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Title: Biomarkers of Repetitive Transcranial Magnetic Stimulation for Treatment Resistant Adolescent Depression

Author(s): Jasoui, Y (1); Kirton, A (2,3); Langevin, LM (1); Sembo, M (1); Wilkes, TC (1,2); MacMaster, FP (1,2)

(1) Mathison Centre for Mental Health Research & Education, Psychiatry, (2) Paediatrics, (3) Clinical Neurosciences, University of Calgary, Calgary, AB, Canada

Background: Repetitive transcranial magnetic stimulation (rTMS) is an emerging intervention for treatment resistant major depressive disorder (MDD) in adolescents. Though rTMS is an effective technique, positive responses are not universal. As MDD is associated with alterations in brain chemistry, we investigated metabolite concentrations as a biomarker for predicting treatment response. We hypothesized that lower baseline glutamate levels would predict beneficial rTMS treatment response and associate with lower MDD scores post-treatment.

Methods: Anatomical and spectroscopy data was collected on a 3.0T GE MR750w. A 15-weekday rTMS treatment was applied targeting the left dorsolateral prefrontal cortex (DLPFC).

Results: At baseline, responders had lower left DLPFC glutamate concentration ($p = 0.047$) that increased with rTMS compared to non-responders ($p = 0.01$) and correlated with the change in Hamilton depression rating scores (HAMD; $r = 0.58$, $p = 0.02$). Reduced DLPFC thickness was observed in responders ($p = 0.009$), and was associated with greater change in HAMD ($r = -0.56$, $p = 0.03$). Lower left DLPFC cerebral blood flow at baseline was associated with greater change in Children's Depression Rating Scale ($r = -0.62$, $p = 0.02$) and Beck Depression Inventory scores ($r = -0.59$, $p = 0.03$).

Conclusions: Measures of glutamate and cortical thickness in the left DLPFC may provide tractable predictions of rTMS treatment response in youth, leading to more personalized therapy regimens.

Title: Movement Abnormalities Predict Transitioning to Psychosis in Individuals at Clinical High Risk for Psychosis

Author(s): Dallas A. Callaway, Diana O. Perkins, Scott W. Woods, Lu Liu, Jean Addington

Background: Improving upon the predictive validity of determining the transition from high risk to actual psychosis is a primary aim of early intervention research and previous work has suggested that premorbid spontaneous dyskinesias or movement abnormalities may be one possible predictor.

Methods: Dyskinetic movements were assessed with the Abnormal Involuntary Movement Scale (AIMS) at baseline of a multisite longitudinal study of 148 neuroleptic-naïve individuals at clinical high risk (CHR) of developing psychosis. All participants met Criteria of Prodromal States based on the Structured Interview for Psychosis-Risk Syndromes (SIPS; McGlashan, Walsh, & Woods, 2010); 145 (97.98%) met attenuated positive symptom syndrome (APSS) criteria, one (0.67%) met genetic risk and deterioration (GRD) criteria, and two (1.35%) met both APSS and GRD criteria. Mean age of the sample was 19.77 (4.60) years and the majority was Caucasian (77.00%).

Results: Twenty-eight (18.92%) individuals transitioned to a psychotic disorder over the course of the study. Mann-Whitney U group comparisons between transitioned and non-transitioned individuals indicated that, relative to those that were not observed to transition, participants that developed a psychotic disorder exhibited greater baseline spontaneous dyskinesias of the facial muscles, jaw, upper extremity, trunk, and, at a trend-level, tongue. Moreover, increased dyskinetic movements at baseline resulted in a more than two-fold increase in odds (OR = 2.22, 95% CI = 1.19-4.15) of developing a psychosis for each 1-point increase in AIMS scale score. **Conclusion:** These findings suggest (a) that dyskinetic movements may constitute primary features of emerging psychosis rather than pure artifact of neuroleptic pharmacotherapy and (b) that individuals with greater premorbid dyskinetic movements may comprise a subset of CHR individuals at inordinate risk to decompensate into psychosis.

Title: Prevalence of Major Depression is higher in urban compared to rural areas

Authors: Kathryn Wiens, Jeanne V. A. Williams, Dina H. Lavorato, Andrew G. M. Bulloch, Scott B. Patten

Background: Contradictory reports dominate the literature on urban-rural difference in prevalence of major depression. An elevated prevalence within urban areas would influence planning of mental health services, requiring increased accessibility in urban regions. With inconsistencies evident in the literature it becomes impossible to make a definitive conclusion. Such inconsistency may arise from lack of statistical power within the existing studies, leading to imprecise estimates. This paper addresses the issue of imprecision through data synthesis methods involving a series of national population-based surveys. **Methods:** The National Population Health Survey and Canadian Community Health Survey are a series of national cross-sectional data files obtained from Canadian household residents. Prevalence estimates of major depression in urban versus rural areas can be derived for each survey. Data synthesis methods (eg. graphical methods and meta-analysis) provide an opportunity to generate estimates of higher precision than previously possible, while meta-regression analyses further assess the effect of survey type and year on variation between estimates. **Results:** There was no effect of survey type or year on estimate variability. Through synthesis of the survey estimates, the pooled odds ratio revealed an increase of 1.19 (1.13, 1.25) times the odds of major depression in urban compared to rural regions. **Conclusions:** A weak effect of 20 percent increase in odds of major depression was detected for urban compared to rural regions. Data synthesis is an effective method for increasing precision and power of an estimate. Future mental health initiatives should consider this difference when implementing services.

Title: Development of a Signal System for Feedback Informed Treatment**Author(s):** Sandy Berzins, Lindsay Guyn & Robbie Babins-Wagner

Background: Feedback informed treatment (FIT) involves monitoring client outcomes on a session by session basis. It is an effective way of improving therapy effectiveness, as it allows therapists a way to identify individuals who are deviating from predicted treatment response and timely modification of treatment plans for these clients. As well, the addition of a “signal system” can work alongside FIT and prevent treatment failure. With a signal system, feedback messages along with a progress graph indicate if therapy is on track or not after each session. In practice this requires considerable commitment; client status has to be measured at each visit and the results stored in a timely fashion so a predicted outcome pathway can be calculated and utilized at subsequent therapy sessions. At Calgary Counselling Centre (CCC), a well-developed outcome measurement and data management system exists; we have an outcomes database for over 20,000 clients. Clients complete the outcome measure tool ‘Outcome Questionnaire (OQ-45)’ as well as the Session Rating Scale (SRS) (a therapeutic alliance measure) at each counselling session. **Methods:** Hierarchical linear modelling (HLM) was used to develop an equation that can predict outcome pathways and prediction intervals for individual clients. A variety of HLM model types were constructed, using different versions of the session number used to express time, including: untransformed session values, log-transformed session numbers, log-session using only the first 14 sessions, and the session term expressed as a quadratic value. Prediction intervals were calculated around the predicted value to create a signal system. Performance was tested by looking at the rate of treatment failure (using two different definitions) for clients who exceeded the upper prediction limit at least once. **Results:** The best-fitting model proved to be one using the log-transformed session number, along with gender, problem severity, and problem type as explanatory variables, plus some interaction terms. A 90% prediction interval had high sensitivity (95-99%) but also a high rate (30%) of false positives; i.e. clients who triggered the signal alarm but did not actually deteriorate. Using 98% or 99% intervals improved performance. **Conclusions:** CCC is piloting a new data collection system, so some clients complete their outcome measures on a computer tablet instead of a paper form. A graphical representation of the expected outcomes over time is provided in real-time to therapists after first sessions, and a signal message indicates deviations from their individually predicted pathway, which can be identified and treatment plans altered if indicated. After the system has been tested and issues addressed, all clients will complete their outcome measures on computer tablets. Ongoing monitoring of the signal system will be done to evaluate its effectiveness.

Title: Developing a Feasibility Study of Online Resiliency Training for Adolescents in an Acute Care Psychiatric Inpatient Unit

Author(s): Brooke Duncan, Jordan Cohen, Janet De Groot, Badri Rickhi, John Toews

Background: Mental illness is a well-known risk factor for suicide, the #1 cause of non-accidental death in teens. There has been a shift in the literature from a focus on deficits to protective factors and a subsequent explosion in resiliency-based research. Although definitions of resilience vary, it is clear that resilient individuals are more likely to have positive outcomes despite being faced with adversity. Interventions such as (BreathingRoom™) have the potential to build skills to improve resiliency and potentially decrease adverse outcomes of mental illness, including suicide. Intervening during adolescence is especially important given it's potential to have a greater effect on future mental health outcomes. This study aims to explore the potential value and feasibility of an online program designed to build resilience in adolescents with mental illness. **Methods:** A pilot prospective cohort study has been designed wherein patients admitted to the adolescent psychiatric acute care inpatient unit at the Foothills Hospital will be invited to complete modules from a resiliency-based online program (BreathingRoom™) following informed consent and/or assent. Pre and post measures of resilience to suicide will be obtained by questionnaire. Usage data will be collected during the participant's admission as well as for 6 months post-discharge. Changes in CGAS scores will be compared to a database of controls who did not undergo the intervention. Thematic analysis of qualitative interviews of participants post-discharge will be done according to qualitative theory. A focus group of unit staff will also address potential feasibility issues. The main objectives of this study are to gather feedback from adolescents with mental illness on the perceived psychological value of the program, to evaluate the suggested program for feasibility with respect to implementation on an acute care psychiatric inpatient unit and to obtain preliminary data on the impact of this intervention on adolescent resilience to suicide. **Discussion:** This program has shown preliminary success in improving depression in a mild to moderately depressed adolescent outpatient population. In the face of a health care system with limited resources, there is growing interest in developing innovative ways to provide meaningful interventions to improve mental health that do not require professionally trained staff and there is growing evidence for the effectiveness of internet-based treatment programs, especially for adolescents who have embraced the age of technology. Our hypothesis is that this program would benefit all adolescents with mental illness and we aim to evaluate this program in a more clinically diverse and presumably more severely ill population. If this program proves to be feasible and does in fact improve resilience, then it follows that it may have an effect on reducing suicide risk in this particularly vulnerable population.

Title: Depression In MCI: A Systematic Review

Author(s): Ismail Z, Elbayoumi H, Fischer C, Hogan D, Millikin C, Schweizer T, Smith E, Patten S, Fiest K.

Introduction and Background: Depressive symptoms commonly occur in association with mild cognitive impairment (MCI). Studies examining depression prevalence in MCI have been conducted, but their results have been inconsistent such that no consensus has emerged. **Objective:** To identify the best estimate of the prevalence of depression and depressive symptoms in MCI and any possible correlation. **Methods:** A systematic search of literature up to October 2013 was performed using Medline, Embase and PsycINFO databases, with no restrictions on the year of the study. Inclusion criteria included: original research studies, studies reporting on Depression and MCI and studies in English language only. References were retrieved to a software reference manager. A team of 9 reviewers participated in all the phases of, screening the abstracts, full text article review and the data abstraction. Every reference and selected full text article was double reviewed by 2 independent reviewers. 2 reviewers also performed data abstraction. **Results:** Initially 5329 references were screened with 177 articles selected for full text article review. From this initial search 44 articles were identified for the data abstraction phase. An updated literature search performed in January 2015, combined with a hand search of references from the 177 full text review articles contributed an additional 19 articles. **Conclusions:** We will provide best estimates of prevalence of depression and depressive symptoms in MCI. We will present funnel plots of the data and explore sources of systematic error.

Title: The Epidemiology of Bipolar Disorder in the Canadian General Population: What Do We Know?

Author(s): McDonald Keltie, Bulloch Andrew, Bresee Lauren, Duffy Anne, Lavorato Dina, Williams Jeanne, Patten Scott

Background: It is important to study the epidemiology of bipolar disorder (BD) in order to direct surveillance, resource allocation and research activities, which share the aim of reducing disease burden and improving quality of life. In order to be informative, the methods used to identify BD at the population level must be valid. **AIM.** This presentation is intended to inform the audience about problems encountered when estimating the prevalence of BD in a Canadian nationally representative survey. **Methods:** Data were drawn from the Canadian Community Health Survey-Mental Health (CCHS-MH), a nationally representative survey of household residents ages 15 and older living in the 10 provinces. The survey response rate was 68.9% (n=25,113). Psychiatric illnesses were identified in the survey using the World Mental Health Survey version of the Composite International Diagnostic Interview (CIDI). We estimated the prevalence of BD and described demographic features and health status indicators of the sample. All analyses were weighted using procedures recommended by Statistics Canada. **Results:** The estimated prevalence of BD according to the CIDI algorithm was 1.44% (95% CI 1.20-1.68). There was low congruence between different methods used to identify BD including self-reported professional diagnosis. Although health status was substantially poorer among those with BD compared to those without according to the CIDI, our estimates suggest the CIDI produced inaccurate classification of BD status. **Conclusions:** Psychiatric illnesses including BD are usually identified in population surveys using algorithms applied to data collected through fully structured diagnostic interviews. Internationally, the CIDI is among the most widely used diagnostic tools in population-level surveys. However, fully structured interviews, including the CIDI, may not be appropriate for assessing complex psychiatric illnesses such as BD. Future research should aim to develop and evaluate new methods of identifying BD in the general population in relation to a referent gold standard.

Title: Vitamin B₁₂ Deficiency: A Case Report and Review of Neuropsychiatric Consequences

Author(s): Rita Watterson

Vitamin B₁₂ is essential for normal blood synthesis and neurological function. Vitamin B₁₂ deficiency may cause megaloblastic anemia, subacute combined degeneration of the cord and psychiatric illness. We will describe an unusual case of a patient with severe vitamin B₁₂ deficiency together with profound hematological derangements and florid neuropsychiatric impairment who presented to a local community hospital with repeated falls, dizziness, weight loss, fatigue and irritability.

Vitamin B₁₂ deficiency is a common condition amongst our population, and the neuropsychiatric presentations associated with it can be quite varied. Thus, screening, reference ranges and biochemical markers are quite widely debated within the literature, leading to difficulties in determining abnormalities. Identified risk factors and epidemiological trends can help us identify at risk groups, but current literature is unclear of screening and treatment guidelines for our patients. These issues, and pertinent psychiatric presentations will be discussed in the second half of the presentation.

Title: Increased mortality associated with depression: a cohort study using The Health Improvement Network (THIN) database

Author(s): Isabelle Vallerand, Jordan Engbers, Mark Lowerison, Andrew Bulloch, Scott Patten

Background: Depression is associated with an increased risk of mortality from many different causes. Databases which use electronic medical records such as The Health Improvement Network (THIN) primary care database provide many advantages for studying this risk compared to most existing datasets which are limited by small sample sizes, insufficient follow-up periods and scarce data on important covariates. Therefore, the purpose of the current study was to investigate the overall risk of mortality associated with depression using THIN. **Methods:** We conducted a retrospective cohort study using THIN. All patients between the ages of 10-90 years with a first code for depression were included. We randomly assigned an index date for patients without any codes for depression to match the distribution of index dates among those with depression and only valid records were retained. This identified 558,457 patients with depression and 4,849,701 patients without depression. We used Cox proportional hazards models to conduct survival analyses. **Results:** Patients with depression had a significantly ($p < 0.0001$) increased risk of mortality during the observed period compared to those without depression (Hazard Ratio (HR)=1.47; 95%CI: 1.45-1.49). Males had a significantly ($p < 0.0001$) greater risk of mortality from depression (HR=1.86; 95%CI: 1.82-1.90), compared to females (HR=1.29; 95%CI; 1.27-1.31). **Conclusions:** Lifestyle-based risk factors such as smoking and alcohol use may explain to some extent the increased risk of mortality from depression observed among males. Further research using electronic medical records is needed to determine the extent to which such lifestyle-based risk factors and comorbid chronic diseases may influence the observed increased mortality risk among people with depression.

Title: Mentorship tools for difficult conversations? Pocket cards for (1) career counseling and (2) approaching perceived unprofessional trainee behavior.

Author(s): Jordan S Cohen

Background: Medical educators are both accountable for providing career guidance to our trainees and ensuring that they demonstrate a high degree of professionalism. At the undergraduate level there is a need to explore many career options within a limited period of time and ask critical questions to determine why a future area of medicine will best suit a student's needs. In residency, there are still many questions to be answered to develop a career plan in psychiatry. While trainees navigate career development they may struggle and be perceived as unprofessional, these incidents are often not dealt with appropriately or at all. **Purpose:** To present two pocket cards for mentoring trainees. The first card (The WILD Card = "Why I Love what I Do") is a career-counseling tool. The second, is a card that can be used by all teachers to aid them in dealing with concerning trainee behavior. **Methods:** The development of these cards will be outlined. **Results:** The WILD Card provides an opportunity for exploring a resident's interests, strengths and values. The pocket card for perceived unprofessional trainee behavior provides a non-judgmental approach to discerning what is the cause (based on the different The Royal College of Canada's CanMEDS roles) and possible resources to aid a struggling trainee. **Discussion:** The ways these tools are integrated in our mentoring program will be discussed (self-reflection, preceptor-discussions and teaching). **Conclusion:** Both these pocket cards have been incorporated into our formal mentoring system and have been positively received by residents and faculty.

Title: Open Trial of the Neurosequential Model of Therapeutics (NMT) Approach in a Clinical Setting

Author(s): Emily Wang, T. Christopher Wilkes, Bruce Perry, Frank P. MacMaster, Jan Ference, Jamie Gramlich

Background: The Preadolescent Treatment Program (PTP) is a trauma informed, attachment-based residential treatment program serving kids between 5 to 12 years. PTP uses the Neurosequential Model of Therapeutics (NMT). **Methods:** Clients were 5 to 13 years old. A retrospective quality assurance review of the baseline and discharge charts was conducted. Variables evaluated include: (1) Child and Adolescent Functional Assessment Scale (CAFAS) scores, (2) Cortical Modulation Ratio scores from the NMT Metric, as well as (3) a review of individuals' Critical Incidents from initial intake to discharge. This was completed to determine whether the youth in care did indeed show a reduction in maladaptive behaviors (and improved self regulation) because of their care at PTP. **Results:** CAFAS scores showed a significant reduction of 59% ($t = 10.97$, $p < 0.001$). Cortical Modulation Ratio showed a 45% increase ($t = 8.510$; $p < 0.001$). There was a negative correlation between baseline Cortical Modulation Ratio and Post CAFAS scores ($r = 0.533$, $p = 0.031$). **Conclusions:** Based on the results above, using the four functional domains identified in the NMT approach to support the youth at the PTP provides a strong foundation for treatment interventions to increase self-regulation and decrease maladaptive behaviors.

Title: An Evaluation of Cognitive Training in Healthy Seniors

Author(s): Luu, M.; Goghari, V. M.

Background: Maintaining or enhancing mental ability is an attractive concept, especially for seniors concerned about declining cognitive abilities, such as memory, thinking speed, and decision making abilities. However, research on the effectiveness of cognitive training for healthy older adults has been mixed to date. One controversy in the cognitive training literature is whether healthy seniors are able to benefit from cognitive training protocols, and if so, which cognitive abilities should be addressed to maximize training. Given the inconsistency of findings, the present study aims to evaluate whether an online brain training program that targets working memory or higher level logic and planning skills leads to improvements in cognitive abilities after 8 weeks of training. **Methods:** Participants included 16 healthy seniors who completed measures of cognitive abilities, such as working memory and executive functioning, before and after an 8-week web-based cognitive training program. **Results:** Participants experienced differences in cognitive performance from baseline to post-training. Preliminary analyses indicate improved performance on specific cognitive assessment measures after the training period compared to baseline measures, such as design fluency, a measure of generativity and creativity, as well as an increased ability to follow rules in a planning task. **Conclusions:** Cognitive training may result in improved cognitive performance for healthy seniors. The results of this study can be used to refine cognitive training protocols to suit the needs of seniors. Future directions will evaluate if cognitive training contributes to improved quality of life for healthy seniors, as well.

Title: Violent content in attenuated psychotic symptoms in those at clinical high-risk for psychosis

Author(s): Catherine Marshall, Dallas Callaway, Kristen Cadenhead, Tyrone Cannon, Barbara Cornblatt, Thomas McGlashan, Diana Perkins, Larry Seidman, Ming Tsuang, Elaine Walker Scott Woods, Carrie Bearden, Dan Mathalon, Jean Addington

Background: The relationship between psychosis and violence has typically focused on what factors are likely to predict who will commit violent acts. A number of factors have been found to increase the likelihood of violent acts being committed by those experiencing psychosis including demographic variables, substance abuse, and trauma. The aim of the current study was to examine violent content in the attenuated psychotic symptoms of individuals who are at clinical high risk (CHR). **Methods:** The sample consisted of 442 CHR individuals who had attenuated psychotic symptoms (APS). CHR status was determined with the Structured Interview for Prodromal Syndromes (SIPS). The description of the APS symptoms was taken from comprehensive vignettes based on the SIPS. The content of these APS symptoms were coded as being present or absent using the Content of Attenuated Positive Symptoms (CAPS) Codebook. Measures included the Calgary Depression Scale for Schizophrenia, the Social Interaction Anxiety Scale, the Self-Rating Anxiety Scale, Global Functioning: Social & Role Scale, Alcohol/Drug Use Scale, Brief Core Schema Scale, trauma and, perceived discrimination. **Results:** The sample was divided into those who presented with violent content in their APS (n=213) and those without (n=229). There were no group differences in DSM-IV diagnoses, depression, anxiety, social, role or intellectual functioning. CHR individuals who reported violence in their symptom content reported greater negative beliefs regarding the self. As well, although not statistically significant after application of Bonferroni correction, a series of chi-square analyses indicated a significant association between reporting a history of psychological or emotional bullying and reporting violent content. Those who reported self-direct violence tended to report greater negative core beliefs regarding themselves and others compared to those who did not report violent content. **Conclusion:** There is no evidence of clinical or functional differences or differences in early experiences between CHR individuals who have violent content in their APS and those who do not. However, those who report experiencing violent content in their APS symptoms have more negative beliefs about themselves and other people. Further work in this area needs to explore violent content with actual behavior.

Title: Social Functioning in Individuals at Clinical High Risk of Psychosis

Author(s): Laina McAusland, Diana Perkins, Scott Woods, Lu, Liu, Jean Addington

Background: There is accumulating evidence that individuals at clinical high risk (CHR) of developing psychosis typically have poor functioning and that poor functioning may be a predictor of later conversion to psychosis. Furthermore, even for those who do not go on to develop psychosis more than 50% continue to function poorly. The purpose of this study was to examine social functioning in a large sample of individuals at CHR of psychosis and to determine its role in conversion. **Method:** The sample consisted of 153 young people (64 females, 89 males) at CHR of psychosis, 27 of whom later developed psychosis. The sample was part of the PREDICT study which was a multisite project conducted at the Universities of Toronto, North Carolina and Yale. The Structured Interview for Prodromal Syndromes was used to determine criteria and the Scale of Prodromal Symptoms for determining severity of symptoms. Social functioning was assessed with Birchwood's Social Functioning Scale (SFS) which assesses seven domains of social functioning that include social engagement, interpersonal communication, performance, competence, recreation, prosocial behavior and occupation, as well as overall score. Role functioning was assessed with the role functioning and role satisfaction subscales from Heinrich and Carpenter's Quality of Life Scale (QLS). **Results:** On average this sample demonstrated poor social functioning. Those who converted demonstrated significantly poorer functioning with respect to the overall score ($p < 0.001$) and for 5 of the 7 sub scores, namely interpersonal communication, performance, recreation, prosocial behavior and occupation (p values ranged from $p < 0.01$ to $p < 0.001$) on the SFS. Those who converted to psychosis also performed more poorly on the role function subscale of the QLS compared to those who did not convert. However, there was no difference between those who converted and those who did not on role satisfaction. Poor functioning was unrelated to attenuated psychotic symptoms but significantly related to negative symptoms ($p < 0.01$). **Conclusions:** This data supports earlier studies that demonstrated poor functioning in those who are at risk for psychosis. Those who make the transition to a full blown psychotic illness at initial assessment have poorer social and role functioning than those who do not; however this is more pronounced for social rather than role functioning.

Title: Repetitive Transcranial Magnetic Stimulation for Treatment Resistant Depression in Youth

Author(s): Sembo, M, Kirton, A., Langevin, LM, Jasoui C, Y, Wilkes, TC, MacMaster, F

Background: The incidence of major depressive disorder (MDD) in adolescents is a growing concern. Medication and behavior therapy are only effective in about half of adolescents. Hence, new treatment options are needed. We investigated repetitive transcranial magnetic stimulation (rTMS) as an alternative treatment for youth with treatment resistant MDD. **Methods:** Twenty-three youth (age 13-21 years, mean 17.81 years \pm 2.07 years; 9 males, 9 females) diagnosed and previously treated for MDD completed semi-structured interviews and questionnaires on two occasions, separated by a three-week rTMS intervention. Average age of onset of MDD was 14.00 \pm 3.16 years (mean \pm standard deviation), with a baseline Hamilton Depression Rating Scale (HAM-D) score of 24.72 \pm 7. Three participants withdrew from the study, although none cited the rTMS treatment as the reason for doing so. Response to treatment was defined as a minimum 30% score reduction on the HAM-D. **Results:** Of the 18 participants retained throughout the length of the study, the mean reduction in HAM-D scores was 45.53 \pm 26.09. Twelve participants responded to treatment (mean HAM-D change 56.71 \pm 16.13), while six did not respond to treatment (mean HAM-D change 14.18 \pm 17.15). Of the non-responders, five of six had comorbid social phobia (compared to 1 of 12 of the responders). **Conclusions:** rTMS treatment is an effective and promising alternative to treating adolescents suffering from MDD. This also suggests that social phobia plays a role in response to rTMS treatment.

Objectives

- (1) To understand the effect of repetitive transcranial magnetic stimulation for treatment resistant depression in youth
- (2) To understand the potential role of comorbid social phobia in response to repetitive transcranial magnetic stimulation for treatment resistant depression in adolescents
- (3) To understand the basics of repetitive transcranial magnetic stimulation

Financial

Cuthbertson and Fischer Chair in Paediatric Mental Health, Children's Hospital Aid Society, Alberta Children's Hospital Foundation

Title: Childhood Adversity and Subsequent Mental Health Status in Adulthood: Screening for Associations Using Two Linked Surveys

Author(s): Scott B. Patten, T. Christopher R. Wilkes, Jeanne VA Williams, Dina H. Lavorato, Nady el-Guebaly, T. Cameron Wild, Ian Colman, Andrew GM Bulloch

Aims: Accumulating evidence links childhood adversity to negative health outcomes in adulthood. However, most of the available evidence is retrospective and subject to recall bias. Published reports have often focused on specific childhood exposures (e.g. abuse) and/or specific outcomes (e.g. major depression). Other studies have linked childhood adversity to a large and diverse number of adult risk factors and health outcomes such as obesity and cardiovascular disease. In order to advance this literature, we undertook a broad examination of data from two linked surveys. The goal was to avoid retrospective distortion and to provide a descriptive overview of patterns of association. **Methods:** A baseline interview for the Canadian National Longitudinal Study of Children and Youth (NLSCY) collected information about childhood adversities in 1994. The sampling procedures employed in a subsequent study called the National Population Health Survey (NPHS) made it possible to link n=1977 of these respondents to follow-up data collected later when respondents were between the ages of 14 & 27. The outcomes included mental health outcomes, some risk factors and educational attainment. Cross-tabulations were used to examine these associations and adjusted estimates were made using the regression models. As the NPHS was a longitudinal study with multiple interviews for most respondents Generalized Estimation Equations (GEE) were used to fit these models. As there were multiple exposures and outcomes a multiplicity of statistical tests a statistical procedure to control the false discovery rate (Benjamini-Hochberg) was therefore employed. **Results:** Childhood adversities were most consistently associated with a cluster of potentially related outcomes: major depressive episodes, psychotropic medication use, and smoking. These outcomes are potentially related in the sense that psychotropic medications are commonly used in the treatment of major depression, and smoking is strongly associated with major depression. However, no consistent associations were observed for other outcomes examined: physical inactivity, excessive alcohol consumption, binge drinking or educational attainment. **Conclusions:** The conditions found to be most strongly associated with childhood adversities were a cluster of outcomes that may potentially share pathophysiological connections. Whereas prior literature has suggested that a very large number of adult outcomes, including physical inactivity and alcohol-related outcomes are associated with childhood adversity, this analysis suggests a degree of specificity between adversity and three outcomes potentially related to depression. Some of the other reported adverse outcomes (e.g. those related to alcohol use issues, physical inactivity or more distal outcomes such as obesity and cardiovascular disease) may emerge later in life and in some cases may be secondary to depression, psychotropic medication use and smoking.

Title: Biomarkers of Repetitive Transcranial Magnetic Stimulation for Treatment Resistant Adolescent Depression

Author(s): Jasoui, Y (1); Kirton, A (2,3); Langevin, LM (1); Sembo, M (1); Wilkes, TC (1,2); MacMaster, FP (1,2)

(1) Mathison Centre for Mental Health Research & Education, Psychiatry, (2) Paediatrics, (3) Clinical Neurosciences, University of Calgary, Calgary, AB, Canada

Background: Repetitive transcranial magnetic stimulation (rTMS) is an emerging intervention for treatment resistant major depressive disorder (MDD) in adolescents. Though rTMS is an effective technique, positive responses are not universal. As MDD is associated with alterations in brain chemistry, we investigated metabolite concentrations as a biomarker for predicting treatment response. We hypothesized that lower baseline glutamate levels would predict beneficial rTMS treatment response and associate with lower MDD scores post-treatment. **Methods:** Anatomical and spectroscopy data was collected on a 3.0T GE MR750w. A 15-weekday rTMS treatment was applied targeting the left dorsolateral prefrontal cortex (DLPFC). **Results:** At baseline, responders had lower left DLPFC glutamate concentration ($p = 0.047$) that increased with rTMS compared to non-responders ($p = 0.01$) and correlated with the change in Hamilton depression rating scores (HAMD; $r = 0.58$, $p = 0.02$). Reduced DLPFC thickness was observed in responders ($p = 0.009$), and was associated with greater change in HAMD ($r = -0.56$, $p = 0.03$). Lower left DLPFC cerebral blood flow at baseline was associated with greater change in Children's Depression Rating Scale ($r = -0.62$, $p = 0.02$) and Beck Depression Inventory scores ($r = -0.59$, $p = 0.03$). **Conclusions:** Measures of glutamate and cortical thickness in the left DLPFC may provide tractable predictions of rTMS treatment response in youth, leading to more personalized therapy regimens.

Title: Using Bounded Rationality to Adopt Healthy Decision-Making in Eating

Author(s): Oswald, L., Chater, A., Lange, D.

The focus of the current work is integrating the theory of bounded rationality with decision-making regarding eating behaviour. Bounded rationality outlines how individuals make decisions while constrained to time, cognitive capability, and their environment. It proposes the use of heuristics, or simple mental tools, which show to be both fast and frugal. Bounded rationality's focus is on the interaction between cognition and the environment- that is, the selection of heuristics used will depend on both the environmental context and cognitive capacity. Bounded rationality's emphasis on the environmental context as a major influence in the decision-making process complements present theories in food decision-making. Variance of cognitive capability in the selection of heuristics in food decision-making is less studied, and will be explored. Bounded rationality will be described, related to existing models, and reviewed through empirical evidence. This work has possible implications for designing heuristic-based weight management programs centered around food decision-making, which cater to both the environment and cognitive capabilities of the target group

**Title: Developing a Formalized Mentorship Program For Postgraduate Training:
University of Calgary, Department of Psychiatry Residency Program**

Author(s): Jordan S Cohen

Background: Career development is an integral component to residency training. Many residents develop informal mentors who are their teaching faculty, but this relationship can be challenging if the trainee then encounters academic problems. Some residents have difficulty making connections with mentors and some do not believe or are unaware of the importance of being mentored. The majority of residency programs across North America do have informal mentoring relationships that have been mainly based around research collaboration. **Purpose:** To describe our novel formalized mentoring program for psychiatry residents. This program was developed with resident consultation and a set curriculum, as well as, specific career counseling tools that are utilized to develop the mentoring relationship. **Methods:** Based on resident consultation and feedback from mentors a curriculum was developed that considered both process and content of mentoring. **Results:** The curriculum begins in year one and considers the challenges to building a mentoring relationship, considers critical aspects of career development (e.g. sharing clinical experiences, learning to be an educator, ethics, physician health, professionalism). Specific pocket tools used for exploring career options in psychiatry and dealing with difficult challenges as a teaching were integrated into this curriculum. **Discussion:** Strengths, weaknesses, opportunities and future directions for this program will be discussed. **Conclusion:** This program has been well received over the 3 years it has been piloted. Ongoing evaluation still needs to occur to determine if residents feel it has made a significant difference in their career development during training.

Title: Health psychology in a psychiatric setting**Author(s):** Lauren Oswald

The objective of this presentation is to introduce the field of health psychology within a psychiatric setting. Health psychology is the study of psychological and behavioural processes in health, illness, and healthcare. Health-related behaviour is understood through a biopsychosocial approach. For example, behavioural factors that harm or enhance health (eg., smoking, excessive alcohol consumption, or exercise, and a diet low in fat). The aims of health psychology are to understand behavioural and contextual factors, prevent illness, understand the effects of disease, critically analyze health policy, and conduct research. Health psychology also focuses on teaching and communication with patients and with other medical professionals in academic and medical settings. Practical applications will be reviewed with particular focus on a psychiatry setting, such as using motivational interviewing to increase compliance to treatment.

Title: Epidemiological Data on Mental Health of Canadian Physicians**Author(s):** Raymond Lau, Scott Patten

Background: There is no epidemiologic study previously done to support claims of higher mental illness prevalence among physicians. Methods: Using the Canadian Community Health Survey from Statistics Canada, we determined in physician and non-physician groups, the prevalences of mood and anxiety disorder, as well as different types of stresses. Results: Survey response rate 78.5%. N=267532 with 443 in physician subset. There is evidence that physicians have lower incidence of disorders of mood, nicotine, and alcohol. Physicians are in lower general distress, but have differing stress elements in the workplace. Conclusions: Physician mental health appears to be superior to non-physicians. Limitations of this result include a limited set of analysed outcome variables, possible confounding by sex, age, and income demographic variables. This is a correlational study that does not show cause and effect. Data may be influenced by response bias due to physician training in psychiatry.

Title: Fatigue Risk Management Amongst University of Calgary Resident Physicians

Author(s): Kimberly Williams, Natalia Jaworska, Kevin McLaughlin

Background/Purpose: Resident fatigue has been cited as one of many factors that contribute to errors in the healthcare setting. The definition of fatigue is extreme tiredness resulting from mental or physical illness. Chronic sleep loss adversely affects mood, personal relationships and perceived quality of life. The impact of emotional, mental and motivational fatigue on resident performance is not well characterized in the literature. Further data is required in order to better elucidate the contribution of these forms of fatigue to the resident experience of fatigue and its contribution to job performance, cognition, and medical errors. Methods: Data will be collected in January 2015. A validated survey to identify the perceived impact of various aspects of fatigue will be conducted with University of Calgary residents of various specialties. Then explanatory focus groups will be conducted. The focus group data will be transcribed and then analyzed using thematic analysis. The questionnaire will be analyzed using a mixture of parametric and nonparametric tools including both descriptive analysis and multivariate regression. Results: The objectives of the study are to a) collect baseline data on how residents identify and manage fatigue, b) assess the perceived effectiveness of programs in identifying and managing resident fatigue, c) explore how residents help their colleagues with fatigue, and d) elucidate which aspects of fatigue are the greatest contributors to overall resident fatigue. Conclusions: To date there has been no prior qualitative assessment of Alberta resident physicians regarding fatigue and fatigue management. The data has implications for improved resident mental health.

Title: The Alzheimer's Disease Neuroimaging Initiative: FDG-PET Neuroimaging of Delusions in the Absence of Hallucinations in Early AD

Author(s): Zahinoor Ismail, Colleen Millikin, Corinne Fischer, Tom Schweizer, Tiffany Chow

Fluorodeoxyglucose Positron Emission Tomography (FDG-PET) data from the Alzheimer's Disease Neuroimaging Initiative (ADNI) were used to examine changes in brain function associated with the presence of delusions, in the absence of hallucinations, in patients with Alzheimer's Disease (AD). All patients were identified as non-delusional at baseline. Sixteen subjects were included in the analysis. Eight patients who developed delusions and were delusional at the time of scanning were matched to eight non-delusional patients for age, education, illness duration and level of global cognitive impairment. Images were processed as per the ADNI protocol. Independent samples t-tests demonstrated significantly increased activity in the bilateral anterior insulae and the left temporal regions for patients with delusions. The right insula volume of interest (VOI) had 151 voxels centered at Montreal Neurological Institute (MNI) coordinates $x=-32$, $y=26$, $z=4$. The left insula VOI had 45 voxels centered at MNI coordinates $x=30$, $y=14$, $z=10$. The left temporal VOI had 21 voxels, centered at Montreal Neurological Institute (MNI) coordinates $x=40$, $y=0$, $z=-34$. These regions are involved in sensory and emotional processing and have been previously implicated in neuroimaging studies of delusions in dementia as well as in schizophrenia.

Title: Combination of Clozapine with Long Acting Injectable Antipsychotics in Treatment Resistant Schizophrenia: Preliminary Evidence from Health Care Utilization Indices

Author(s): Rachel Grimminck, Toba Oluboka, Manvir Bal, Donna L. Rutherford, Tolulope Sanjobi, Helen Yeung

Objectives: Clozapine is indicated for Treatment Resistant Schizophrenia (TRS) yet only 30-60% of patients will respond to optimum treatment. There have been studies of clozapine augmentation with oral second generation antipsychotics (SGA) with mixed results but no studies considering the combination with long acting injectable (LAI) antipsychotics. This study attempts to establish the efficacy of the combination of clozapine and LAI antipsychotics in TRS. **Methods:** A mirror-image study design was employed to review health care utilization measures 2 years pre and post combination of clozapine with a LAI (either first generation antipsychotic (FGA) or SGA) in a small sample of patients (N=20) with chronic psychotic disorders followed by the Assertive Community Treatment service in Calgary, Alberta. **Results:** Paired sample t tests showed a statistically significant reduction in average ED visits in the two years post combination with an average 1.8 fewer ED visits (95%CI =[0.58 to 3.02], p=0.024). There was also a statistically significant reduction in number of hospital admissions in the 2 year post combination with a mean reduction of 0.85 admissions (95%CI = [0.36 to 1.34], p=0.008). But there was no statistically significant reduction in hospital bed days between pre- and post-combination.

Conclusions: The combination of clozapine and a long acting injectable antipsychotics appears to reduce health care utilization in terms of ED visits and number of hospital admissions. Future research will investigate the effects of this combination on psychopathology and health related quality of life outcomes in this patient population.

Title: Training social cognition in schizophrenia

Author(s): Mariapaola Barbato

Background: Social cognition is defined as the ability to understand, process and react to social cues. Social cognition is impaired in schizophrenia and appears to mediate the relationship between neurocognition and social functioning. Interventions focusing on social cognition, called Social Cognitive Training (SCT), have been developed and seem to improve both social cognition and functioning. Most of these trainings are psychosocial group-based interventions; however, a growing field of research has developed computerized training. Compared to group interventions, which involve active participation of trained therapists, computerized training programs are less expensive, more accessible and can be done with very little supervision. There is some preliminary evidence showing that these interventions have some success. However, further studies are needed to explore the potential of such interventions in individuals at different stages of psychosis. **Aims:** Our study aims at evaluating behavioral and brain changes following a structured SCT focused on facial affect processing in people at the first episode of psychosis. In particular our aim is to evaluate if any change in facial affect recognition and/or social functioning can be observed in these individuals after 3 sessions of a computerized SCT. **Methods:** In this single-blind placebo-controlled trial 18 participants will be randomized to either SCT or a control condition (standard video games that do not affect social cognition). The SCT will include two computerized programs, eMETT 3.0 and eSETT, comprised of emotion lessons, quizzes and games. Participants will receive 3 training sessions (one hour X week X 3 weeks). Clinical measures include IQ with the WASI, SCID, PANSS, social functioning, and facial affect recognition. **Results:** So far we have recruited 3 participants in the study. More detail about the characteristics of the sample may be available at the time of this presentation.

Title: Cortical thickness is associated with meta-cognition in brain regions implicated in the pathogenesis of psychosis: A study in youth at clinical high risk of psychosis

Author(s): Lisa Buchy

Background: Meta-cognition is compromised in people with schizophrenia and people at clinical high risk (CHR) of psychosis. In the current study in a CHR sample, we hypothesized that meta-cognitive functions would correlate with cortical thickness in five brain regions implicated in the pathogenesis of psychosis: inferior and middle frontal cortices, anterior cingulate cortex, superior temporal cortex and insula. Secondly, we hypothesized that similar neural systems would underlie different meta-cognitive functions. **Methods:** Narratives were gathered for 29 youth at CHR of psychosis using a semi-structured interview. Four meta-cognitive functions within the narratives were measured with the Meta-cognition Assessment Scale and regressed on cortical thickness from our a priori regions of interest using FreeSurfer. **Results:** Mapping statistics from our a priori regions of interest revealed that meta-cognition functions were associated with cortical thickness in inferior and middle frontal gyri, superior temporal cortex and insula. The distribution of cortical thickness was partially similar across the four MAS items. **Conclusions:** Results confirm our hypothesis that cortical thickness is significantly associated with meta-cognition in brain regions that consistently show gray matter reductions across the schizophrenia spectrum. Evidence for thickness covariation in a variety of regions suggests partial dependence in the neural architecture underlying various meta-cognitive functions in CHR.

Title: Baseline and one month follow-up data for cognitive insight, attenuated positive and negative symptoms, and functioning in individuals at clinical high risk for psychosis

Author(s): Kristina Lyngberg, Lisa Buchy, and Jean Addington

Background: Cognitive insight is measured through an individual's Self-Reflectiveness and Self-Certainty (overconfidence). Low Self-Reflectiveness and high Self-Certainty have been associated with the severity of delusions and hallucinations as well as poor functioning in individuals with schizophrenia. There is recent evidence that higher Self-Certainty is related to attenuated delusions in a sample at clinical high risk (CHR) for psychosis. However, less is known how cognitive insight influences psychological factors in those at a CHR for psychosis or how these factors co-vary over time. The present study evaluated in a CHR sample change in cognitive insight and attenuated positive and negative symptoms and current functioning at baseline and one month follow-up.

Methods: Fourteen individuals at CHR of psychosis were assessed at baseline and one month follow-up on cognitive insight with the Beck Cognitive Insight Scale and assessed on attenuated psychotic symptoms with the Scale of Prodromal Symptoms (SOPS). Current functioning was determined with the Global Functioning Social and Role scales.

Results: Self-Reflectiveness and Self-Certainty did not significantly change between baseline and one month follow-up. Positive symptoms significantly improved between the baseline and one month assessments and there was a trend toward improvement in negative symptoms. No significant changes were observed in social or role functioning.

Conclusions: Although attenuated positive and negative symptoms improved over one month, cognitive insight does not appear to change in tandem with improvements in attenuated psychotic symptoms. Although there is evidence that cognitive insight is related to attenuated positive symptoms cross-sectionally our results suggest these factors do not co-vary over time. The relationship between cognitive insight, symptoms, and current functioning can further be explored in a larger population sample.

Discerning Risk Differences in a Canadian Survey Data Library

Author(s): Scott B. Patten, Jeanne VA Williams, Dina Lavorato, Andrew GM Bulloch

Aims: Epidemiological research seeks to understand the distribution and determinants of disease. To accomplish this, epidemiologic studies depend on large samples sizes. With limited sample sizes, estimates may suffer from imprecision. In other words, they may have wide confidence intervals, limiting their usefulness. A solution to this problem is to conduct analyses on very large datasets, but the availability and quality of such data are often questionable. An alternative approach is to pool together estimates from different studies, an approach that has been widely adopted in the systematic review literature. This approach seems feasible with national survey datasets produced by Statistics Canada, since such surveys often have shared data elements and design features. **Methods:** We examined estimates of mental-health variables in several national datasets: the National Population Health Survey, the Canadian Community Health Survey and two national mental health surveys. Estimates that accounted for design effects (unequal selection probabilities, clustering) were made. Pooling was contingent on homogeneity, as assessed by forest plots and the Q statistic. **Results:** Pooling was found to usually require the use of random effect models, and in some cases this limited gains in precision because between-study variability was not always negligible. Temporal trends were seen in some parameters (e.g. antidepressant use) and not in others (e.g. major depression prevalence). When pooling was feasible, increased precision resulted in the identification of dramatic seasonal variation and clearly evident interactions between age and sex. **Conclusions:** Whereas statistical pooling techniques are widely used in the systematic review literature, these techniques can also provide insights from observational studies.