microbial pathogens because iron is a limiting nutrient in vivo. *R. oryzae* obtains iron from the host by taking up ferric iron by a high affinity permease. In addition, *R. oryzae* secretes a polycarboxylate iron chelator called rhizoferrin, but the importance of rhizoferrin synthesis in virulence is currently unknown. Carboxylate siderophores are synthesized via non-ribosomal peptide synthetase-independent siderophore (NIS) genes and we have identified a putative NIS gene in *R. oryzae*. Our hypothesis is as follows: disruption of the RoNIS gene will eliminate rhizoferrin biosynthesis and reduce virulence of *R. oryzae* in a mouse model of mucormycosis. Knock out the RoNIS gene was done with a fusion construct containing NIS flanking genes and an antibiotic resistance cassette using *Agrobacterium*-mediated transformation. PCR confirmed the presence of the antibiotic resistance gene in five putative knockout mutants. However, because *R. oryzae* spores are multinucleated (i.e., heterokaryotic), to obtain a true knock out the isolation of a homokaryotic strain is required. We attempted to generate mononucleated vesicles using sonication; however, wild type gene activity was still present indicating that heterokaryons persisted. Further work will determine whether or not homokaryotic mutants can be generated; alternatively, knockdown of the gene using RNAi will be done. Ultimately, the strains with reduced/eliminated NIS activity will be used to compare the virulence of mutant strains with the wild type in a mouse model of pulmonary mucormycosis.

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FACTORS AFFECTING USABILITY OF TECHNOLOGY IN THE OR: THE K-MOUSE USABILITY TEST

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Keywords: surgery, technology, usability, ergonomics, radiology

Purpose of Study: With increasing use of picture archiving and communications systems (PACS) to review imaging in the operating room (OR), much effort has been put into the development of novel human-computer interfaces (HCIs) that allow surgeons to review imaging within a sterile field. K-Mouse is an HCI that allows surgeons to navigate PACS intraoperatively by moving their hands and performing gestures in front of a Microsoft Kinect infrared depth-sensing camera. By comparing the K-Mouse against a mouse-and-keyboard interface in simulated OR scenarios, this study aims to identify factors specific to an OR setting that determine the usability of HCIs.

Methods: Surgeons, surgical fellows, and surgical residents were asked to complete a series of tests using both a mouse/keyboard and the K-Mouse. Two sets of tests were devised: a general set designed to establish basic usability metrics, and a set designed to simulate typical intraoperative tasks using Phillips iSite PACS. Data was collected on time elapsed, tracking accuracy, and hesitancy. Participants were interviewed after completion of the tests.

Results: Eight participants completed the test procedure. In general usability tests, subjects took 5 to 8 times longer to complete straight-line movements using the K-Mouse, and 1.5 times longer to complete organic movements. Singular actions such as clicking and scrolling took approximately 2 times longer. Completion of simulated intraoperative tasks on iSite took 3 to 5 times longer. Participants expressed more frustration completing tasks using iSite compared to the general tests.

Conclusions: This study suggests that several barriers prevent the K-Mouse from being used in its current form, including fatigue, unreliable hand-to-screen tracking, and poorly-adapted user interfaces. However, with further development, intraoperative use of the K-Mouse or a similar system seems feasible, and participants stated they could see using a more refined system in the future. Furthermore, this study provided insight into factors that determine the usability of an HCI in the OR. Future HCIs for use in the OR must be developed with the ergonomic constraints of the OR in mind, and software must be designed to accommodate the nature of non-traditional HCIs.

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IMPROVED DIFFERENTIATION OF SKIN CONDITIONS BY POLARIZED LASER SPECKLE IMAGING

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Keywords: laser speckle, melanoma, skin cancer, dermoscopy

Malignant melanoma, the number one cause of skin cancer death, is also the fastest increasing preventable cancer. Currently, the lack of an imaging modality to quickly and non-invasively analyse the functional and morphological characteristics of tissues is hampering clinical practice. In a previous study, Tchvialeva et al. were able to demonstrate that the measurement of scattered laser light polarization off a skin lesion could provide useful metrics for distinguishing and diagnosing malignant melanoma. In this study, the utility of image speckle is investigated as an alternative versus free space speckle. A speckle pattern is a measure of intensity of reflected, random interference of a set of wavefronts. The image speckle device consisted of a 635nm laser, with orthogonal polarization images captured simultaneously via dual electronically controlled CCDs and optics. Skin phantoms produced to mimic the morphology of human skin were studied. Depolarization characteristics of the laser light were measured. The depolarization ratio, taking into account radial symmetry, of the speckle pattern was compared against roughness of the skin phantoms. Changes in bulk optical properties of the phantoms resulted in quantifiable changes in the depolarization ratio. Use of image speckle lead to a better differentiation between phantoms when compared to free space speckle.

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EXAMINING DRIVER-RELATED RISK FACTORS FOR CRASHING AND HEALTH OUTCOMES OF DRIVERS INVOLVED IN MINOR CRASHES

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Keywords: Emergency Department, drivers, motor vehicle crashes

Background: Traffic accidents are a major cause of morbidity and mortality in Canada and a significant public health issue. The majority of traffic accident and injury data are generated from police reports and hospital admissions; however, police do not attend all accidents and the majority of car crash victims are discharged home from the Emergency Department (ED). Once these patients leave the ED, their recovery is no longer followed. Therefore, “minor” crashes are poorly studied resulting in a dearth of information regarding the crash risk factors and the health outcomes for these drivers. In this study, we conducted a pilot questionnaire of drivers with minor injury while they were in the Emergency and a follow-up telephone interview 6 months after they were released from the ED. Our aims were to (1) examine driver-related risk factors for minor crashes and (2) determine the health outcome of drivers after minor crashes.

Methods: We approached a convenience sample of 123 injured drivers, of which interviews were completed in 74 (60%). During the pilot, 65 drivers became eligible for 6-month follow-up and 40 could be interviewed (follow-up rate = 62%).

Results: Prior to the index crash, 4 drivers (5.4%) reported drinking alcohol, 1 (1.4%) reported illicit drug use and 31 (41.9%) reported using prescription medications including antidepressants (5.4%), opioids (4.1%), and sedatives (4.1%). Nine drivers (12.2%) were distracted at time of crash. Based on the Dula Dangerous Driving Index, 4 (5.4%) were aggressive drivers, 6 (8.1%) were risky drivers, and 8 (10.8%) drove while experiencing anger or other negative emotions. At 6 month follow-up, many drivers were still experiencing health problems due to the crash. Over 50% were not fully recovered and had not returned to all their usual daily activities or work duties.

Conclusions: In conclusion, some driver-related risk factors (alcohol) were slightly less common amongst drivers involved in minor crashes compared with more serious crashes and, despite their name, minor injury crashes were often associated with slow recovery, persisting pain, and prolonged absenteeism from work.

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EVALUATION OF DAIRY GOAT PROJECT TO IMPROVE THE NUTRITIONAL AND ECONOMIC BENEFIT OF LOCAL GOATS IN RURAL KENYA

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Keywords: global health, sustainability, indigenous agriculture, community development

Purpose: The Global Health Initiative (GHI) at UBC is partnered with Partners in Community Transformation (PCT) in Western Kenya to deliver sustainable livelihood projects to improve community health and socioeconomic well-being. Based on an analysis of community needs, the GHI-PCT alliance designed several projects aimed to target these disparities including a dairy goat project directed at increasing community nutrition and economic wealth. To ensure sustainability, this project demands a thorough evaluation of project outcomes, challenges, and potential for growth.

Methods: Since 2010, pure-bred milk producing bucks and does have been purchased to create 27 breeding stations at community homes within the 3 sub-locations (total population ~15000), where residents bring indigenous goats to be serviced to create milk-producing offspring. During the summer of 2013, three GHI students conducted a qualitative analysis through visits to these buck stations to evaluate goat and housing structure maintenance.

Results: As of October 2013, 147 local goats have been served by one of the breeding stations. There were many challenges identified including problems with shared responsibility for maintenance, infection control, birthing, and feeding offspring. This prompted the creation of revised goat-keeping guidelines for four of the sites and increased site visits from PCT are expected during the next year. Proper education and training for the goat keepers has proved to be a fundamental step in the success of this project.

Conclusions: The goal of the GHI-PCT dairy goat project is to establish a sustainable means to improve the nutritional and economic benefit of the local goats. A step to greater success and expansion will entail community sensitization to continue to relay the benefits of the project for community members and to encourage the use of the breeding stations. Moving forward it is expected that the project will become fully self-sustaining.

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DEVELOPING A COMMUNITY HEALTH WORKER PROGRAM IN RURAL NORTHERN INDIA

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Keywords: community health workers, rural northern India, maternal health

Background: Global Health Initiative's Voice of Children Project (VOC) aims to improve the health of communities in the Uttarakhand province, in Northern India. The project began four years ago in collaboration with two local non-governmental organizations (NGOs). Each summer, University of British Columbia (UBC) students travel to India to carry out educational workshops alongside NGO workers on topics such as maternal health, newborn health, sanitation and hygiene. The NGOs are now ready to transition to carrying out the workshops independently. Thus the project is at a turning point where establishment of a training program for community health workers (CHWs) is necessary. Therefore, last year the focus was to do a comprehensive literature search and critical analysis of existing CHW training programs.

Methods: Working in collaboration with our project supervisor and an obstetrics and gynecology resident we performed a literature search using several key headings that regarded community health worker training programs in rural communities. Since World Health Organization (WHO) had previously performed a worldwide assessment of CHW programs our team focused on 133 studies, which were specific to India and subsequently narrowed these down to 18 of the most relevant articles.

Results: Based on our findings from the literature search, a CHW training proposal was developed for the NGOs. Some of the key findings for recruitment and training emphasized the involvement of community members, especially women in the selection process of candidates who would ideally be an educated, older female with children of her own (1,2,3). Training should include a combination of interactive sessions and practicums, which are sensitive to that community's values and belief systems (4). Each trained CHW should have specific incentives and be continually evaluated by a supervisor (4,5). This will ensure that healthcare provided by the CHW is effective and efficient.

Conclusions: The development of a CHW program at the local level can be aided through a review of existing models and lessons learned and through a knowledge sharing partnership with the local community. The end goal is to improve various maternal and general health outcomes to increase the sustainability of the VOC project.

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A COMPARISON OF PRIMARY HEALTH CARE IN CUBA AND CANADA

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Keywords: Cuba, primary health care

Purpose: To learn about the primary health care system in Cuba through visits at a family practice clinic and a live-in care center for pregnant women, and compare these to similar services in the Canadian primary health care system.

Methods: In June 2013, the UBC GHI team spent 3 weeks at the Universidad de Ciencias Medicas in Santa Clara, Cuba, doing primary care rotations. Rotations were held at a family practice and at a Hogar Materno for high-risk pregnancy women. A qualitative study was performed using observations made in Cuba, and comparing these observations to student experiences in Vancouver.

Results: Cuba's medical system provides universal primary health care with very few resources, but with excellent health outcomes. The way the primary health care system is structured ensures that each person is assigned one general practitioner (GP) in his/her neighborhood; creating free and convenient access. In contrast, many Canadians do not have a GP due to a shortage of family physicians, mostly in rural areas, but is also in urban centers. As a result, a large portion of primary care is delivered in walk-in clinics where there is no continuity of care.

Hogar Materno is a Cuban primary care program that provides housing and 24/7 medical supervision for women in a high-risk pregnancy for the last 15-20 weeks of the pregnancy. Since being instated in the early 1960s, this program has lowered the infant mortality rate in Cuba to a number similar to Canadian statistics (5.13/1000 in Cuba and 5.72 in Canada, 2010 UN statistics).

Conclusions: Cuba is a country faced with poverty and lack of resources. However, the country's focus on primary health has established Cuba as a leader in preventative health care. Much can be learned from their health care system to make Canada's system better, and to implement universal primary health care programs in other developing countries.

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A NEW ENTITY IN THE SPECTRUM OF HIGH FLOW VS. LOW FLOW VASCULAR MALFORMATIONS

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Keywords: AVM, Arteriovenous Malformation, Diagnostic Criteria, Vascular Anomalies, low-flow AVM, Venous Malformation

Background: Arteriovenous Malformations (AVMs) are high flow lesions with abnormal connections between arteries and veins without an intervening capillary bed. While the diagnosis of an AVM is classically made clinically, much of our current treatments for AVMs require a detailed understanding of the architectural and rheological characteristics of the lesion. These are best ascertained with radiographic imaging (ultrasound, magnetic resonance imaging (MRI/MRA), or conventional angiography). Infrequently, the radiographic diagnosis of a vascular lesion will not support the clinical diagnosis of an AVM. These “discrepant” lesions are not adequately captured within the current classification system and represent a treatment dilemma for the involved practitioner.

Objective: The purpose of this study is to review our center’s experience with vascular anomalies where incongruity in a patients’ clinical and radiographic presentation produce a diagnostic and therapeutic challenge.

Methods: A retrospective chart review of patients with atypical AVM presentations, which are not adequately captured in the current ISSVA classification system. Parameters reviewed included patient history and demographics, clinical presentation, radiological imaging and treatment modalities.

Results: The 7 cases presented here consist of 2 male patients and 5 female patients with a mean age at presentation of 22 years (range 4 to 67) and a mean follow up period of 5 years (range 1 to 10). The primary modality of imaging was Angiogram, which showed a contradictory low flow signal in 5 of 7 patients. In the remaining two patients low flow was illustrated by detailed ultrasound or MRI imaging. All patients were treated based on their radiological diagnosis and managed either conservatively or with sclerotherapy. No lesions evolved into a high flow process.

Conclusions: We have identified and described a unique subcategory of vascular anomalies that have clinical features of high flow malformations but radiological features of low flow malformations. From a practical treatment standpoint, these lesions behave like low flow malformations and should be treated as such. We propose that complex vascular malformations should best be evaluated by both clinical as well as specialized radiological (MRI/MRA/angiography) means, radiologic diagnoses should usurp what is found clinically, and ultimate treatment is preferentially based on a radiological diagnosis.

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SMOKING-RELATED MEDICAL CONDITIONS IN THE EMERGENCY DEPARTMENT: PREVALENCE AND ACCURACY OF PATIENT PERCEPTION THAT THEIR VISIT MAY BE RELATED TO SMOKING

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Keywords: smoking cessation, patient perception, health education

Introduction: Worldwide, smoking is the single leading cause of preventable deaths and disability. In 2004, the US General Surgeon's Report provided a list of medical conditions that were causally found to be smoking-related. In this study, we determine the prevalence of smoking-related conditions as the Emergency Department (ED) discharge diagnosis among tobacco users who visited a tertiary care academic ED. We also sought to determine which medical conditions were more or less likely to be accurately perceived by patients as being smoking-related.

Methods: All adults ≥ 18 years of age who had used tobacco within the last 30 days prior to their ED visit and who were enrolled in a randomized controlled trial (ClinicalTrials.gov, NCT01454375) from Dec.1, 2011 to Aug.31, 2012 were included in the study. As part of the randomized controlled trial, all patients were asked whether or not they perceived that their ED visit could be due to a smoking-related condition. Blinded abstractors coded ED diagnoses from patient charts as smoking-related or not smoking-related. All smoking-related conditions were placed under 7 major disease categories: cardiovascular disease, neoplasm, respiratory disease, reproductive complication, peptic ulcer disease, post-op complication, or dental disease.

Results: Eight hundred and twelve patients were included; the mean age was 40 years and 61% were male. In total, 14% had a smoking-related condition - 56% were respiratory diseases, 16% cardiovascular disease, 7% peptic ulcer disease, 7% post-operative complications, 7% dental disease, 5% neoplasm, and 2% reproductive complications. Of the conditions identified, 33% were correctly perceived by patients to be smoking-related. Cardiovascular diseases, neoplasms, and respiratory diseases were more likely to be accurately perceived by patients to be smoking-related. Dental diseases, peptic ulcer disease, post-operative complications, and reproductive complications were less likely to be perceived as smoking-related.

Conclusion: In this study, 14% of all visits to the ED among smokers were secondary to a smoking-related condition. Only 33% of smoking-related conditions were accurately perceived by patients to be related to tobacco. Further patient education is required to increase awareness of smoking-related conditions, which may ultimately lead to increased quit rates.

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PATIENT-CENTERED OUTCOMES FOLLOWING MUSCLE FLAP RECONSTRUCTION OF STERNAL WOUND INFECTION DEFECTS: A SYSTEMATIC REVIEW

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Keywords: DSWI, Mediastinitis, VRAM, PMMF, Postoperative Complications

Background: Deep sternal wound infections (DSWI) following open-heart surgery are associated with significant morbidity and mortality. The pectoralis major myocutaneous flap (PMMF) and vertical rectus abdominus myocutaneous (VRAM) flaps are effective reconstructive options for sternal wound coverage; however, there is little evidence to suggest one flap over the other. The purpose of this study is to evaluate the strength of evidence for the use of either flap when reconstructing post-cardiac mediastinitis defects.

Methods: A search of EMBASE, EBM Reviews, MEDLINE, CINAHL, and Web of Science returned 1095 potential articles (final search: July 16, 2013). After assessment by two independent reviewers (AV, RN) using prespecified criteria, 58 articles met the inclusion criteria. Data on several variables was extracted, including all-cause mortality, risk of recurrent infection, flap necrosis and risk of requiring a second flap procedure. The relative risk (RR) was calculated for each.

Results: Pooled data from 58 studies provided information on a total of 1719 pectoralis major and 337 rectus abdominus flaps. There was no significant difference in mortality rates in either group ($p=0.41$). Patients undergoing pectoralis muscle flap sternal reconstruction were 1.8 times more likely to require a second flap surgery compared with VRAM flap patients (RR 1.8 (95% CI 0.12-27.75)). In contrast, VRAM patients were twice as likely to develop partial flap necrosis (RR 2.30, 95%CI 0.70-7.53) than pectoralis flap patients. Overall, there was no increased risk of secondary infection (RR 0.76, 95% CI 0.10-5.36) with either flap procedure.

Conclusions: To our knowledge, this is the first systematic review comparing the outcomes of pectoralis major and rectus abdominus muscle flaps for the treatment of post-cardiac surgery mediastinitis. Evidence-based studies with rigorous design are needed to further elucidate the difference in complication rates, if any, between these techniques, in order to optimize patient management.

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MAPPING OF BREAST CANCER CARE PATHS IN BRITISH COLUMBIA FOR A BREAST CANCER MICRO-SIMULATION MODEL

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Keywords: Breast Cancer, Population Health, Micro-simulation, Modeling, Early Detection

Objective: A micro-simulation model for breast cancer will be developed using care paths and cancer control data from BC. This will be designed as a tool for evaluating the impact of different early detection strategies on multiple outcomes such as population health and costs to the healthcare system. The breast cancer care paths including screening, diagnosis, treatment, survivorship, and end-of-life care for women in British Columbia were documented.

Materials & Method: Information on care paths for the model was gathered from expert opinions in the fields of radiology, radiation oncology, surgical oncology, medical oncology, and palliative care. The screening and diagnostic imaging portions of the model were based also on previously published care paths in the Provincial Breast Health Strategy. The palliative care portion follows guidelines from the Cancer Care Ontario publication.

Results: The path begins with detection of breast cancer either via screening mammography or via a physician. Normal results are found for the majority of women; the women with abnormal results progress to diagnostic imaging and, if a positive diagnosis is made, they progress to treatment. The treatment paths in this map have been divided into two main branches based on whether the cancer is metastatic or non-metastatic. The surgical and radiation treatment options in the care paths are based on TNM staging whereas the systemic treatment options are based on TNM staging as well as tumour biology. For systemic treatment, in addition to chemotherapy options, the map also includes options for hormone therapy which are based on menopausal status as well as the previously noted tumour biology and staging. For patients who have had metastatic disease or require supportive care only, there is an additional palliative care pathway.

Conclusion: The care paths for breast cancer in British Columbia have been documented and the map is ready to be validated. When complete, this model can be used for predicting the downstream impacts of different early detection or treatment regimens on multiple outcomes such as population health and costs to the healthcare system.

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A MIXED QUALITATIVE METHODS ASSESSMENT OF HEALTH CONCEPTS AND PRIORITIES AT A RURAL SCHOOL COMMUNITY IN INDIA'S SPITI VALLEY

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Keywords: global health, India, health needs assessment, qualitative research

Purpose Since 2007, University of British Columbia students have been involved in Global Health Initiative projects to improve student health outcomes at a rural Himalayan boarding school in Spiti Valley, Himachal Pradesh, India. Projects have included health screens and education, greenhouses, anemia assessments, and water chlorination. To align future projects with community priorities, this mixed-methods qualitative study was undertaken in the summer of 2013 to determine the community's health concepts and needs.

Methods Three age-appropriate qualitative methodologies were employed to explore ideas about health and health priorities. Thirty grade five students, nine grade ten students, three school administrators, and fifteen teachers and caretakers were randomly selected from a pool of volunteers. School administrators were interviewed, and teachers and caretakers participated in focus group discussions. Grades five and ten students engaged in participatory drawing and photography, respectively. The data was transcribed and coded for thematic content to elicit main constructs.

Results Key health determinants that participants identified include nutrition, lifestyle, water access and sanitation, the physical environment, and personal hygiene. While some participants maintained that Spitians are generally healthy, others recognized a community lack of access to health education and facilities required for disease prevention and treatment. Children tended to view microorganisms and lifestyle as causing disease, while many adults held traditional beliefs. Food insecurity and limited access to sanitary water and to healthcare, particularly during the isolating winter months, were emphasized as health concerns. Moreover, decreasing water and food contamination, improving sanitation and waste disposal, and increasing greenery were principal community health priorities. Participants varied in their use of traditional medicine, Buddhist health beliefs, and Western medicine for disease prevention and treatment and valued sustainable and culturally relevant medical and educational initiatives.

Conclusions Mixed qualitative methods effectively access the heterogeneous health perspectives of various age groups within a community to provide an inclusive picture of local health concerns. These findings will inform health initiatives undertaken by the Spiti community, UBC, and other foreign groups. The development and implementation of culturally appropriate and sustainable global health projects in collaboration with local communities relies on the integration of such community-identified health concerns.

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