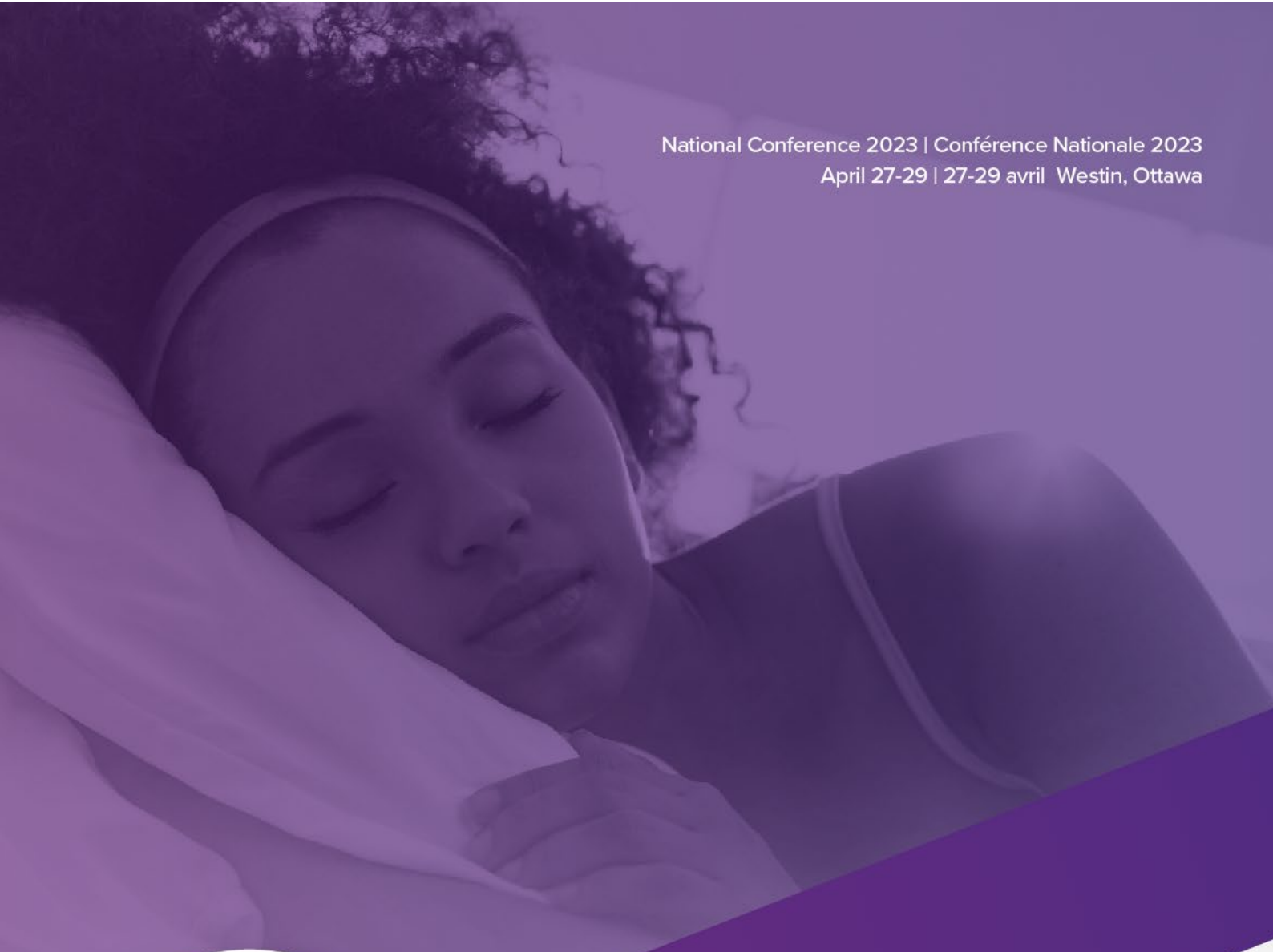
National Conference 2023 | Conférence Nationale 2023
April 27-29 | 27-29 avril Westin, Ottawa



Sleep | Dormir

Abstract Book
Livre des résumés

Canadian Sleep Society | Société Canadienne du Sommeil

Contents

SAMPLE ANNOTATION:
Au CT, Voutsas G, Katz SL, Narang I. *Association between OSA, sleep quality, and neurocognitive function in children and adolescents with obesity*. Vigilance (S), 2023 April, p. 26.

NOTE: Two asterisks (**) beside an author's name indicates presenting author at the 2023 Canadian Sleep Society's National Conference.

ORAL SESSION 1: SLEEP, MENTAL HEALTH AND NOVEL INTERVENTIONS

ORAL SESSION 1: Behavioral therapy for shift work disorder improves healthcare workers' sleep, sleepiness, and mental health: A pilot randomized control trial

**Vallières, Annie[1,2,3]; Garnier, Séverine[1]; Pappathomas, Alric[1,2,3]; Paquette, Tyna[4]; Mérette, Chantal[2,5]; Carrier, Julie[4,6]; Bastien, Célyne H.[1,2]

[1]École de psychologie, Université Laval; [2]Centre de recherche CERVO; [3]Centre de recherche du CHU de Québec-Université Laval; [4]Centre d'études avancées en médecine du sommeil, Recherche CIUSSS du Nord-de-l'Ile-de-Montréal; [5]Département de psychiatrie et de neurosciences, Université Laval; [6]Département de psychologie, Université de Montréal

Submission ID 62

ABSTRACT Introduction/objectives Around 30% of shift workers suffer from shift work disorder (SWD) involving insomnia and/or sleepiness related to their work schedule. This study evaluates the efficacy of our recently developed behavioral therapy adapted for SWD (BT-SWD) with a randomized control design in a healthcare population. Methods: Forty-three healthcare night workers (mean age: 34y.o.; 77% women) suffering from SWD were randomized to either BT-SWD or a waitlist-control group. Once waiting was over, waitlist-control participants received BT-SWD (n=10). Pre- and post-treatment questionnaires included: Epworth Sleepiness Scale (ESS), Insomnia Severity Index (ISI) for day and night sleep, Cognitive Pre-Sleep Arousal Scale (PSAS-C), Dysfunctional Beliefs and Attitudes about Sleep scale (DBAS-16), State-Trait Anxiety Inventory (STAI), and Beck Depression Inventory (BDI-II). BT-SWD involved sleep restriction therapy, stimulus control, and fixed sleep periods in the dark. Repeated-measures ANCOVAs controlled for age and sex were performed with group as the between-subject factor and time (pre-post) as the within-subject factor. Effect sizes (ESs) were computed. Results Group*time interactions were significant for day and night ISI, Fs(1,27)= 40.99 and 9.04, ps < .0001 and .0057, indicating that BT-SWD participants experienced a significant decrease in insomnia severity at post-treatment (ESs time= -1.77 and -0.90, ps < .0001 and =.0002) while wait-list control participants did not. Compared to the control group, the BT-SWD group showed improvements from pre- to post-treatment on DBAS-16, PSAS-C, STAI-trait, and BDI-II scores (ESs time= -0.82, -1.10, -1.04, and -1.16, ps=.0005 and < .0001). Sleepiness also improved at post-treatment in the BT-SWD when data from the control-waiting list group were added to BT-SWD (ESs= -0.90, ps < .0001). Conclusions BT-SWD is effective in reducing insomnia severity, cognitive activation, anxious, and depressive symptoms and, to a lesser extent, sleepiness. Adapted BT-SWD can be used to improve the sleep and mental health of healthcare workers. An eHealth BT-SWD application is under development and testing.

ORAL SESSION 1: Effect of Continuous Positive Airway Pressure, Mandibular Advancement Splints and Combination Therapy on Blood Pressure in Obstructive Sleep Apnea Patients: A Multi-Center Randomized Clinical Trial

**Hamoda, Mona M[1]; Huynh, Nelly[2]; Rompre, Pierre[2]; Series, Frederic[3]; Masse, Jean-François[3]; Gakwaya, Simon[3]; Arcache, Patrick[2]; Ayas, Najib T.[4]; Fleetham, John A[4]; Almeida, Fernanda R.[1]

[1] Department of Oral Health Sciences, Faculty of Dentistry, University of British Columbia, Vancouver, British Columbia, Canada [2] Faculty of Dentistry, Universite de Montreal, Montreal, Canada [3] Universite Laval, Quebec City, Canada [4] Division of Respiratory Medicine, Department of Medicine, University of British Columbia, Vancouver, British Columbia, Canada

Submission ID 160

ABSTRACT Continuous-Positive-Airway-Pressure(CPAP) and Mandibular-Advancement-Splints(MAS) have shown modest reductions in blood-pressure (BP). Aims were to assess BP and objective adherence for CPAP, MAS and their combination (alternating-therapy). A multi-center, double-randomized, three-phase (titration/cross-over/observation) trial comparing CPAP and MAS followed by their alternating use was conducted. Outcomes were assessed at the end of 1-month CPAP and MAS, and 1-month and 6-months observation. Outcomes included objective adherence, efficacy and in-office BP. Eighty patients were assessed at baseline, mean REI=21events/hour, mean age= 52(range:24-74)years and 73% males. Mean percentage efficacy of CPAP and MAS were 90% and 42% respectively. Mean and median hours of adherence (when-used) were higher for MAS relative to CPAP(p<0.0001). Observation phase showed similar mean and higher median hours of use (p=0.003) relative to CPAP. Total sample showed significant reduction in mean SBP for 1-month-MAS(p=0.02) and 6-months-observation(p=0.046) relative to baseline. Significant reduction in mean DBP between baseline and 1-month-CPAP(p= 0.02), 1-month-MAS(p=0.002) and 6-months-observation(p=0.03) was observed. Seventy-four-percent of participants were Stage 1 or 2 hypertensive at baseline. Significant reduction (p<0.05) in SBP for hypertensive subset at all timepoints except 1-month-CPAP and significant reduction (p<0.001) in DBP for hypertensive subset relative to baseline at all timepoints were noted. No statistically significant differences in SBP and DBP between treatment timepoints and no effect of treatment sequence during cross-over on efficacy, adherence or BP were observed. Body-Mass-Index showed no statistically significant differences between all timepoints. This is the first trial to assess alternating-therapy long-term and the first to objectively measure-and-compare adherence to CPAP, MAS and alternating-therapy. MAS showed lower efficacy yet higher adherence relative to CPAP and their combination (alternating-therapy) helped maintain high level of adherence long-term. BP reduction appeared to be related to adherence rather than efficacy and high adherence likely contributed to the clinically significant reduction in BP. Improvements were greater for hypertensive subset and alternating-therapy.

ORAL SESSION 1: Effectiveness and Optimization of Lower-Sodium Oxybate in Participants With Narcolepsy Switching From Sodium Oxybate: Interim Data from the Substitution of Equal Grams of Uninterrupted Xyrem to Xywav (SEGUE) Study

**MacFadden, Wayne[1]; Leary, Eileen B.[1]; Kirby, Todd [1,2]; Skowronski, Roman[1]; Xu, Kevin [1]; Pfister, Craig[1]

[1]Jazz Pharmaceuticals, [2]Department of Psychiatry, Medical College of Georgia at Augusta University

Submission ID 18

ABSTRACT Introduction: Lower-sodium oxybate (LXB; Xywav®) contains 92% less sodium than sodium oxybate (SXB) and is approved in the US for treating cataplexy or excessive daytime sleepiness (EDS) in patients with narcolepsy (≥7 years of age). The SEGUE study examines safety, tolerability, effectiveness, and treatment optimization in participants with narcolepsy transitioning from SXB to LXB. Methods: Eligible participants in this ongoing, multicenter, open-label study (NCT04794491) are adults with narcolepsy (type 1 or 2) on an SXB stable dose (maximum 9 g/night; no single dose >6 g) and regimen (once, twice, or thrice nightly). After 2 weeks on SXB (baseline period), participants switch to the same LXB dose/regimen (intervention period; 6 weeks). If needed, LXB dose/regimen is titrated to optimize efficacy/tolerability. Assessments include the Patient Global Impression of Change (PGIc), forced preference questionnaire (FPQ), and ease of switching medication scale (EOSMS; all collected at end of treatment/early discontinuation). An interim analysis (first 24 completers) is reported. Results: Most participants were White (92%); 54% were female; mean (SD) age was 45.5 (16.20) years. Starting and ending (end of treatment/early discontinuation) median total nightly doses of LXB were both 9.0 g. Most participants took LXB twice nightly (88%). Twenty-two participants completed the transition period; mean (SD) time to optimized dose was 1.4 (1.56) days, and median (range) number of dose/regimen changes was 0.0 (0, 1). At end of treatment/early discontinuation, most participants reported improvement (57%) or no change (43%) in narcolepsy symptoms on the PGIc, preferred LXB over SXB on the FPQ (86%), and reported the transition was easy on the EOSMS (91%). Most treatment-emergent adverse events reported were mild to moderate. Conclusions: Participants switched from SXB to LXB with minimal modifications and reported the transition was easy. Efficacy of oxybate treatment was maintained or improved, and most participants preferred LXB. Support: Jazz Pharmaceuticals

ORAL SESSION 1: Effects of Closed-Loop Auditory Stimulation (CLAS) on Sleep and Memory in Chronic Insomnia

**Phillips, Emma-Maria[1,2], Perrault, Aurore A.[1,2], Ong, Ju Lynn [3], Cross, Nathan E.[1,2], Teo, Teck Boon[3], Dicom, Andrew R.[3], Chee, Nicholas I.Y.N.[3], Patanaik, Amiya[3], Chee, Michael W.L.[3], Dang Vu, Thien Thanh[1,2]

[1] Sleep, Cognition and Neuroimaging Lab, Department of Health, Kinesiology and Applied Physiology & Center for Studies in Behavioral Neurobiology, Concordia University, Montreal, Quebec, Canada; [2] Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal, CIUSSS Centre-Sud-de-l'Ile-de-Montréal, Québec, Canada; [3] Sleep and Cognition Laboratory, Centre for Sleep and Cognition, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Submission ID 141

ABSTRACT Closed-loop auditory stimulation (CLAS) was found to boost slow oscillation (SO) and sigma activity as well as sleep-dependent memory processes in good sleepers. This study tested the effects of CLAS on sleep and memory in individuals with sleep complaints. Twenty-seven individuals with chronic insomnia (Mage=35.11±15.54, 18F; MISI=16.15±2.11) experienced a night with the CLAS stimulation (STIM) and a night without it (SHAM), in a counterbalanced order. Before and after sleep, they performed a word paired-associate task to test overnight declarative memory consolidation (i.e., difference in accuracy between the delayed and immediate recall tests).The CLAS stimulation consisted of 50 ms sounds synchronized with SO up-states during N2 and N3 sleep in 2-ON/2-OFF blocks, thus requiring a train of four consecutive SOs to complete a pattern. Whole night PSG recordings included 9 EEG, 2 EOG and 2 EMG electrodes (Brain Products, Germany; 512 Hz sampling rate). Sleep was visually scored according to the AASM guidelines, whereas SOs and spindles were automatically detected. ANCOVAs with age and sex as covariates were used to test the effect of Condition on sleep and memory. Pearson correlations were performed to assess whether changes in SO activity were associated with changes in sleep. Overall, there were no effects of Condition on sleep architecture, spindle and SO characteristics, and memory performance (all p>.05). However, CLAS decreased high beta band power (19-35 Hz) during NREM (p=.02), suggesting reduced cortical arousal. In addition, individuals whose SO density increased during NREM sleep with CLAS (n=15/27) displayed reduced arousal density (r=–.44, p=.02) and increased spindle density (r=.39, p=.04). Overall, CLAS applied during NREM sleep dampens neurophysiological signatures of hyperarousal that characterize patients with chronic insomnia without consistent effects on other EEG markers of sleep regulation, but a subgroup of individuals with insomnia may be more responsive to its effects, highlighting inter-individual differences.

ORAL SESSION 1: Efficacy of long-term treatment with daridorexant in patients with insomnia disorder on sleep and daytime functioning: a post-hoc analysis

**Leontiou, Chrysoula[1]; Wild, Imane[1]; Dauvilliers, Yves[2]; Benes, Heike[3]; Kunz, Dieter[4]; García-Borreguero, Diego[5]; Plazzi, Giuseppe[6]; Thein, Stephen[7]; Coloma, Preciosa[8]; Rausch, Magdalena[8]; Sassi-Sayadi, Mouna[8]; Seboek Kinter, Dalma[8]

[1]Idorsia Pharmaceuticals Ltd, [2]Centre Hospitalier Universitaire de Montpellier, Montpellier, France, [3]Somni Bene Institut für Medizinische Forschung und Schlafmedizin Schwerin GmbH, Schwerin, Germany, [4]Clinic for Sleep- and Chronomedicine, St.-Hedwig-Krankenhaus Berlin, Berlin, Germany, [5]Sleep Research Institute, Madrid, Spain, [6]IRCCS Istituto delle Scienze Neurologiche, Bologna, Italy; Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy, [7]Pacific Research Network – an ERG Portfolio Company, San Diego, CA, USA, [8]Idorsia Pharmaceuticals Ltd, Allschwil, Switzerland

Submission ID 31

ABSTRACT Introduction Daridorexant, improved night and daytime symptoms of insomnia in two parallel, phase 3, randomized, 12-week studies and maintained these improvements in a 40-week extension study. The largest effect in the 12-week studies was seen with daridorexant 50mg. A post-hoc analysis of the extension study further explored the long-term efficacy of daridorexant 50mg, vs placebo and daridorexant 25mg. Methods This post-hoc analysis includes 392 patients with insomnia randomised (1:1:1) to daridorexant 50mg, 25mg or placebo who completed 12-weeks of double-blind treatment (NCT03545191) and subsequently entered the extension study (NCT03679884). In the 40-week (12-month) double-blind extension study, patients originally randomized to daridorexant (50mg[n=137], 25mg [n=132]) remained on their respective treatments while patients originally randomized to placebo were re-randomized 1:1 to daridorexant 25mg(n=66) or placebo(n=57). Exploratory efficacy endpoints were change from baseline over time in subjective total sleep time (sTST) and daytime functioning which was assessed using the Insomnia Daytime Symptoms and Impacts Questionnaire (IDSIQ) comprising of total score, and sleepiness, alert/cognition and mood domain scores. Results For patients who participated in the 12-week trial and extension study, mean (±SD) increase in sTST from baseline to end of extension study was 75.6 minutes (±69.90), 65.5 minutes (±66.61) and 52.8 minutes (±75.90) for daridorexant 50mg, 25mg and placebo. For IDSIQ total and domain scores, reductions were also consistently larger with 50mg, with no clear distinction between daridorexant 25mg and placebo. For IDSIQ total score (range 0–140), mean (±SD) reduction from baseline to Month 12 was –27.3 (± 25.48)–17.3 (25.79) and –22.1 (25.88) for daridorexant 50mg, 25mg and placebo. IDSIQ sleepiness, alert/cognition, and mood domain scores also improved over time. Conclusions This post-hoc analysis provides additional evidence for the long-term maintenance over 12 months of the favourable treatment effect of daridorexant 50mg on both nighttime symptoms and daytime functioning.

ORAL SESSION 1: Endotyping OSA Using Polysomnography in People with Depression

**Higginson, Caitlin [1,2], Sands, Scott[3], Alex, Raichel M.[3], Pierre-Louis, Libny[4], Kendzerska, Tetyana[5], Lee, Elliott[1,2], Spitale, Naomi[1,2], Robillard, Rebecca[1,4]

[1] Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada; [2] Sleep Disorders Clinic, Royal Ottawa Mental Health Centre, Ottawa, K1Z 7K4, Canada; [3] Division of Sleep and Circadian Disorders, Brigham and Women's Hospital, Boston, MA, 02130, USA; [4] School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada; [5] The Ottawa Hospital Sleep Center, Ottawa Hospital – Civic Campus, Ottawa, K1Y 4E9, Canada

Submission ID 153

ABSTRACT Introduction: The physiological mechanisms/endotypes and clinical manifestations/phenotypes of obstructive sleep apnea (OSA) are being actively investigated to improve diagnostic and treatment plans. OSA endotypes can now be estimated using polysomnography data. There is a high comorbidity between OSA and depression, but the endotypic profile of OSA in the context of depression remains to be explored. Methods: Data were retrospectively collated from patients who underwent diagnostic polysomnography at the Sleep Disorders Clinic of the ROMHC and who met the following selection criteria: individuals with a diagnosis of depression (n=411), and mentally healthy controls (n=95). All cases included had a Respiratory Disturbance Index of ≥5 events/hour. Using established methods, four OSA endotypic traits were derived based on standard polysomnography: upper airway collapsibility, upper airway muscle compensation, ventilatory instability (loop gain, chemoreflex delay), and arousal threshold. Results: Compared to the mentally healthy group, the depression group had significantly shorter sleep duration (t(520)=3.4, p<.001), lower apnea-hypopnea index (AHI; t(512)=2.4, p=.008; mostly driven by lower AHI during REM sleep), and shorter respiratory event durations t(498)=3.34, p<.001). After adjusting for AHI, the depression group had significantly lower ventilatory instability (F(1, 383)=12.8, p<.001), lower chemoreflex delay (F(1, 383)=9.6, p=.002), and less severe passive airway collapsibility (F(1, 384)=7.6, p=.006), and active airway collapsibility F(1, 383)=7.0, p=.008). The groups did not differ in the airway compensation or arousal threshold traits. Conclusions: These findings suggest the endotypic profile of patients with OSA and comorbid depression differ from that of mentally healthy patients with OSA. Those with depression have a more stable respiratory control system and less upper airway collapsibility. Additionally, the depression group had shorter respiratory events that were distributed throughout the night rather than more concentrated in REM sleep. Future work will examine how these differences in endotypic traits may relate to apnea severity, symptom-based phenotyping and therapeutic interventions.

ORAL SESSION 1: Long-term Safety During a Clinical Trial of Lower-Sodium Oxybate in Participants With Narcolepsy With Cataplexy

**Bogan, Richard K.[1]; Foldvary-Schaefer, Nancy[2]; Chen, Abby[3]; Thorpy, Michael[4]

[1]University of South Carolina School of Medicine, [2]Department of Neurology, Sleep Disorders Center, Cleveland Clinic, [3]Jazz Pharmaceuticals, [4]Albert Einstein College of Medicine

Submission ID 19

ABSTRACT Introduction: Treatment-emergent adverse events (TEAEs) were analyzed during a 6-month open-label extension (OLE) of a double-blind, placebo-controlled, randomized withdrawal trial (NCT03030599) of lower-sodium oxybate (LXB; Xywav®). LXB is FDA approved for treating cataplexy or excessive daytime sleepiness in patients with narcolepsy aged ≥7 years and for treating idiopathic hypersomnia in adults. Methods: Participants entered the OLE following rescreening (re-entry) after discontinuing LXB or directly following the main study (rollover). Re-entry participants initiated LXB (4.5 g/night) or, if taking sodium oxybate (SXB) during rescreening, transitioned to LXB gram-for-gram. Rollover participants initiated LXB at ≤1/2 their stable dose during the main study. Participants titrated to a maximum 9 g/night. TEAEs were assessed in those receiving ≥1 LXB dose. TEAE duration represents time from TEAE start to end date (or end of OLE, if end date unrecorded). Results: In the analysis population (N=74, mean±SD age=37.6±12.6 years, 66.2% female, 91.9% White), 63.5% rolled over. Most reported ≥1 TEAE (overall, 58.1%; re-entry, 59.3%; rollover, 57.4%). Commonly reported TEAEs were headache (n=7, 9.5%; peak incidence, month 3 [n=5/72]; median [range] duration=1.0 [1–25] day), nasopharyngitis (n=6, 8.1%; peak incidence, month 6 [n=2/69]; median [range] duration=9.0 [1–24] days), and dizziness (n=5, 6.8%; peak incidence, month 1 [n=3/74]; median [range] duration=26.0 [1–181] days). TEAEs were most prevalent in month 3 (n=11/72 [15.3%] reporting a TEAE). No participant reported fall or enuresis; 1 reported nausea (rollover). Most TEAEs were mild or moderate; 2 participants had severe TEAEs (invasive ductal carcinoma [IDC], n=1; dizziness, n=1). Few participants (14.9%) had LXB-related TEAEs, most frequently dizziness (overall, 5.4%). Seven participants discontinued (re-entry, n=2; rollover, n=5), 3 due to TEAEs (IDC, n=1; apathy, n=1; sleep apnea syndrome, n=1); only apathy was treatment-related. Conclusions: In this long-term study, LXB safety and tolerability were generally consistent with the known SXB safety profile. Support: Jazz Pharmaceuticals

ORAL SESSION 1: Sleep, Mental Health, and Sleep-Related Healthcare in Canadians Using Wearable Sleep Tracking Devices

**Dion, Karianne[1,2]; Lee, Elliott[1,3]; Kendzerska,Tetyana[4]; Douglass, Alan[1]; Pennestri, Marie-Hélène[5]; Godbout, Roger[6]; Gallson, Dave[7]; Robillard, Rébecca[1,2]

[1]Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada; [2]School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada; [3]Sleep Disorders Clinic, Royal Ottawa Mental Health Centre, Ottawa, K1Z 7K4, Canada; [4]The Ottawa Hospital Research Institute, University of Ottawa, Ottawa, K1H 8L6, Canada; [5]Department of Educational & Counselling Psychology, McGill University, Montréal, H3A 0G4, Canada; [6]Faculty of Medicine, Université de Montréal, Montréal, H3T 1J4, Canada; [7]Mood Disorders Society of Canada, Belleville, K8P 4S2, Canada

Submission ID 42

ABSTRACT Introduction: Sleep tracking wearables are being developed and made available to consumers at an unprecedented pace. The present study investigated the correlates of wearables use in terms of sleep, mental health, and sleep-related healthcare in Canadians. Methods: A survey investigating sleep and mental health was distributed in September 2021 to a representative sample of 1,200 Canadians. It included questions on wearables use and sleep patterns, and questionnaires evaluating insomnia (ISI-3), anxiety (GAD-7), and depression (PHQ-9) symptoms. Results: Among respondents, 19% (n=231) reported having used a wearable device to monitor sleep. Of all wearables users, 44% felt that using sleep wearables had a positive impact on their sleep and stress level, while 4-5% noted a negative impact. Compared to non-users, users reported significantly longer sleep onset latency (users: M=46.7+/-74.5min.; non-users: M=33.9+/-42.4min.), slept about 1hour less (users: M=5.7+/-2.1hours; non-users: M=6.6+/-1.7hours), endorsed more severe insomnia symptoms (ISI-3; users: M=4.7+/-3.0; non-users: M=4.0+/-3.1), and were two times more likely to have a diagnosed sleep disorder. The proportion of wearables users was almost twice as high in those who indicated having informed a healthcare provider about sleep difficulties and in those having used sleep medications. Wearables users had significantly more severe symptoms of anxiety (GAD-7; users: M=7.5+/-6.2; non-users: M=4.9+/-5.8) and depression (PHQ-9; users: M=8.9+/-7.1; non-users: M=5.7+/-6.4), and were nearly two times more likely to have a psychological disorder diagnosis. Conclusion: Approximately 1 in 5 Canadians acknowledged having used sleep wearables. Although many individuals reported positive effects from the use of wearables, users also indicated higher rates of sleep and psychological difficulties. Further investigations are needed to determine whether individuals facing such challenges may be more likely to engage in objective sleep monitoring or whether the use of wearables may be contributing to sleep and mental health difficulties (i.e., “orthosomnia”).

ORAL SESSION 1: The Insomnia Daytime Symptoms and Impacts Questionnaire: An Analysis of Clinically Meaningful Change Using Phase 3 Clinical Trial Data

**Leontiou, Chrysoula[1]; Wild, Imane[1]; Phillips-Beyer, Andrea[2]; Kawata, Ariane K.[3]; Kleinman, Leah[4]; Seboek Kinter, Dalma[1]

[1]Idorsia Pharmaceuticals Ltd, Allschwil, Switzerland; [2]Innovus Consulting, Ltd, London, UK; [3]Evidera, Bethesda, MD, USA; [4]Evidera, Seattle, WA, USA

Submission ID 32

ABSTRACT Introduction The Insomnia Daytime Symptoms and Impacts Questionnaire (IDSIQ) is a validated patient-reported outcome instrument evaluating daytime functioning in insomnia patients, comprising 14 items grouped into 3 domains: Alert/Cognition, Mood, and Sleepiness. To further explore IDSIQ's ability to capture clinically meaningful changes in daytime functioning following treatment, we estimated within-patient changes in IDSIQ scores using phase 3 trial data. Methods Data were obtained from a randomized, double-blind placebo-controlled trial of daridorexant in adults with insomnia (NCT03545191) who completed the IDSIQ daily during treatment. Spearman correlations were calculated for changes in IDSIQ scores and potential anchors: Insomnia Severity Index, Patient Global Assessment of Disease Severity, Patient Global Impression of Severity, and Patient Global Impression of Change, applying a pre specified threshold of 0.30. Anchor-based analyses of weekly average IDSIQ total and domain scores were used to estimate responder definitions (RDs). The RD estimates were triangulated to identify values where they converged. Distribution-based and receiver operating characteristic analyses calculated standard error of measurement (SEM), 0.5 standard deviation (SD), and Youden's index. Results The analysis included 930 patients. Score change correlations for potential anchors and IDSIQ at month (M)1 (0.36–0.44) and M3 (0.45–0.57) were all >0.30. Triangulation of mean IDSIQ score changes in patients with clinically relevant improvement on the different anchors supported RD thresholds for clinically meaningful change of 17 points for IDSIQ total score, 9 ,4 and 4 points for the Alert/Cognition, Mood, and Sleepiness domain scores respectively. SEM and 0.5 SD values were within the ranges of anchor-based IDSIQ score changes. Youden's index was maximized or near-maximized when RD estimates were used as thresholds for identifying responders. Conclusion IDSIQ is sensitive to changes in patients who experience daytime impacts of insomnia and can assess treatment efficacy on daytime functioning.

ORAL SESSION 2: SLEEP, ASSESSMENTS AND COGNITION

ORAL SESSION 2: A Link between Temporal Clustering of Sleep Spindles, Reactivation of the Task-Related Network and Memory Consolidation – Evidence from a Simultaneous EEG and fMRI Study

**Gabitov, Ella[1]; Boutin, Arnaud[2,3]; Pinsard, Basile[4]; Carrier, Julie[5,6]; Doyon, Julien[1]

[1]McConnell Brain Imaging Centre, Montreal Neurological Institute, Department of Neurology and Neurosurgery, McGill University, Montreal, Quebec, H3A 2B4, Canada; [2]Université Paris-Saclay, CIAMS, 91405, Orsay, France; [3]Université d'Orléans, CIAMS, 45067, Orléans, France;
[4]Functional Neuroimaging Unit, Research Centre IUGM, Montreal, Quebec, H3W 1W5, Canada
[5]Center for Advanced Research in Sleep Medicine, Centre Intégré Universitaire de Santé et de Services Sociaux du Nord-de-l'Ile de Montréal, Montreal, Quebec, H2G 3G2, Canada
[6]Department of Psychology, Université de Montréal, Montreal, Quebec, H3C 3J7, Canada

Submission ID 167

ABSTRACT Research in our and other laboratories suggests that consolidation of newly formed memory traces during sleep crucially depends on their spontaneous reactivation - a mnemonic process that has been linked to sleep spindles. However, there is no unitary view on whether all or only some spindles contribute to this process. Here we tested the hypothesis that spindle clustering is crucial to sleep-dependent memory consolidation, and then sought to identify neural substrates associated with this clustering effect. To this end, we conducted a sleep study, recording brain activity using electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) simultaneously. Before sleep, participants were trained on a 5-element sequence of finger movements, using their left hand. To estimate performance gains overnight – a measure of memory consolidation – participants were also retested 24 hours post-training. Sleep spindles were detected automatically as brief bursts of activity (0.3-2 s) in the sigma (11-16Hz) frequency range during non-REM sleep and were subsequently grouped into clusters using a 6-sec cutoff. The results of the EEG-informed fMRI analysis revealed that the onset of longer spindle clusters – a clustering effect estimated as a number of spindles less than 6 sec apart – was associated with increased brain activity in key cortical and subcortical regions of the task-related network, including the sensorimotor cortices, striatum, and thalamus. Furthermore, when the analysis was limited to spindles detected on C3 – an electrode over the motor cortex contralateral to the trained hand, greater spindle clustering was associated with increased fMRI signal strongly lateralized to the "trained" hemisphere, and participants with greater overnight gains in performance exhibited stronger activation of the "trained" primary motor hand area. These findings suggest that sleep spindles clustering facilitates reprocessing and consolidation of newly encoded motor memories involving brain regions that were initially engaged in the learning process.

ORAL SESSION 2: Attentional performances in sleep disorders compared to sleep restricted good sleepers

**Fontaine, Ophélia[1,2,3]; Perrault, Aurore A[4]; Pomares, Florence B.[4]; Cross, Nathan[4]; Duquette, Zara[5]; Gool, Jari[6]; Fronczek, Rolf[7]; Lammers, Gert Jan[7]; van der Werf, Ysbrand[6]

[1]University of Montreal, [2]RQRV, [3]CR-IUGM, [4]Concordia University, Montreal, Quebec, Canada, [5]University of Montreal, Quebec, Canada, [6]Vrije Universiteit Amsterdam, Amsterdam, Netherlands, [7]Leiden University Medical Centre, Leiden, Netherlands

Submission ID 140

ABSTRACT Daytime impairments in vigilance and attentional capacities are key symptoms in many sleep disorders, including central hypersomnolence disorders and chronic insomnia. Whether the features of those attentional impairments are similar between sleep disorders and resemble those observed in sleep restricted good sleepers remain to be investigated. We tested the attentional performance of 11 good sleepers (6 F; 34 ± 8 y.o.) after unrestricted sleep (GS-NN) and after a sleep-restricted night (4h of sleep; GS-RS). The good sleepers were age and sex matched with individuals with chronic insomnia (INS; N=25; 16 F; 39 ± 9 y.o), idiopathic hypersomnia (IH; N=19; 12 F; 32 ± 8 y.o.) and narcolepsy Type 1 (NT1; N=17; 11 F; 30 ± 9 y.o.). In the morning, all participants performed a simple reaction time task (SRTT; 3 min) as well as a multitasking task (task-switching paradigm; 8 min) in the morning. Within-group (GS-NN vs GS-RS) as well as between-group differences in accuracy (percentage of correct trials) and mean reaction time were evaluated using ANCOVA with age and sex as covariates and post-hoc corrected for multiple comparisons (FDR) in both tasks. Within GS, sleep restriction decreased accuracy in the multitasking task (p=.045) but did not change reaction time compared to normal sleep (all p>.05) in both tasks. All sleep disorder groups (INS, NT1, IH) were slower than GS-NN in both tasks (all p<.05) but not than GS-SR (p=.08). While there was no group effect in accuracy for SRTT, INS were more accurate than NT1 (p=.02) and GS-SR (p=.02) but not IH or GS-NN (all p>.05) in the multitasking task. Our findings revealed differences in attentional performance between sleep disorders, especially when higher cognitive load was required. Moreover, attentional impairment in insomnia is distinct from sleep restriction in good sleepers.

Oral session 2: Habitual short and long sleepers are at risk of long COVID

**Berezin, Linor [1]; Waseem, Rida[1]; Merikanto, Ilona[2]; Benedict, Christian[3]; Partinen, Markku[4,5]; Dauvilliers, Yves[6]; Chung, Frances[1] and ICOSS II investigators

[1] Department of Anesthesia and Pain Management, Toronto Western Hospital, University Health Network, University of Toronto, Toronto, ON, Canada; [2] SleepWell Research Program, Orton Orthopaedics Hospital, Faculty of Medicine, University of Helsinki, Helsinki, Finland; [3] Department of Pharmaceutical Biosciences, Molecular Neuropharmacology, Uppsala University, Uppsala, Sweden; [4] Department of Clinical Neurosciences, University of Helsinki Clinicum Unit, Helsinki, Finland; [5] Helsinki Sleep Clinic, Terveystalo Healthcare Services, Helsinki, Finland; [6] Sleep-Wake Disorders Center, Department of Neurology, Gui-de-Chauliac Hospital, Institute for Neurosciences of Montpellier INM, INSERM, University of Montpellier, Montpellier, France.

ID: 163

ABSTRACT Background : Preliminary evidence suggests that the risk of developing Long COVID is higher among people with pre-exsiting medical conditions.[1] There exists a clear U-shaped

relationship between sleep duration and mortality, whereby both individuals with short (<6 hours) and long (>9 hours) habitual sleep duration have an increased risk of adverse health outcomes.[2,3] Based on its proven adjuvant role in immunity, habitual sleep duration can alter the risk for developing Long COVID. To date, whether the risk of developing Long COVID varies by habitual sleep duration is unknown.
Objective : To determine whether the odds of developing Long COVID are higher amongst those with pre-existing medical conditions, and whether the strength of this association varies by habitual sleep duration.
Materials and Methods : Using data from 13,461 respondents from 16 countries who participated in the survey-based International COVID-19 Sleep Study on 2021 (ICOSS II),[4] we studied the associations between habitual sleep duration, pre-existing comorbidities, and development of Long COVID.
Results : Of 2,508 individuals who had COVID-19, 61% reported at least one Long COVID symptom. Multivariable logistic regression analysis showed that the risk of having Long COVID was 1.8-fold higher for average-length sleepers (6-9h/night) with pre-existing medical conditions compared to those without pre-existing medical conditions [aOR 1.84 (1.18-2.90), P=0.008].The risk of Long COVID was 3-fold higher for short sleepers with pre-existing medical conditions [aOR 2.95 (1.04-8.4), P=0.043] and probably higher for long sleepers with pre-existing conditions [aOR 2.11 (0.93-4.77), P=0.073] compared to average-length sleepers without pre-existing conditions.
Conclusion : Habitual short nighttime sleep duration exacerbated the risk of Long COVID in individuals with pre-existing conditions. Restoring nighttime sleep to average duration represents a potentially modifiable behavioral factor to lower the odds of Long COVID for at-risk patients.

ORAL SESSION 2: Home sleep apnea tests: Are they sponsored or subsidized?

Chen, Tanya[1]; **Lee, Melissa[2]; Constantin, Evelyn[3]; Gurberg, Joshua[4]; Nguyen, Lily HP[4]

[1]Department of Otolaryngology Head and Neck Surgery, University of Toronto; [2]Faculty of Medicine, University of British Columbia; [3]Department of Pediatrics, Montreal Children's Hospital
[4]Department of Pediatric Otolaryngology Head and Neck Surgery, Montreal Children's Hospital

Submission ID 126

ABSTRACT Background. Home sleep apnea tests (HSAT) have become increasingly popular in recent years and physicians rely on HSAT literature to guide their diagnostic methods related to obstructive sleep apnea (OSA). Our objectives were to: 1) review the frequency and trajectory of HSAT publications in the literature over the last two decades; 2) describe the quality of these HSAT publications; 3) describe presence of funding and/or potential conflict of interest (COI) and the relationship between these factors. Methods. A review of the literature was performed from Jan 2000 to Dec 2021. Studies with the primary objective of evaluating a level 3 or 4 HSAT in the diagnosis of OSA were included. Oxford Level of Evidence (OLE) was used as a quality metric. Conflict of interest (COI) and funding were recorded verbatim as self-declared in the text of the manuscript. Results. Literature search yielded 4257 articles with 400 articles included in final analysis. There was an overall 18.2% yearly increase in absolute number of articles published, alongside an increase in LOE (OR 3.6, 95% CI 0.4 to 29.4). Nearly half of all articles (43.0%, n=172) lacked a statement regarding funding or COI. There was a positive correlation between level of evidence and funding, notably of industry funding. The largest source of funding was from industry, comprising 39.6% of all studies that had a funding statement. Of these industry-funded studies, 37.5% reported no COI or lacked a COI statement. Conclusion. The HSAT literature has

been increasing in quantity and quality over the last 21 years. However, there is heterogeneity in reporting of COI and high prevalence of industry funding and COI. Further independent studies are needed to further assess potential bias and COI related to industry funding, as well as a re-evaluation and consensus amongst journals on reporting disclosure guidelines.

ORAL SESSION 2: Hypersomnolence symptoms secondary to post-COVID-19 condition : preliminary results

**Massicotte, Mia Claude[1,2]; Thompson, Cynthia[1]; Nigam, Milan[1,3]; Lafond, Chantal[4]; Falcone, Emilia Liana[5]

[1]Center for Advanced Research in Sleep Medicine, Research center of the Centre intégré universitaire de santé et de services sociaux du Nord de l'Île-de-Montréal, Montreal, Canada, [2]Department of Psychology, Université de Montréal, Montreal, Canada, [3]Department of Neuroscience, Université de Montréal, Montreal, Canada, [4]Department of pneumology, Hôpital du Sacré-Cœur, Montréal, Canada, [5]Center for Inflammation, Immunity and Infectious Diseases, Montreal Clinical Research Institute (IRCM), Montreal, QC, Canada

Submission ID 97

ABSTRACT The Post-COVID-19 condition (PCC), also known as long COVID, is a heterogeneous clinical entity associated with physical, neurologic, and psychiatric symptoms. It can affect 2-15% of patients for weeks to years after the initial infection. A subgroup of patients reports having developed disabling and persistent hypersomnolence symptoms. However, it is unclear whether patients meet current diagnostic criteria for hypersomnia or whether they rather have fatigue or depression symptoms that are confounded with hypersomnolence. This study aimed to collect preliminary objective data on sleep and sleepiness in PCC. Eight patients (46 ± 12 yo, 6 women [75%]) with PCC and hypersomnolence symptoms tested 509 ± 79 days post-infection and 16 healthy controls (45 ± 14 yo, 12 women [75%]) matched for age and sex were assessed with an in-laboratory polysomnography (PSG) and a Multiple Sleep Latency Test (MSLT) combined with questionnaires, sleep diaries and a wrist actigraphy. No group difference was observed for nighttime total sleep time and total sleep time on 24 hours compared to controls with both, actigraphy and PSG. However, PCC patients reported a poorer sleep quality (PSQI: 9.9 ± 2.8 PCC/ 3.3 ± 3.3 controls, p=<.001), more daytime sleepiness (ESS: 11.6 ± 6.1PCC/ 7.0 ± 3.8 controls, p=.032), showed more naps on actigraphy (N naps: 4.1 ± 3.4 PCC/ 0 controls) and had a higher apnea hypopnea index on PSG (AHI: 7.7 ± 4.7 PCC/ 2.0 ± 1.9 controls, p=.002) than controls. Furthermore, six PCC patients (75%) had a MSLT <8min. These preliminary results suggest that patients with PCC have objective excessive daytime sleepiness. That hypersomnolence may contribute to fatigue, psychological distress, and cognitive dysfunction in this PCC subgroup. A better understanding of this hypersomnolence has the potential to improve overall health and quality of life in patients with PCC by including sleep management among treatment priorities.

ORAL SESSION 2: REM Sleep Microstructure Scoring Guidelines – Technical Pearls and Interrater Harmonization

Yao, Chun William[1,2]; **Fiamingo, Giuseppe[2,3]; Lacourse, Karine[2]; Frenette, Sonia[1,2]; Postuma, Ronald B [2,4,5]; Montplaisir, Jacques-Yves[2,6]; Lina, Jean-Marc[2,4,5]; Carrier, Julie[1,2]

[1]Psychology Department, Université de Montréal, Montreal, QC; [2]Center for Advanced Research in Sleep Medicine, Research center of the CIUSS du Nord-de-l'Ile-de-Montreal Montréal, QC; [3]Department of Brain and Behavioral Sciences, University of Pavia, Pavia, Italy; [4]Department of Neurology and Neurosurgery, McGill, Montréal, QC; [5]McGill University Health Center, Montréal, QC; [6]Department Psychiatry, Université de Montréal, Montréal, QC; [7]Department of Electrical Engineering, École de Technologie Supérieure, Montréal, QC; [8]Centre de Recherches Mathématiques, Université de Montréal, Montréal, QC

Submission ID 91

ABSTRACT Introduction: Rapid eye movement (REM) sleep is often treated as a uniform state in both research and clinical practice, although it contains two distinct microstructures - phasic (presence of rapid eye movement) and tonic REM. Due to loss-of-REM-sleep atonia and frequent comorbidity with other parasomnia (e.g., apnea), polysomnography recordings of patients with REM sleep behavior disorder (RBD) pose challenges due to the presence of artifacts. By using RBD polysomnography recordings, we aimed to identify technical challenges during REM sleep microstructure classification and propose potential solutions. Methods: This study included 57 RBD polysomnography recordings randomly selected from the Montréal RBD cohort. Each 30-second REM sleep epoch was classified into a 3-second phasic/tonic REM sleep based on AASM sleep technician manual. Polysomnography recordings were allocated into 3 consecutive batches (n=10, 13, and 34) for independent scoring by two raters, blinded of patients` clinical history. Interrater reliability was evaluated via Cohen's kappa for each scoring batch. To identify challenges and reach agreement, interrater revisions were performed between batches. We evaluated changes in reliability scores across batches via Kruskal-Wallis rank sum test. Results: Kappa score was 0.76±0.08 for the first batch and 0.70±0.09 for the second batch. On the third batch the two raters reached an average score of 0.81±0.06, with 25/34 recordings being above 0.8 (i.e., almost perfect agreement). In addition to significant changes among scores (p=0.0003), an effect size of 0.7 (i.e., strong improvement) was obtained between the first and the third batch performances. Noise reduction techniques and concessions were found helpful in improving interrater reliabilities in challenging epochs identified (e.g., motion artifacts and stage transitioning). Conclusion: Our study illustrated potential solutions and guidance for challenges that may be encountered during REM sleep microstructure classification. Open-source tools to facilitate interrater harmonization and artifacts identification is being developed and will be deployed online.

ORAL SESSION 2: Self-Reported Perioperative Experience in Patients with Narcolepsy: A Survey Study

**Pappu, Ameya[1], Auckley, Dennis[2]; Thorpy, Michael[3]; Hershner, Shelley[4]; Ankalagi, Basavaraj[1]; Singh, Kawalpreet[1], Singh, Mandeep[1,5,6]

[1]Department of Anesthesia and Pain Management, Toronto Western Hospital, University Health Network, University of Toronto, Toronto, Ontario; [2]Division of Pulmonary, Critical Care and Sleep Medicine, Metro Health Medical Center, Case Western Reserve University, Cleveland, Ohio [3]Department of Neurology, Montefiore Medical Center, Albert Einstein College of Medicine, New York; [4]Department of Neurology, University of Michigan, Ann Arbor, Michigan; [5]Department of Anesthesiology, Women's College Hospital, Toronto, Ontario; Toronto Sleep and Pulmonary Center, Toronto, Ontario

Submission ID 143

ABSTRACT Narcolepsy is associated with increased perioperative complications, but data regarding patient-reported outcomes remains sparse. A survey was circulated to patients registered with the Nexus Narcolepsy registry between September 2017 and February 2019 with an emphasis on perioperative counselling, medication use and excessive postoperative sleepiness and cataplexy. Pairwise comparisons (2-sided chi-squared test) were conducted in patients with narcolepsy with- or without-cataplexy. Multivariable logistic regression was done and adjusted odds ratios (aOR) (covariates: age, sex, medication) with 95 % confidence intervals (CI) were constructed to evaluate for clinical predictors. Increased sleepiness (49.85 %), post-procedural complications (15 %) and inadequate analgesia (11 %) were the most frequently reported complications. Patients with narcolepsy-with-cataplexy had a higher incidence of self-reported intra-procedural complications than those without-cataplexy (20.6% vs 11.8%; P = 0.047). Excessive postoperative sleepiness was more common in patients having narcolepsy with-cataplexy than those without-cataplexy. (aOR 2.01, 95 % CI 1.24, 3.25; P = 0.004) and reported more frequently by respondents receiving sedation (aOR 1.942, 95 % CI 1.215, 3.015; P = 0.025) or general anaesthesia (aOR 1.590, 95 % CI 1.043, 2.435; P = 0.011). Counselling about possible increased sleepiness (78.4 %), cataplexy (94.6 %), interactions with anaesthetic drugs (93.1 %) and post-operative driving restrictions (55 %) was lacking in the majority of patients. A higher proportion of patients taking sodium oxybate achieved same day discharge when compared to patients not taking the drug (91% vs 74.5%; P = 0.002). We found that narcolepsy with cataplexy was associated with increased complications, following sedation or general anaesthesia. Discussions regarding continuation of medications and possible postoperative worsening of symptoms need to be prioritized during the perioperative care of these patients.

ORAL SESSION 2: The Effects of Acute High-Intensity Interval Training on Declarative Memory in Sleep Restriction

**Frimpong, Emmanuel [1,2,3,5]; Mograss, Melodee [1,2,3,4,5]; Paez, Arsenio [1,2,3]; Aubertin-Leheudre, Mylene [5,6]; Bherer, Louis [5,7]; Pepin, Veronique [2,3,8]; Robertson, Edwin [9]; Dang-Vu, Thien Thanh [1,2,3,4,5]

[1] Sleep, Cognition and Neuroimaging Laboratory, Concordia University, Montreal, Quebec, Canada, [2] Department of Health, Kinesiology & Applied Physiology, Concordia University, Montreal, Quebec, Canada; [3] PERFORM Center, Concordia University, Montreal, Quebec, Canada. [4] Department of Psychology, Concordia University, Montreal, Quebec, Canada; [5] Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal, Montreal, Quebec, Canada. [6] Département des Sciences de l'activité physique, GRAPA, Université du Québec à Montréal, Montréal, Quebec, Canada; [7] Department of Medicine and Centre de recherche de l'Institut de cardiologie de Montréal, Université de Montréal, Quebec, Canada; [8] Centre de recherche, CIUSSS du Nord-de l'Île-de-Montréal, Montréal, Quebec, Canada; [9] School of Psychology and Neuroscience, University of Glasgow, UK.

Submission ID 26

ABSTRACT While recent evidence has shown that a nap and acute exercise can interact synergistically to enhance memory, acute exercise's potential for mitigating the detrimental effects of sleep restriction on memory is unknown. We evaluated whether acute exercise may offset sleep restriction's impairment of long-term declarative memory compared to average sleep alone. A total of 92 (82% females) healthy young adults (mean= 24.6, SD=4.2 years) were randomly allocated to one of four evening groups: sleep restriction only (S5, 5-6 hours/night), average sleep only (S8, 8-9 hours/night), high-intensity interval training (HIIT) before restricted sleep (HIITS5) or HIIT before average sleep (HIITS8). Groups either followed a 15-minute remote HIIT video or rest period in the evening (7:00 p.m.) prior to encoding 80 face-name pairs. Participants completed an immediate retrieval task the same evening and a delayed retrieval task the next morning, after their respective sleep opportunities (documented subjectively). Long-term declarative memory performance was assessed with the discriminability index (d-prime, d') during the recall tasks. We found that the d' of S8 (mean=0.58, SD=1.37) was not significantly different from those of HIITS5 (mean= -0.03, SD=1.64, p=0.176) and HIITS8 (mean= -0.20, SD=1.28, p=0.092), except the S5 (mean= -0.35, SD=1.64, p=0.038) at the delayed retrieval. Similarly, the d' of HIITS5 was not significantly different from those of HIITS8 (p=0.716) and S5 (p=0.469). These results suggest that acute evening HIIT partially reduced the detrimental effects of partial sleep restriction on long-term declarative memory. The acute evening HIIT intervention before an average night-time sleep did not enhance long-term declarative memory over and above that of the average sleep alone condition. Future studies are needed to understand how best to maximize the effects of acute exercise in offsetting the deleterious effects of sleep loss on long-term declarative memory.

ORAL SESSION 3: SLEEP ACROSS THE LIFESPAN

ORAL SESSION 3: Association between OSA, sleep quality, and neurocognitive function in children and adolescents with obesity

**Au, Chun Ting [1 2 3], Voutsas, Giorge [1 2 3], Katz, Sherri Lynne [4 5 6], Narang, Indra [1 2 3]

[1] Translational Medicine, Research Institute, Hospital for Sick Children, Toronto; [2] Division of Respiratory Medicine, Hospital for Sick Children, Toronto; [3] University of Toronto, Toronto
[4] Department of Pediatrics, Children's Hospital of Eastern Ontario, Ottawa; [5] Children's Hospital of Eastern Ontario Research Institute, Ottawa; [6] University of Ottawa, Ottawa

Submission ID 85

ABSTRACT Previous studies underlined the impairment of neurocognitive function in children with obstructive sleep apnea (OSA). However, there is a paucity of data describing the association between OSA, sleep quality, and neurocognition in children with obesity. This was a prospective study of children aged 8-18 years with obesity and symptoms suggestive of OSA. All participants underwent an overnight polysomnography and filled in questionnaires to assess their sleep-related breathing disorder symptoms [Pediatric Sleep Questionnaire (PSQ)], sleep quality [Pittsburgh Sleep Quality Index (PSQI)], executive function [Behavior Rating Inventory of Executive Function (BRIEF)], and inattention and hyperactivity symptoms [Conners 3]. Participants were categorized into non-OSA [obstructive apnea-hypopnea index (OAHI)<1 event/h], mild OSA (OAHI 1–<5 events/h), and moderate-severe OSA (OAHI>=5 events/h) for comparisons. A total of 84 children (62% male, age: 14.0y±3.0, body mass index (BMI): 38.4kgm-2±8.6) were recruited, of whom 33, 18, and 33 were categorized into the non-OSA, mild OSA, and moderate-severe OSA groups, respectively. The moderate-severe group had greater proportion of males, higher BMI, and higher snoring subscale of PSQ than the other two groups, but no significant differences in PSQI, BRIEF, and Conner-3 scores could be observed. However, PSQI and the subscales of PSQ correlated with some of the subscales of BRIEF and Conners-3. After adjusting for age, sex, BMI z-score, and log-transformed OAHI, PSQI was associated with metacognition, global executive composite score, learning problem, executive functioning, and inattention. The sleepiness subscale of PSQ was associated with behavioral regulation and global executive composite score. The snoring subscale was also associated with learning problem. In conclusion, executive function, inattention, and hyperactivity symptoms were not associated with OAHI in this group of children with obesity. Self-reported sleep quality and parented reported snoring and daytime sleepiness were independently associated with neurocognitive function.

ORAL SESSION 3: Changes in the macrostructure of sleep occurring after menopause

**Perez-Medina-Carballo, Rafael[1,2]; Kosmadopoulos, Anastasia[2,3]; Boudreau, Philippe [2]; Robert, Manon [2,4]; Boivin, Diane B. [1,2]

[1]Integrated Program in Neuroscience, McGill University, Montreal, Quebec, Canada. [2]Centre for Study and Treatment of Circadian Rhythms, Douglas Mental Health University Institute, Department of Psychiatry, McGill University, Montreal, Quebec, Canada. [3]Appleton Institute for Behavioural Sciences, Central Queensland University, Adelaide, South Australia, Australia. [4]Centre de Recherche du Centre Hospitalier de l'Université de Montréal, Université de Montréal, Montréal, Quebec, Canada

Submission ID 45

ABSTRACT During menopause, 40-60% of women report sleep complaints. Even though menopause is associated with fluctuations in sex hormones that can affect circadian physiology, the role of ovarian hormones on sleep and circadian physiology is poorly understood. The present study aimed to understand the changes occurring after menopause in the circadian variation of sleep and alertness. Eight healthy postmenopausal women (PMW; 54.8±3.4 years, one taking hormones) without sleep complaints were compared to 12 healthy young women (YW; 25.8±3.4 years) in their mid-follicular phase. Following an 8-h baseline sleep period, participants underwent a 48-h (PMW) or 72-h (YW) ultradian sleep-wake cycle procedure (USW) with alternating 60-minutes wake and nap opportunities. Sleep was polysomnographically recorded. Sleep parameters included total sleep time (TST), sleep onset latency (SOL), arousals, and sleep stages. Circadian variations of these sleep parameters were assessed, aligned to time elapsed into the USW, and groups were compared using mixed-effects linear models on the first 48 hours of USW. PMW presented earlier habitual bedtimes (23:07±00:11 vs 00:13±00:12) and rise-times (07:07±00:11 vs 08:13±00:12) compared to YW ($p=0.005$). At baseline, PMW presented more stage N1 ($p=0.016$) and arousals ($p\leq0.001$) than YW. During the USW procedure, PMW showed more stage N1 ($p=0.013$) and N2 ($p\leq0.001$) sleep. PMW also showed a dampened circadian amplitude of TST, SOL, and N3 sleep ($p\leq0.014$). In PMW, post-hoc tests revealed greater TST ($p=0.012$) and shorter SOL ($p\leq0.001$) during the biological day, and more arousals ($p=0.027$) throughout day and night. The primary findings in PMW with no sleep complaints was a general increase in light sleep and arousals, as well as a dampened circadian variation of sleep. This disrupted temporal organization of the sleep-wake cycle might contribute to sleep disturbances occurring after menopause.

ORAL SESSION 3: Early nap cessation in young children as a predictor of language and psychosocial outcomes: Evidence from a large Canadian sample

**Newton, Adam[1]; Reid, Graham[1]

[1]Western University

Submission ID 59

ABSTRACT Objectives: Most children stop napping between 2 and 5 years old. We tested the association of early nap cessation (i.e., children who stopped before their third birthday) with several outcomes. This model was conceptualized using the socioecological model. Methods: Data were from a nationally representative, longitudinal sample of Canadian children, with three

timepoints. Children were 0-to-1 year old at Time 1, 2-to-3 years old at Time 2, and 4-to-5 years old at Time 3. Early nap cessation was tested as a predictor of children's behavioral functioning (cross-sectionally and longitudinally), cognitive function (longitudinally), and receptive language functioning (longitudinally). There were 4923 children (50.9% male; 90.0% White) and their parents in this study who were included in the main analyses. Parents reported on demographic, perinatal, developmental, child functioning, and child sleep. Children completed direct assessments of receptive language and cognitive ability. Nap cessation, demographic, and developmental-control variables were tested as correlates of cross-sectional and longitudinal outcomes using linear regression (with a model-building approach). Results: Early nap cessation predicted higher receptive language ability (β = 0.061) and lower anxiety (β = -0.041) at Time 3, after controlling for known correlates of nap cessation, nighttime sleep, and other sociodemographic correlates of functioning. Cognitive ability, hyperactivity-inattention, and aggression were not correlated with nap cessation. Conclusions: Early nap cessation is related to specific functional benefits (i.e., better receptive language and lower anxiety symptoms). These findings align with previous research. Future research should investigate differences associated with later nap cessation and in nap-encouraging cultures.

ORAL SESSION 3: Effect of sleep deprivation on adult sleepwalkers with and without comorbid sleep disorders

**Blanchette-Carrière, Cloé[1,2]; Montplaisir, Jacques[2,3], Boucetta, Soufiane[4]; Desautels, Alex[2,5], Zadra, Antonio [1,2]

[1]Department of Psychology, Université de Montréal; [2]Center for Advanced Research in Sleep Medicine, Hôpital du Sacré-Coeur de Montréal; [3]Department of Psychiatry, Université de Montréal; [4]Neurotherapy Montreal, Montréal; [5]Department of Neurosciences, Université de Montréal

Submission ID 74

ABSTRACT Laboratory studies have shown that adult sleepwalkers experience more frequent and complex forms of sleepwalking during recovery sleep following sleep deprivation than during normal polysomnographic (PSG) recordings. While this suggests that sleep deprivation could be used to establish a PSG-based diagnosis of sleepwalking in predisposed patients, little is known about the utility of this diagnostic method in adult sleepwalkers presenting with concomitant sleep disorders. The aim of the present study was to compare the effects of sleep deprivation on somnambulistic episodes in adult sleepwalkers with and without comorbid sleep disorders. 124 adults (32.0 ± 10.2 years) with a diagnosis of sleepwalking and 17 adults (40.5 ± 10.6 years) with a diagnosis sleepwalking as well as obstructive sleep apnea syndrome and/or an index of periodic leg movement in sleep with micro-arousal index > 5 were investigated with one night of continuous PSG recording (baseline recording) followed the next day by a standard 25hr sleep deprivation protocol and PSG recording of their subsequent recovery sleep. Both groups were more likely to experience at least one somnambulistic episode during recovery sleep than at baseline (P = 0.02). There was a trend (P = 0.08) for patients without comorbid sleep disorders to be more likely to experience at least one episode during their recovery sleep. No between-group differences were found in the frequency of episodes, both at baseline and during recovery sleep (P

= 0.30). Our results suggest that sleep deprivation is effective in facilitating the occurrence of behavioral episodes in adult sleepwalkers with varying sleep-related clinical profiles.

ORAL SESSION 3: Mitochondrial Function-Associated Genes Underlie Cortical Thinning in Isolated REM Sleep Behavior Disorder

**Rahayel, Shady[1,2]; Tremblay, Christina[2]; Vo, Andrew[2]; Misic, Bratislav[2]; Lehéricy, Stéphane[3]; Arnulf, Isabelle[4]; Dagher, Alain[2,5]

[1]Center for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal, Montreal, Canada, [2]The Neuro (Montreal Neurological Institute-Hospital), McGill University, Montreal, Canada, [3]Sorbonne Université, Institut du Cerveau – Paris Brain Institute – ICM, INSERM, CNRS, Paris, France, [4]Sorbonne Université, Institut du Cerveau – Paris Brain Institute – ICM, INSERM, CNRS, Paris, [5]Department of Neurology and Neurosurgery, McGill University, Montreal, Canada

Submission ID 83

ABSTRACT Background: Isolated REM sleep behavior disorder (iRBD) is a parasomnia characterized by the loss of muscle atonia during REM sleep and the onset of abnormal movements while dreaming. The majority of patients with iRBD will develop dementia with Lewy bodies or Parkinson's disease. Patients with iRBD already present with brain changes that are reminiscent of manifest synucleinopathies including brain atrophy. Brain atrophy is a specific predictor of dementia with Lewy bodies in these patients. However, the mechanisms underlying this atrophy remain poorly understood. In this study, we investigated the gene expression patterns and neurotransmitter systems, functional networks, cytoarchitectonic classes, and cognitive systems associated with cortical atrophy in iRBD. Methods: A large multicentric cohort of 171 patients with videopolysomnography-confirmed iRBD and 238 controls with T1-weighted MRI and clinical data were included. Cortical thickness and surface area changes were derived from the T1-weighted scans using FreeSurfer. Partial least squares regression and imaging transcriptomics were then used to assess the gene expression components underlying brain atrophy in iRBD and the associated patterns of biological enrichment. Comprehensive spatial mapping was then performed to understand the patterns on which map the atrophy seen in iRBD. Results: We found that the genes related to mitochondrial functioning and macroautophagy were the strongest contributors of the cortical atrophy seen in iRBD. Moreover, we found that the pattern of cortical thinning in iRBD was constrained by the brain's structural and functional connectome and that it mapped over specific systems, namely networks involved in motor and planning functions. In contrast, changes in surface area were related to different genes and spatial patterns. Conclusions: This study demonstrates that the development of atrophy relates to specific genes and networks in prodromal synucleinopathies.

ORAL SESSION 3: Mouse models of REM sleep behaviour disorder

**Dugan, Brittany J.[1], Luke, Russell[1], Fraigne, Jimmy[1], Watts, Joel[2,3], Peever, John[1]

[1]Department of Cell and Systems Biology, University of Toronto, Toronto, Ontario, Canada
[2]Tanz Centre for Research in Neurodegenerative Diseases, University of Toronto, Toronto, Ontario, Canada; [3]Department of Biochemistry, University of Toronto, Toronto, Ontario, Canada

Submission ID 94

ABSTRACT Background: RBD is a parasomnia in which patients manifest inappropriate muscle activity during REM sleep. Following RBD onset, 80-90% of patients develop a synucleinopathy such as Parkinson's disease (PD) or multiple system atrophy (MSA). RBD is thus considered a prodromal disease state and the best predictor of synucleinopathic diseases. Interestingly, RBD is comorbid in only 25-58% of PD patients but is present in almost 100% of MSA patients. Further, the distribution of pathology, disease severity, and targeted cell types (i.e. neurons vs oligodendrocytes) markedly differ between diseases. It is theorized that while one protein may seed all synucleinopathies, small, structural differences may drive different strains of disease, lending to varying clinical outcomes. Whether strains underly differences in RBD development, however, remains to be examined. The current study addresses this gap by examining pathological and behavioural differences between RBD-MSA and RBD-PD mouse models. Methods: We injected mice with brain lysate derived from either a PD or MSA mouse model into the brainstem regions that engage REM sleep atonia. Mice were then sacrificed at varying timepoints for histological analysis, and at the same time points, another cohort of mice were evaluated for RBD-like behaviours using EEG, EMG, and video recordings. Results: We found that MSA-like mice (n=20) have faster and more severe pathological development in the REM sleep atonia circuit compared to PD-like mice (n=20). MSA- and PD-like mice additionally differ in incubation time, motor symptom development, and end-point phenotypes. Furthermore, electrophysiological recordings revealed that MSA-like mice (n=12) exhibit RBD symptoms far earlier than PD-like mice (n=6) and both groups differ from control mice at equivalent time points (n=10). Conclusion: Our findings demonstrate disease-dependent differences in RBD presentation in MSA and PD models, suggesting that REM sleep atonia generating neurons may exhibit differential vulnerability depending on the specific strain of disease.

ORAL SESSION 3: Obstructive Sleep Apnea, Hippocampal Volume, and Cerebral Small Vessel Disease in the Cognitively Impaired

**Settimi, Matthew[1]; Lim, Andrew S.P.[1,2,3]; Chung, Frances[4,5,6]; Goubran, Maged[1,7]; Mitchell, Sara[1,2]; Masellis, Mario[1,2]; Lam, Benjamin[1,2]; Black, Sandra E.[1,2]; Boulos, Mark I.[1,2,3]

[1]Hurvitz Brain Sciences Research Program, Sunnybrook Research Institute, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada
[2]Department of Medicine, Division of Neurology, University of Toronto, Toronto, Ontario, Canada
[3]Sleep Laboratory, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada
[4]Anesthesiology, University Health Network - Mount Sinai Hospital
[5]Department of Anesthesia, University of Toronto, Toronto, Ontario, Canada
[6]Krembil Research Institute, Toronto, Ontario, Canada
[7]Department of Medical Biophysics, University of Toronto, Toronto, Ontario, Canada

Submission ID 90

ABSTRACT Background: Obstructive sleep apnea (OSA) is common in aging and extensive research has linked OSA to cerebral small vessel disease (SVD) and hippocampal volumes. However, most prior work has explored individuals with normal cognitive function. Objective: To characterize the relationship between OSA and both SVD and hippocampal volume in individuals with cognitive impairment due to neurodegenerative, vascular, or mixed etiology. Patients with subjective cognitive complaints, but no underlying neurodegenerative or vascular disease, served as controls. Methods: Data was retrospectively analyzed from 151 patients with cognitive impairment (mean age 68.8±10.8 years, 57.0% male) and 48 controls with subjective cognitive complaints (mean age 55.5±11.5 years, 37.5% male); brain MRI was acquired within 1 year of in-laboratory polysomnography or home sleep apnea testing. The presence of OSA was defined as an AHI≥15, or 5≤AHI<15 with a lowest oxygen saturation ≤88%. MRI brain scans were processed to measure hippocampal, intracranial, and white matter hyperintensity volumes using the HippMapper, iCVMapper, and HyperMapper pipelines, respectively. Results: In the patients with cognitive impairment, after controlling for age, sex and BMI, the presence of OSA was associated with a reduction in total (β=446.0 mm3, 136.0-756.1 95% CI, p<0.01), left (β=219.9 mm3, 76.0-363.8 95% CI, p<0.001), and right (β=226.2 mm3, 44.1-408.2 95% CI, p<0.05) hippocampal volumes. Lowest oxygen saturation was also significantly associated with reductions in hippocampal volumes in the patients with cognitive impairment. None of these relationships were observed in the control group. Intracranial and white matter hyperintensity volumes were not significantly associated with any OSA-related metric in either group. Conclusion: In cognitively impaired patients, OSA severity and reduced oxygen saturation values were associated with decreased total, left, and right hippocampal volumes. In patients with subjective cognitive decline, these changes were not seen. This research may elucidate whether OSA is a potential therapeutic target for cognitively impaired individuals.

ORAL SESSION 3: Phase-Amplitude Coupling of Theta and Gamma Rhythms During Rapid Eye Movement Sleep Improves Memory Across the Lifespan

**Gillman, Samuel [1]; Weiner, Oren [1,2,3] O'Byrne, Jordan [1]; Ly, Michelle [3]

[1]Department of Health, Kinesiology, and Applied Physiology, PERFORM Center (Concordia University), Montréal, Canada, [2]Institut Universitaire de Gériatrie de Montréal, Montréal, Canada, [3]Department of Psychology, Concordia University, Montréal, Canada

Submission ID 146

ABSTRACT Introduction: Phase-amplitude coupling (PAC) between brain oscillations may be an underlying mechanism of memory consolidation. PAC may become weaker with age, possibly explaining natural age-relate memory decline, as suggested by non-rapid-eye-movement sleep PAC studies. Theta-gamma-PAC (TGC) during wake is correlated with better encoding and recall. However, it is unclear how TGC during rapid-eye-movement (REM) sleep (REM-TGC) correlates with memory or age. This study examined REM-TGC and associations with sleep-dependent memory consolidation between healthy younger and older adults. We hypothesized REM-TGC strength would improve memory consolidation but decline with age. Methods: Twenty-one younger (M[SD] = 24.24[2.96] years; 13 female) and sixteen older adults (M[SD=67.44[6.77] years; 11 female) completed polysomnograms followed by two non-consecutive overnight electroencephalograms (EEG). EEG overnight visits included pre- and post-sleep declarative (word-pair) memory or non-memory control tasks, randomized between nights. Theta (4-8Hz) and slower (30-64.75Hz) and faster (65-100Hz) gamma were extracted from filtered EEG on channels Fz, Cz, Pz, T3 and T4. TGC strength was measured using a modulation index (MI). Associations between REM-TGC MI and memory consolidation were quantified using Pearson's r correlation and linear regression (covariates: sex, age). Analysis of covariance (covariates: sex, age) was used to compare TGC between age groups and nights. Results: Memory consolidation was better in younger (M[SD]=37.10[2.88]), compared to older, adults (M[SD]=32.35[7.79]) (ANOVA: p<0.001). REM-TGC MI was not different between age groups nor task nights. Faster gamma coupling on Fz was positively correlated with and predicted improvements in memory consolidation in younger adults (correlation: r=0.558, p=0.009; regression: β=0.59, p=0.002). Slower gamma coupling on Cz was positively correlated with memory consolidation in older adults (r=0.617, p=0.011). Conclusions: Our results suggest REM-TGC strength remains stable across the lifespan. However, associations between REM-TGC and memory consolidation may differ with age. These results shed new light on the mechanisms of memory consolidation during REM sleep.

ORAL SESSION 3: Potential Proxy Markers for Dim-Light Melatonin Onset during Childhood & Adolescence

**Ramil, Joanne M.[1], McGrath, Jennifer J.[1]

[1]PERFORM Centre & Department of Psychology, Concordia University, Montreal, QC

Submission ID 183

ABSTRACT Circadian misalignment and altered circadian rhythm have been increasingly linked to health problems, including obesity, diabetes, and cardiovascular outcomes. Dim-light melatonin

onset (DLMO) remains the gold standard for identifying circadian timing. Yet, DLMO protocols are time- and resource-intensive making them less feasible to use, particularly in pediatric populations. Practically, standardized questionnaires (e.g., chronotype), sleep logs (e.g., timing patterns), and wearables (e.g., actigraphy) are easier to administer. Sleep logs and actigraphy also offer the distinct advantage of repeated use over multiple nights, which is uncommon for DLMO protocols. This study aimed to examine whether readily collected variables (e.g., chronotype, sleep midpoint, bedtime, waketime, weekend oversleep, jet lag) could be used as proxy markers to estimate DLMO variables in a sample of children and adolescents. Youth (N=233, 44% female) aged 9 to 17 years (mean 12.5 yrs) recruited from the local community participated in the ongoing Healthy Heart Project in Montreal. Youth answered questionnaires (Morningness-Eveningness Questionnaire), completed a sleep log (modified Consensus Sleep Diary), wore an actigraphy monitor (at least 4 nights), and completed an at-home DLMO protocol. Classification and Regression Tree (CART) analyses were used to test models predicting melatonin timing. Melatonin onset (time at >3pg/mL) was best predicted by age, sleep midpoint, bedtime, and jet lag measured by actigraphy, accounting for 91% of the variance. The final model using these proxy markers was able to predict DLMO onset within 12 minutes of the actual timing. Of note, while actigraphy yielded the most accurate indicators to estimate DLMO timing (RMSEavg=1.64), questionnaires (RMSEavg=2.09) and sleep logs (RMSEavg=1.88) provided adequate proxies and may be an attractive alternative given their ease of administration and cost. Future research should continue to explore proxy variables, including body temperature. Identification of proxy variables offers potential to include measures of circadian timing more readily in research and practice.

ORAL SESSION 3: Propagation of α-synuclein pathology drives phenotypic progression from REM sleep behaviour disorder to Parkinsonism in mice

Luke, Russell[1]; Yoo, Han Soo[2]; **Dugan, Brittany[1]; Zhang, Bin[3]; Fraigne, Jimmy[1]; Luk, Kelvin[3]

[1]Department of Cell and System Biology, University of Toronto, Toronto, Canada, [2]Department of Neurology, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, South Korea, [3]Center for Neurodegenerative Disease Research, Department of Pathology and Laboratory Medicine, University of Pennsylvania Perelman School of Medicine, Philadelphia, USA

Submission ID 70

ABSTRACT Background: REM sleep behaviour disorder (RBD) is a parasomnia that is widely considered a prodrome of synucleinopathies such as Parkinson's disease. Given that RBD is characterized by a loss of muscle atonia during REM sleep, it stands to reason that dysfunction in the neural substrates for REM atonia, such as the sublaterodorsal nucleus (SLD), would lead to RBD. While the precise mechanisms that underlie RBD pathogenesis remain unclear, its strong association with synucleinopathies suggests that RBD may arise from α-synuclein (αsyn)-mediated degeneration of SLD neurons. Here, we test the hypothesis that degeneration of REM sleep circuits causes RBD in mice. Methods: To model αsyn pathology in the mouse brain, we injected αsyn pre-formed fibrils (PFFs) into the SLD of mice. From 3-9 months post-injection, mice then underwent immunohistochemical and behavioural assessments. To determine if mice displayed RBD symptoms, we measured muscle activity during REM sleep using EEG, EMG, and video recordings. In addition, we used catwalk gait analysis to assess motor function during wakefulness.

Results: First, immunohistochemical analysis revealed that αsyn PFFs induced the accumulation of pathologic αsyn aggregates within SLD cells at 1 month post-injection. By 6 months, widespread aggregation of αsyn was observed in regions including the substantia nigra. Next, we found that this progressive αsyn pathology in PFF-inoculated mice was associated with higher levels of muscle activity during REM sleep from 3-6 months post-injection, as indexed by increased phasic muscle twitching during REM sleep compared to controls. In addition, RBD symptoms were followed by gait abnormalities indicative of Parkinson's disease at 6 months post-PFF injection. Conclusions: Our findings demonstrate that the propagation of αsyn pathology from REM sleep circuits to waking motor centers induces both RBD symptoms and Parkinsonian motor deficits in mice, which suggests that αsyn-mediated degeneration could underlie disease progression in RBD and the synucleinopathies.

ORAL SESSION 4: SLEEP AND MEDICAL CONDITIONS

ORAL SESSION 4: Comorbid Insomnia and Obstructive Sleep Apnea: How Sleepiness and Objective Sleep Quality with Odds Ratio Product Changes by Diagnosis

**Tomson, Heather[1]; Lambing, Kari[1]; Bender, Amy[1]

[1]Cerebra

Submission ID 173

ABSTRACT Introduction: Insomnia and obstructive sleep apnea are often comorbid. In this study, we investigated how the presence of each of these disorders alone, or together as COMISA impacts objective sleep quality measured with odds ratio product (ORP).

Methods: 418 participants (age 46.2±12.5; 176 females) recorded their sleep with in-home PSG using the Cerebra Sleep System and completed sleep questionnaires. Sleep quality was measured using ORP derived from micro-analyzing frontal EEG channels. On the questionnaires, participants reported insomnia symptoms present at least three times a week. Participants were classified as: i) no diagnosis, if RDI<15 and no insomnia symptoms; ii) insomnia only, if

RDI<15 and ≥1 insomnia symptoms; iii) OSA, if RDI≥15 and no insomnia symptoms, and iv) COMISA, if RDI≥15 and ≥1 insomnia symptoms.

Results: 117 participants were classified as no diagnosis, 112 as insomnia only, 84 as OSA only, and 105 as COMISA. Controlling for age, there was a significant effect of diagnosis on ORP_{NREM} ($p < .001$). Participants with no diagnosis had lower ORP_{NREM} than patients with OSA only ($p = .002$) or patients with COMISA ($p < .001$). Patients with insomnia only had a lower ORP_{NREM} than patients with COMISA ($p < .002$). There was also a significant effect of diagnosis on ORP_{TRT} ($p < .001$). Participants with no diagnosis had lower ORP_{TRT} than insomnia only ($p = .032$), OSA only ($p = .015$), or COMISA ($p < .001$). Insomnia only patients had lower ORP_{TRT} than COMISA patients ($p = .045$). COMISA patients were sleepier than participants with no diagnosis ($p < .001$) or insomnia only ($p < .001$).

Conclusions: Participants with no diagnosis had the lowest ORP reflective of better sleep, and lower levels of sleepiness than participants with sleep disorders. Within the sleep disorder groups, participants with COMISA had worse sleep quality and higher sleepiness than insomnia only. Having COMISA appears to impact sleep quality more than insomnia alone.

ORAL SESSION 4: Data-driven phenotyping of central disorders of hypersomnolence with unsupervised clustering: toward more reliable diagnostic criteria

**Gool, Jari[1,2,3], Zhang, Zhongxing[4]; Oei, Martijn[5] Mathias, Stephanie[3]; Khatami, Ramin[4,6]

[1]Sleep-Wake Center, Stichting Epilepsie Instellingen Nederland (SEIN), Heemstede, the Netherlands, [2]Department of Neurology, Leiden University Medical Centre, Leiden, the Netherlands, [3]Anatomy&Neurosciences, Amsterdam UMC location Vrije Universiteit Amsterdam, Amsterdam, the Netherlands, [4]Center for Sleep Medicine, Sleep Research and Epileptology, Klinik Barmelweid AG, Barmelweid, Switzerland, [5]Leiden Observatory, Leiden University, Leiden, the Netherlands, [6]Department of Neurology, Inselspital, Bern University Hospital, University of Bern, Switzerland

Submission ID 150

ABSTRACT Introduction: Recent studies fuelled doubts as to whether all currently defined central disorders of hypersomnolence are stable entities, especially narcolepsy type 2 and idiopathic hypersomnia. New reliable biomarkers are needed. The main aim of this data-driven observational study on neurological sleep disorders was to see if data-driven algorithms would segregate narcolepsy type 1, and identify more reliable subgrouping of individuals without cataplexy. Methods: We used the newly developed agglomerative hierarchical clustering package (Bowerbird) to identify distinct hypersomnolence clusters in the large-scale European Narcolepsy Network database including 1078 unmedicated adolescents and adults. We included 97 variables, covering all aspects of central hypersomnolence disorders such as symptoms, demographics, objective and subjective sleep measures, and laboratory biomarkers. The primary aim of the study was subgrouping of people without cataplexy. Advanced analyses (resampling and clustering evaluation metrics) were performed to test for cluster reproducibility and distinctness. Results: Seven clusters were identified, of which the first four clusters included predominantly individuals with cataplexy. Clusters 5 and 6 consisting of 157 and 158 people respectively, were most distinctly grouped and had good cluster reproducibility. These two clusters were dominated by those without cataplexy and, amongst other variables, significantly differed in presence of sleep drunkenness, subjective difficulty awakening and weekend-week sleep length difference. Clusters 1-4 mainly consisted of people with narcolepsy type 1, and people formally diagnosed as narcolepsy type 2 and idiopathic hypersomnia were evenly mixed in clusters 5 and 6. Discussion: In the largest study on central disorders of hypersomnolence to date, we identified distinct data-driven subgroups. Our results confirm NT1 diagnosis with multiple subtypes, contest inclusion of sleep-onset REM periods in diagnostic criteria for people without cataplexy, and provide promising new variables for reliable diagnostic categories. Data-driven classification will result in a more solid hypersomnolence classification system with less vulnerability to single, instable features.

ORAL SESSION 4: Effect of Lemborexant on Sleep Onset and Maintenance in Patients with Comorbid Insomnia Disorder and Mild Obstructive Sleep Apnea

**Moline, Margaret[1]; Cheng, Jocelyn Y[1]; Kumar, Dinesh[1]; **Ramos, Barbara[2]; Lowe, Alan D[3]

[1]Eisai Inc., Nutley, NJ, USA; [2]Eisai Ltd, Mississauga, Canada; [3]University of Toronto, Toronto, ON, Canada

Submission ID 52

ABSTRACT Insomnia and obstructive sleep apnea (OSA) are frequent comorbid sleep disorders. However, commonly prescribed hypnotic drugs may exacerbate pre-existing respiratory dysfunction. This analysis evaluated the effects of lemborexant (LEM), a competitive dual orexin receptor antagonist approved in multiple countries for the treatment of insomnia disorder, in patients with comorbid insomnia disorder and OSA (COMISA) of mild severity. Study E2006-G000-304 (Study 304; NCT02783729) was a 1-month, randomized, double-blind, placebo (PBO)-controlled and active-comparator (zolpidem tartrate extended release 6.25 mg [ZOL]) study of LEM 5 mg (LEM5) and LEM 10 mg (LEM10) in subjects age ≥55y. This post-hoc analysis included subjects with both insomnia disorder and mild OSA (apnea hypopnea index [AHI] ≥5 and <15 events/h of sleep). Sleep onset (latency to persistent sleep [LPS]), sleep maintenance (sleep efficiency [SE] = total sleep time / time in bed), wake after sleep onset (WASO), and WASO in the second half of the night (WASO2H) were assessed at Nights 1/2 (NT1/2) and Nights 29/30 (NT29/30) using polysomnography. In this study, 40.8% of the population (n=410/1006) had mild OSA, with AHI (mean [SD]) at screening of 9.33 (2.9) events/h; median age was 65 y, and 83.9% of subjects were female. Improvement (increase) in SE from baseline was larger and significantly different for both LEM5 and LEM10 versus PBO and ZOL on NT1/2 ($P<0.05$) and NT29/30 ($P<0.0001$). LPS, WASO, and WASO2H were significantly improved (decreased) ($P<0.005$) with LEM5 and LEM10 compared with PBO at both time points. Compared with ZOL, LEM10 produced significantly greater improvements for LPS, WASO, and WASO2H at NT1/2 and NT29/30 ($P<0.01$, all assessments); and with LEM5 on NT29/30 ($P<0.02$, all assessments). LEM was well tolerated, with no new safety signals. These results demonstrate the effectiveness of LEM versus PBO and ZOL in an older patient population with insomnia disorder and mild OSA.

ORAL SESSION 4: Examining Links between General Fatigue in Myasthenia Gravis with Objectively Measured Sleep

**Yang, Jinyuru[1,2]; Katzberg, Hans[3]; Abrahao, Agessandro[1,4]; Kassardjian, Charles[5,6]; Zinman, Lorne[1]; Izenberg, Aaron[1]; Barnett-Tapia, Carolina[7]; Murray, Brian[1,2]; Boulos, Mark[1,2]

[1]Hurvitz Brain Sciences Research Program, Sunnybrook Research Institute, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada, [2]Institute of Medical Science, University of Toronto, Toronto, Ontario, Canada, [3]Department of Neuromuscular Medicine, Toronto General Hospital, Canada, [4]Department of Medicine, Division of Neurology, University of Toronto, Toronto, Ontario, Canada, [5]Division of Neurology, Department of Medicine, St. Michael's Hospital, University of Toronto, Toronto, Ontario, Canada, [6]Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Ontario, Canada, [7]University Health Network, Toronto General Hospital, Toronto, Canada

Submission ID 129

ABSTRACT Background: Myasthenia gravis (MG) is an autoimmune disease that affects the neuromuscular system. Previous research has demonstrated a high prevalence of general fatigue in MG, which negatively impacts quality of life. The pathophysiology of general fatigue in MG remains poorly understood. Sleep disorders are important mediators of general fatigue. However, limited research has examined the association between sleep disorders and general fatigue in MG. Objective: To evaluate the hypothesis that sleep apnea severity in MG is correlated with the presence of general fatigue. We secondarily assessed the association of general fatigue in MG with other sleep disorders and depression. Methods: Patients with MG used a home sleep apnea test (HSAT) for two nights, wrist-actigraphy for a week, and completed questionnaires that assessed for general fatigue, sleep disorders, and depression. Spearman's rank correlations were used to examine the association of general fatigue with sleep apnea severity, and the presence of other sleep disorders and depression. Results: To date, 17 MG patients (6 females, 11 males, average age: 64 years) completed the study assessments. Spearman's rank correlation test showed that there was no significant correlation between general fatigue and sleep apnea severity (rho=-0.22, p-value=0.47), or with the presence of other sleep disorders. There was a significant correlation between general fatigue and depression in MG (rho=0.69, p-value=0.002). Conclusion: Our early results demonstrate that sleep apnea severity and the presence of other sleep disorders were not correlated with general fatigue in MG patients. Our study is likely under-powered at this time and data collection is on-going; a complete dataset will be presented at the conference (target 50 patients with MG). Future studies should aim to include larger sample sizes as well as further explore how depressive symptoms may be associated with general fatigue in MG.

ORAL SESSION 4: Exploratory Analyses of Obstructive Sleep Apnea Outcomes and Sleep Structure in Parkinson's Disease Motor Subtypes

**Scanga, Amanda[1], Robinson, Ann[2], Gingras, Marianne[2], Benedetti, Andrea[3,5], Lafontaine, Anne-Louise[4], Kimoff, R John[2], Kaminska, Marta[1,2,5]

[1]Division of Experimental Medicine, McGill University, Montréal, QC, Canada; [2]Respiratory Division, Sleep Laboratory, McGill University Health Centre, McGill University, Montréal, QC, Canada; [3]Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montréal, QC, Canada; [4]Montréal Neurological Institute-Hospital, McGill University Health Centre, McGill University, Montréal, QC, Canada; [5]Respiratory Epidemiology and Clinical Research Unit, McGill University Health Centre, Montréal, QC, Canada

Submission ID 29

ABSTRACT Background: Parkinson's disease (PD) can be divided into motor subtypes: postural instability/gait difficulty (PIGD), tremor dominant, and indeterminate. This study aimed to assess differences in obstructive sleep apnea (OSA) between the PIGD and non-PIGD subtypes. Methodology: PD participants with or without OSA (defined as apnea-hypopnea index (AHI) ≥ 15 events/hour on overnight polysomnography) were included. Using scores from specific Movement Disorder Society-Unified Parkinson's Disease Rating Scale items, patients were separated into two groups: PIGD and non-PIGD. Logistic regression adjusted for age, sex, body mass index (BMI), levodopa equivalent dose (LED), proportion of sleep time in stage N3, proportion of sleep time in stage rapid-eye movement (REM), and proportion of sleep time in the supine position was used to determine if the proportion of patients with OSA differs across groups. Linear regression was used to explore differences between groups in AHI and other respiratory parameters (adjusted for the same confounders). Subset analyses were performed: subset 1 excluding patients on psychoactive medication; subset 2 excluding patients taking levodopa or dopaminergic agonists at nighttime. Results: We studied 144 participants: 69.4% male, mean age 65.2±9.9 years, BMI 27.8±4.7 kg/m2 and AHI 31.2±21/h. The PIGD group had more N3 sleep (17.0% vs. 12.1%, p=0.04). Fewer patients had OSA in the PIGD versus non-PIGD subtypes [adjusted OR 0.53, 95%CI (0.21, 1.33), p=0.18 in full sample; adjusted OR 0.20, 95%CI (0.04, 0.83), p=0.034 in subset 1 (n=74); adjusted OR 0.45, 95%CI (0.16, 1.25), p=0.13) in subset 2 (n=99)]. The AHI was lower in the PIGD group (p=0.07 in full sample; p<0.05 in both subsets). Discussion: OSA was more frequent in the non-PIGD subtype when assessing a subset free of psychoactive medication. The PIGD group also had a lower AHI, adjusting for potential confounders including differences in sleep architecture, in subsets excluding psychoactive medication and nighttime dopaminergic medication.

ORAL SESSION 4: Impact of Sleep Chronotype on In-Laboratory Polysomnography Parameters

Colelli, David[1,2]; Dela Cruz, Gio[1]; Murray, Brian[1,3]; **Boulos, Mark[1,3]

[1]Sleep Laboratory, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada, [2]UCD School of Medicine, University College Dublin, Dublin, Ireland, [3]Department of Medicine, Division of Neurology, University of Toronto, Toronto, Ontario, Canada

Submission ID 78

ABSTRACT Introduction: Morningness-eveningness preference, also known as chronotype, is the tendency for a person to sleep during certain hours of the day, and is broadly categorized into morning and evening types. In-laboratory polysomnography (iPSG) is the gold-standard to assess sleep, however, an individual's chronotype is not accounted for in current protocols, which may confound collected sleep data. The objective of our study was to assess if chronotype had an impact on sleep physiology. Methods: Patients who completed diagnostic iPSG and the Morningness-Eveningness Questionnaire (MEQ) during 2010-2015 were assessed. The MEQ categorizes patients into morning type, evening type, or neither. Multivariable linear regression models were used to assess if chronotype was associated with sleep quality, duration and physiology during iPSG. Results: The study sample included 2,612 patients (mean age of 53.6 years, 48% male) who completed iPSG and the MEQ. Morning type, compared to neither type, was significantly associated with an increase in total sleep time and rapid eye movement (REM) sleep, and a decrease in sleep onset latency and the arousal index. Evening type compared to neither type was associated with a decrease in total sleep time, sleep efficiency and REM sleep, and an increase in sleep onset latency and wake after sleep onset. Conclusions: A morningness chronotype was associated with favourable sleep quality and duration while an eveningness chronotype was associated with reduced sleep quality. Our study quantifies the impact of chronotype on iPSG metrics and suggests that laboratory protocols should consider chronotype in their evaluations.

ORAL SESSION 4: Investigating the Impact of CPAP on Cognition in a Retrospective Cohort of Cognitively Impaired Patients

Costa, Yakdehikandage[1,2]; Thorpe, Kevin[3]; Mitchell, Sara[1,2]; Masellis, Mario[1,2]; Lam, Benjamin[1,2]; Black, Sandra[1,2]; **Boulos, Mark[1,2]

[1]Hurvitz Brain Sciences Research Program, Sunnybrook Research Institute, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada, [2]Department of Medicine, Division of Neurology, University of Toronto, Toronto, Ontario, Canada, [3]Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada,

Submission ID 37

ABSTRACT Background: Obstructive Sleep Apnea (OSA) is highly prevalent in patients with cognitive impairment and dementia. Continuous Positive Airway Pressure (CPAP), which administers pressurized air to keep the airway open, is used to treat OSA. Studies on the cognitively impaired population have demonstrated conflicting cognitive outcomes with the use of CPAP. Objectives: To characterize the impact of CPAP use on cognition in a clinical cohort with

obstructive sleep apnea (OSA) and cognitive impairment due to neurodegenerative or vascular etiologies after controlling for baseline sleepiness. Methods: We retrospectively analysed data from 171 patients with cognitive impairment and an OSA diagnosis confirmed with in-laboratory polysomnography or home sleep apnea testing (mean age 69.8±10.6; 66% male) who were eligible to use CPAP. Baseline and follow-up Epworth Sleepiness Score (ESS), Montreal Cognitive Assessment (MoCA), and Mini-Mental Status Examination (MMSE) were obtained from clinical and research visits conducted before and after CPAP initiation. Good CPAP adherence was defined as CPAP use ≥4 hr/night, for 7 days/week at follow-up. Associations between CPAP adherence and follow-up cognitive scores were analyzed using multivariable linear mixed-effects models. Results: After adjusting for age, sex, body mass index, baseline ESS, duration of CPAP therapy, relevant comorbidities and the random effect of research study cohort, good CPAP adherence (compared to poor CPAP adherence or no use of CPAP) for a duration of 2-12 months was associated with a 2.3-point (1.2 – 3.3 95% CI) higher follow-up MoCA score (p<0.001) and a 1.2-point (0.3 – 2.3 95% CI) higher follow-up MMSE score (p=0.01). Conclusions: In patients with OSA and cognitive impairment due to a neurodegenerative or vascular etiology, good adherence to CPAP therapy is associated with improved cognitive outcomes. The findings of this study may aid in motivating patients to use CPAP and support future randomized controlled trials in this area.

ORAL SESSION 4: Positive Airway Pressure Therapy Usage for Obstructive Sleep Apnea in the Lung Transplant Population

**Wang, Xin Ye (Steven)[1]; Martinu, Tereza[1,2]; Keshavjee, Shafique [2,3]; Aversa, Meghan[1,2]; Ryan, Clodagh [1,2]

[1]Division of Respirology, University of Toronto, [2]University Health Network, Toronto, [3]Division or Thoracic Surgery, University of Toronto

Submission ID 136

ABSTRACT Introduction: There is a high reported prevalence (40%-71%) of obstructive sleep apnea (OSA) in the pre- and post-lung transplant population(1,2). While lung transplant is an effective life-saving treatment for lung disease, it does not alleviate pre-existing OSA. Post-lung transplant observational data in those with OSA suggests that positive airway pressure (PAP) usage is associated with lower mortality(2). Non-adherence to PAP therapy is common in the general population, but has not been evaluated in the transplant population. Objective: To evaluate PAP usage in the lung transplant population over time. Methods: This is an exploratory retrospective cohort study of adult lung transplant patients from the Ajmera Transplant Centre-University Health Network, Toronto, Canada who received lung transplant between August 1997 and December 2021. Patients with OSA were identified from the lung transplant database. Data on demographics, lung transplant status, medical comorbidities, date of OSA diagnosis, PAP prescription and usage were abstracted from the medical records and the lung transplant database. Results: A total of ninety-seven patients were identified with OSA in both the pre- and post-lung transplant period. The mean (SD) age at transplant was 59 (9) years, BMI 32.0 (5.2)kg/m2 and 72% were male. The median time from transplant to last follow-up date was 34 months. Of these patients, 57 were diagnosed with OSA pre-transplant and 40 post-transplant. In those who used PAP in the pre-transplant period, 43% discontinued post-transplant. By the last follow-up date, PAP usage was 54.7% (41/75 patients) in post-transplant patients vs. 71.4% (35/48

patients) pre-transplant (p = 0.042). Conclusion: In the lung transplant population diagnosed with OSA and prescribed PAP therapy, usage significantly decreased from the pre- to post-transplant period. This identifies an important gap in the care of post-lung transplant patients, considering that PAP non-adherence has been linked to poorer outcomes in this population.

ORAL SESSION 4: Respiratory Safety of Lemborexant in Adult and Elderly Subjects with Mild to Severe Obstructive Sleep Apnea

Cheng, Jocelyn[1]; Lorch, Daniel[2]; Hall, Nancy[1]; Shah, Dhara[1]; **Moline, Margaret[1]

[1]Eisai Inc., Nutley, New Jersey, USA; [2]Teradan Clinical Trials LLC, Brandon, Florida, USA

Submission ID 12

ABSTRACT Central respiratory depression is a safety risk of some common sleep-promoting drugs. Subjects with coexisting insomnia and respiratory disease, eg, obstructive sleep apnea (OSA), and/or the elderly, are particularly at risk. Lemborexant (LEM) is a competitive dual-orexin-receptor-antagonist approved for treatment of adults with insomnia. Study 102 (NCT03471871) and Study 113 (NCT04647383) were multicenter, multiple-dose, randomized, double-blind, placebo (PBO)-controlled, crossover studies investigating respiratory safety of LEM in adult (age ≥45, <65y) and elderly (age ≥65, ≤90y) subjects with mild (apnea hypopnea index [AHI] ≥5 and <15) or moderate (AHI ≥15 to<30)/severe (AHI ≥30) OSA. Subjects were randomized to two 8-night treatment periods (separated by ≥14d washout), starting with LEM 10mg [LEM10] or PBO. In-lab polysomnography and transmissive pulse oximetry were performed at screening and on first and last nights of both treatment periods. Treatment-emergent adverse events (TEAEs) were recorded. In Studies 102 and 113, 39 and 33 subjects were randomized, respectively. No significant difference was found in AHI (least squares mean [LSM]) after single or multiple doses of LEM10 versus PBO in subjects with mild (single: LEM10,10.19; PBO,10.22, P=0.979; multiple: LEM10, 9.93; PBO, 10.00, P=0.948); moderate (single: LEM10,31.49; PBO,32.41, P=0.818; multiple: LEM10, 34.66; PBO, 37.16, P=0.442); or severe (single: LEM10,48.22; PBO,52.69, P=0.172; multiple: LEM10,51.48; PBO,51.15, P=0.902) OSA. Mean peripheral oxygen saturation (SpO_2) (LSM) was also not significantly different in subjects with mild (single: LEM10,94.62, PBO,94.54, P=0.699; multiple: LEM10,94.65, PBO,94.39, P=0.169); moderate (single: LEM10,93.68, PBO,93.86, P=0.696; multiple: LEM10,93.74, PBO,93.86, P=0.784); or severe (single: LEM10,92.57, PBO,92.65, P=0.841; multiple: LEM10,92.63, PBO,93.02, P=0.283) OSA. TEAEs were higher with LEM10 (mild, 15.8%; moderate/severe, 18.2%) versus PBO (mild, 13.2%; moderate/severe, 9.1%). Most TEAEs were mild. These results show that, as measured by AHI and SpO_2, LEM demonstrated respiratory safety with single and multiple dosing in subjects with mild to severe OSA and was well-tolerated.

ORAL SESSION 4: YAWNS NB – a randomized controlled trial of direct-to-patient mailed interventions to reduce sedative-hypnotic use in older adults

**Gardner DM[1,2], Murphy AL[1,2], Rajda M[1], Turner J[3], Magalhaes S[4]

[1]Department of Psychiatry, Dalhousie University, Halifax, NS; [2]College of Pharmacy, Dalhousie University, Halifax, NS; [3]Faculty of Pharmacy and Pharmaceutical Sciences, Monash University, Melbourne, Australia; [4]New Brunswick Institute of Research, Data, and Training, University of New Brunswick, Fredericton, NB

Submission ID 100

ABSTRACT Introduction: Contrary to guideline recommendations, chronic use of benzodiazepine receptor agonists (BZRA) in older adults remains high, especially in Atlantic Canada. Vulnerability to BZRA cognitive and physical harms increases with age. Direct-to-patient education resources embedded with behaviour change techniques can be used to modify health behaviours. The Your Answers When Needing Sleep in New Brunswick (YAWNS NB) study quantified the impact of mailed packages intended to reduce BZRA use and increase cognitive-behavioural therapy for insomnia (CBTi) knowledge. Methods: YAWNS NB was a three-arm, open-label, pragmatic, randomized controlled trial for people 65 years and older using BZRAs long-term living in the community across NB. Participants were allocated to: i) Sleepwell package, ii) Eliminating Medications through Patient Ownership of End Results (EMPOWER) package, and iii) treatment-as-usual (TAU). Information packages encouraged collaborating with prescribers and pharmacists and included education on BZRA harms, stopping BZRAs safely, and behavioural treatments for insomnia. Assessments were completed at baseline and 6-months. Outcome measures included BZRA discontinuation (primary), ≥25% BZRA dose reduction, sedative switching, CBT-I resource use, sleep measures, and insomnia, anxiety, and sleepiness severity. Results: 517 of 580 (89%) participants completed follow-up. Rates of BZRA discontinuation and ≥25% dose reduction were: Sleepwell 34% and 24% (58%); EMPOWER 32% and 22% (54%), and TAU 9% and 17% (26%). Accesses to CBT-I resources was higher in the Sleepwell group. The Sleepwell group had improvements in sleep onset latency and sleep efficiency and fewer sedative switches. Conclusion: Sleepwell and EMPOWER information packages when mailed to older, community-dwelling adults taking BZRAs long-term resulted in a large proportion stopping or reducing their use while maintaining or improving sleep. The scalability of these behaviour change interventions indicates that they may be sustainable and impactful at the population level if integrated into a health promotion strategy.

A Computational Interrogation of the Validity of Activating Neurons as a Test of Their Functional Importance in Sleep-Wake Control Networks

**Grace, Kevin[1,2,3]

[1]Beth Israel Deaconess Medical Center and Harvard Medical School, Department of Neurology, Boston, MA, USA; [2]University of California, Davis, Department of Neurosurgery, Davis, CA, USA; [3]University of Toronto, Department of Physiology, Toronto, ON, Canada

Submission ID 169

ABSTRACT Understanding sleep/wake states of the brain is enabled by a specific type of experiment. These experiments aim to distinguish functionally critical, from non-critical neuronal groups, in the control of sleep/wake. Taken together, they seek to demarcate the minimum set of neuronal groups that need be considered to explain state dynamics. Neuronal group/node importance is commonly evaluated by two main strategies: node-by-node activation and inactivation. While these strategies are assumed to be complimentary, it may be argued that neuronal activation is often misleading. However, the true epistemological validity of activation cannot be empirically determined in vivo. Such an empirical test may be performed computationally, using exhaustive interrogation of simulated networks. Candidate networks were generated by randomly varying network parameters. Networks had generalized pareto degree distributions (50-nodes), were weighted log-normally, were signed, and directed. Nodes, representing pools of neurons, had analog I/O, determined by variable sigmoidal activation functions, rates of activity decay, bias and noise. Network fitness was evaluated relative to characteristics attributable to sleep-wake networks: anti-correlated node clusters, state bistability, state rebound after 'deprivation'. Network fitness was further optimized using a genetic algorithm. For each network (n=31), exhaustive node-by-node activation and inactivation experiments were performed (n=3100). The effect sizes were compiled into activation and inactivation-based node-importance rankings. Ranking validity was tested with a network-attack approach: for each network-ranking pair (n=62), a series of experiments (n=25) was performed, where progressively larger groups of nodes were removed, moving from with the least important to the 25 least important. Rankings generated by a valid epistemological process will affect network dynamics less compared to random rankings. While inactivation-based rankings outperformed randomized rankings in preserving network dynamics, the performance of activation was equivalent to randomly guessing. Therefore, we should question the epistemological utility of the neuronal activation approach in demarcating functionally important nodes in sleep-wake networks.

A Review of Commercially Available CBT-I Smartphone Applications: Do they Adhere to CBT-I Principles?

**Rahmani, Armin[1]; Mak, Michael[1]

[1]University of Toronto

Submission ID 164

ABSTRACT Objective: There are now multiple smartphone applications available both on Apple Store and Google Play which claim to deliver evidence based cognitive behavioral therapy for insomnia. The goal of this study is to review the current landscape of CBT-I smartphone applications and examine the extent to which they adhere to evidence-based principles for delivering cognitive behavioural therapy for insomnia. Introduction: In the absence of effective and safe habitual and pharmacological options, cognitive behavioural therapy for treatment of insomnia (CBT-I) remains the only first line evidence-based option. Despite its effectiveness, access to CBT-I remains very limited. Digital CBT-I can play an important role in bridging the gap in accessibility of CBT-I. Methods: This was a review study. Our search consisted of reviewing PubMed and Google Scholar for validation studies for CBT-I applications. A second search was done on the most popular smartphone applications platforms, Apple Store and Google Play. Two separate searches were completed and then cross-referenced in order to identify commercially available CBT-I applications which are supported by validation studies. Results: The majority (85%) of smartphone applications focused on insomnia treatment do not follow CBT-I principles. Meditation, relaxing sounds and relaxation techniques are popular approaches. Out of the 12 dCBT-I applications which are commercially available on Google Play and Apple Store, only 5 have validation studies published in peer reviewed journals. All validation studies confirm the effectiveness of their respective smartphone applications. Stimulus control and Cognitive work were the most tightly adhered principles with Termination being the least closely adhered principle of CBT-I. Conclusions: With a relatively simple design, the study was able to show that there is a real shortage of evidence-based CBT-I smartphone applications. An important weakness of the study includes the inability to assess the applications for true adherence with CBT-I principles.

A single night of mild sleep restriction impacts fitness to drive and eye movements associated with scanning and processing environmental stimuli while driving

**Gibbings, A.[1,2]; Sarr, F.[2] Ray, L.B.[1]; Gagnon, S.[2]; Collin, C. A.[1] Robillard, R.[1,2]; **Fogel, S.M.[1,2,3]

[1]Sleep Research Unit, The University of Ottawa's Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada; [2]School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada
[3]University of Ottawa Brain & Mind Research Institute, Ottawa, K1H 8M5, Canada

Submission ID 80

ABSTRACT Objective: Despite the demonstrable behavioural, cognitive, and physiological impacts of chronic and severe sleep loss being well-documented, the impact of mild and acute sleep loss (i.e., only a few hours on a single night), which is much more common, is less well known. However, studies have shown that drowsy driving is associated with a significant proportion of

motor vehicle accidents, causing thousands of deaths every year in North America. Here, we focused on the behavioural and cognitive impact of mild, acute sleep loss via recorded behavioural and eye-tracking measures of vigilance during a simulated driving task. Methods: Participants (N = 22) visited the lab on two separate testing days, where their eye movements and vigilance were simultaneously recorded while performing a long, monotonous driving simulator task. The night before testing, participants either slept from 11 pm-8 am (Normally Rested) or from 1 am-6 am (Sleep Restricted). Results: After only one night of mild sleep restriction, participants reported higher subjective sleepiness, recorded more lapses in vigilance, and were slower responding to stimuli during PVT. During the same session, while driving, participants spent less time scanning their environment and took more time to process stimuli when sleep restricted as compared to normally rested. Conclusions: These findings suggest that after only a single night of mild sleep loss, there are significant negative consequences on fitness to drive and driving performance and a clear, negative impact on eye movement behaviours related to scanning and processing environmental stimuli. Significance: Better understanding of the cognitive, physiological, and behavioural markers associated with sleep loss may lead to important advancements in technologies intended to identify and prevent dangerous, sleep-related lapses in vigilance.

Access and models of care for OSA: A cross-national comparison of Canadian and Australian patient survey data

Fatima, Duaa[1]; Sweetman, Alexander[2,3]; Lovato, Nicole[2,3]; Vakulin, Andrew[2,3]; Bansback, Nick[4]; Stocks, Nigel[3,5]; Fenton, Mark[6,7]; Chai-Coetzer, Ching Li[2,3,8]

[1]Cumming School of Medicine, Cumming School of Medicine, University of Calgary, [2]Adelaide Institute for Sleep Health / FHMRI Sleep Health, College of Medicine and Public Health, Flinders University, Adelaide, Australia, [3]Centre of Research Excellence, National Centre for Sleep Health Services Research, Flinders University, Adelaide, Australia, [4]School of Population and Public Health, University of British Columbia, Vancouver, Canada, [5]Faculty of Health and Medical Sciences, Adelaide Medical School, University of Adelaide, Adelaide, Australia, [6]Department of Medicine, College of Medicine, University of Saskatchewan, Saskatoon, Canada, [7]Respiratory Research Centre, University of Saskatchewan, Saskatoon, Canada, [8]Respiratory, Sleep Medicine and Ventilation Services, Southern Adelaide Local Health Network, SA Health, Adelaide, Australia

Submission ID 72

ABSTRACT BACKGROUND: Obstructive sleep apnea (OSA) is highly prevalent and has significant health consequences. Care delivery models for OSA differ internationally. Comparing such models can highlight how these differences might impact patient outcomes and identify areas to improve OSA care delivery in each country. OBJECTIVES: To determine if there are differences in the patient-borne burden of OSA care between Canada and Australia including among rural and urban participants. METHOD: In this secondary data analysis of patient surveys exploring OSA care in Australia and Canada, we recruited adults with prior diagnosis of OSA from market research companies, social media and patient-facing medical associations. Residential postal codes were translated into geographic census areas to classify participants as having an urban or rural address. Survey domains included wait times and travel distances for care, providers, and treatments. RESULTS: We enrolled 600 Canadians (21% rural; 43% female, Age mean[SD] = 57[13] years) and 412 Australians with OSA (38% rural; 45% female, Age = 58[14] years). Participants waited longer

to seek care for suspected OSA in Canada compared to Australia (37% vs 51% within 12 months of symptoms). Canadians with OSA waited longer for diagnostic testing (59% vs 76% within 3 months of assessment), especially in urban settings (58% vs 78%). In both countries, >80% of participants were offered positive airway pressure (PAP) therapy, but overall, more treatments were offered to Australian participants. Canadian participants reported using a smaller variety of treatments and 12% reported using no therapy (vs 0% among Australians). Participants in both countries most commonly sought initial care for OSA from a primary care practitioner. CONCLUSION: Greater access to diagnostic testing and a larger variety of treatments were found in Australia compared to Canada. Patients, clinicians, and policymakers in Canada may benefit from improved understanding about the importance of diagnosing and treating OSA.

Actigraphic and Self-reported Sleep Outcomes and Relationships to Anxiety and Depression Symptoms in Adolescents and Young Adults with Cystic Fibrosis: A Mixed Methods Study Protocol

**McMurray, Jordana[1]; Widger, Kim[1,2]; Stephenson, Anne[3,4]; Stremler, Robyn[1,2]

[1]Lawrence S. Bloomberg Faculty of Nursing, University of Toronto, Toronto, ON, Canada; [2]The Hospital for Sick Children (SickKids), Toronto, ON, Canada; [3]St. Michaels Hospital, Toronto, ON, Canada; [4]Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, ON, Canada

Submission ID 155

ABSTRACT Cystic Fibrosis (CF) is the most common life-limiting genetic disease in young Canadians. Some research suggests that young people with CF may have more trouble with sleep than people of the same age without chronic illness. Poor quality sleep can affect a person's ability to concentrate at school/work and feel well emotionally. This study will measure the sleep and mental health of adolescents and young adults (AYA) with CF and compare this to AYA without chronic illness. This study will: investigate whether those with CF have more sleep difficulties and more mental health concerns than their peers without chronic illness; determine if there is a relationship between poor sleep and worse mental health in those with CF and will explore the sleep experience from the perspective of those with CF. Participants will be asked to complete questionnaires to measure sleep, symptoms of anxiety and depression and pain. They will also keep a sleep diary and use an actigraph to record their sleep for 7-days and 7-nights. Some individuals with CF who agree to being contacted after they have completed the questionnaires and actigraphy recording will be asked to participate in a virtual interview with a researcher on Zoom Healthcare to discuss their sleep experiences. Clinical details will also be collected from the Canadian CF Registry on consenting CF participants. This study will be the first to ever provide information on the relationship between poor sleep, measured by both self-report and actigraphy, and both anxiety and depression symptoms in AYA with CF and will be the first study to integrate the sleep experiences and voices of the participants themselves. This is important because more completely understanding the relationship between mental health and sleep could have a significant impact on well-being and quality of life.

Adherence to continuous positive airway pressure for the treatment of obstructive sleep apnea in neurodegenerative diseases: results from a systematic review

**Lajoie, Annie[1]; Gu, Yusing[1]; Lim, Andrew[3]; Benedetti , Andrea[1,5]; Kaminska, Marta[1,5]

[1]Respiratory Epidemiology and Clinical Research Unit, Research Institute of the McGill University Health Centre - Montreal, Quebec, Canada; [2]Department of Medicine, Dalhousie University, Halifax, Nova Scotia, Canada; [3]Department of Medicine, Sunnybrook Health Sciences Centre, University of Toronto- Toronto Ontario, Canada; [4]Dept. of Medicine and Dept. of Epidemiology, Biostatistics & Occupational Health, McGill University – Montreal, Quebec, Canada
[5]Respiratory Division & Sleep Laboratory, McGill University Health Centre - Montreal, Quebec, Canada

Submission ID 43

ABSTRACT Background: Obstructive sleep apnea (OSA) is prevalent in patients with neurodegenerative diseases (NDD) and is associated with worse outcomes. Positive airway pressure (PAP) therapy has the potential to benefit patients with NDD and OSA. However, PAP therapy can be challenging in this population. Our aim was to describe PAP adherence and identify predictors of PAP therapy in patients with NDD and OSA. Methods: We performed a systematic review of the literature. Medline, Embase and the Cochrane Central Register of Controlled trials were searched to identify studies reporting on PAP for the treatment of OSA in patients with NDD associated with cognitive impairment. Risk of bias of each included study was performed with the appropriate assessment tools. A quantitative synthesis was planned as part of the original protocol but was not conducted due to between-study heterogeneity and insufficient data. Results: Of the 898 records screened, 16 studies were included for qualitative analysis. Eight studies reported on mild cognitive impairment/Alzheimer's disease (MCI/AD), 5 on Parkinson's disease (PD) and 3 on multiple system atrophy (MSA). Attrition rates ranged from 12% to 75%. In MCI/AD, patients who were younger and white were more adherent to PAP. In PD, longer disease duration, worse motor symptoms, and poorer sleep quality predicted lower adherence. PAP was well accepted in patients with MSA, but its use was relatively short in most patients due to the poor prognosis associated with this disease. Conclusion: Usage of PAP therapy varies in patients with OSA and NDD. Systematic reporting of PAP adherence and predictors of adherence in clinical trials is warranted to determine strategies to promote PAP use in this population. Financial support: none

Are working memory/executive processes involved in REM sleep?

Provias, Vasiliki[1], Jourde, Hugo R.[1], Albouy, Philippe[2] and Coffey, Emily B. J.[1,3]

[1] Concordia University, Montreal, Quebec; [2] University of Laval, Quebec City, Quebec; [3] McGill University, Montreal, Quebec

Submission ID 181

ABSTRACT Working memory is a conscious cognitive process in which items are held in mind so that they can be mentally manipulated. It is tightly tied to neural oscillations in the theta band (defined as 4-8 Hz or sometimes more narrowly as 5-7 Hz), which appears over medial frontal and dorsal parietal regions during tasks that require manipulation in memory or more general executive functioning. Interestingly, elevated theta-band activity is also a prominent feature of rapid eye-movement (REM) sleep. Theta-band activity in REM has been causally implicated in hippocampus-dependent memory consolidation, via a pace-making function of in the medial septum that coordinates theta in hippocampus (Boyce et al., 2019). However, little is known about the function of cortical theta oscillations recorded in EEG in REM, nor for that matter the cognitive functions of REM sleep. To explore the intriguing similarities between working memory/executive functions and sleep theta, we recorded electroencephalogrpahy (EEG) and magnetoencephalography (MEG) overnight in 10 healthy young adults, and identified 5 s windows of REM sleep into phasic (dense eye movements) and tonic (low eye movement) periods. We also

recorded similar data in 17 healthy young adults as they performed an auditory working memory task, and identified time periods in which participants were manipulating tone patterns in mind. In both cases, we analyze oscillatory power in the theta band, and map it to subject-specific brain anatomy using distributed source models (MEG). We also conduct connectivity metrics to quantify inter-region communication within the theta band. We report similarities and differences in brain activity and connectivity across the brain states. Comparing brain activity associated with working memory during task performance and activity in the same frequency band in REM sleep may be a first step towards better understanding REM sleep's cognitive functions.

Association between sleep and maladaptive behaviors in gifted children: A polysomnographic study.

Bastien, Laurianne[1,2]; Théoret, Rachel[2]; **Godbout, Roger [2,3]

[1] Department of Psychology, Université de Montréal, Montréal, Qc Canada; [2] Sleep Laboratory and Clinic, Rivière-des-Prairies Mental Health Hospital, Montréal, Qc Canada; [3] Department of Psychiatry, Université de Montréal, Montréal, Qc Canada

Submission ID 46

ABSTRACT Neurological uniqueness, maladaptive behaviors, as well as atypical sleep patterns are reported to be defining characteristics of giftedness, but this has received little empirical support. We studied the polysomnography recorded sleep of gifted and typically-developing children together with features of maladaptive behaviors. The association of sleep macrostructure and sleep instability with maladaptive behaviors was also investigated in gifted children. Nineteen gifted children (74% boys) and 17 typically-developing children (76% boys) aged 6-12 years old were studied. Giftedness was identified using Renzulli's three-factor definition. The microarousal index, number of awakenings, and number of stage shifts between sleep stages throughout the night were computed as sleep instability parameters. Maladaptive behaviors were assessed using the Child Behavior Checklist. We found significantly more stage N1 sleep and less stage N3 sleep in gifted children compared to typically-developing children. More stage N1 was correlated with more externalizing problems, less stage N3 sleep was correlated with more internalizing problems. Gifted children also displayed more REM sleep, but this was not significantly correlated with behavioral scales. Gifted children displayed two opposing trends of sleep instability: more instability involving N1 sleep and less instability involving N2, N3 and REM sleep. More total stage shifts was correlated with more internalizing and externalizing problems. The results of this study provide initial evidence of polysomnography-based characteristics of giftedness. Further studies are needed to explore common pathways linking sleep alterations and maladaptive behaviors in children with giftedness.

Association of Early Onset Psychiatric Disorders with REM Sleep Behavior Disorder / REM Sleep without Atonia – A Retrospective Study

Makwana, Aditii[1], Driver, Helen[2], Shukla, Garima[1,3]

[1]Center for Neuroscience Studies, Department of Medicine (Respirology[2] & Neurology[3]), Queen's University, Kingston, ON

Submission ID 165

ABSTRACT Background: REM sleep behavior disorder (RBD) typically occurs in older people and has been shown to be a precursor of neurodegenerative diseases including Parkinson's disease and other alpha synucleiopathies. Among younger individuals, RBD is uncommon and has been found to be more common among children with psychiatric illnesses such as depression, anxiety, and ADHD. However, the association of RBD diagnosed in later adult life with mental illnesses observed in early life is largely unexplored. The aim of this study was to investigate association, if any, of early onset psychiatric disorders with RBD. Methods: This is a retrospective chart review-based study, including consecutive patients diagnosed with RBD, through clinical and polysomnography (PSG) evaluation at the Kingston Health Sciences Centre (KHSC) Sleep clinic and laboratory, over a 5 year study period. Detailed information pertaining to sleep, neurological, psychiatric and medication history as well as PSG parameters, was collected and entered into a secure institutional database. In instances of incomplete information, patients were telephonically contacted to obtain additional information. Similar data was also collected from an age and sex matched control group, comprised of patients without RBD, also included from the KHSC sleep lab. Results: Among a total of 20 patients with RBD (16 males), 11 (55%) were observed to have had an early onset (age<25 years) psychiatric disorder, compared to 5 out of 21 (23.8%) in the control group. The likelihood of being prescribed a mental health medication was also significantly higher in the RBD group (70% versus 35%). Conclusion: Observations from our study provide preliminary data suggesting a possible relationship of early onset psychiatric disorder with RBD diagnosed in late adulthood.

Associations between Parental Relationship Dissolution and Child Sleep: a Systematic Review

Lannes, Emilie E.[1]; Chicoine, Marjolaine[2]; Kenny, Samantha[1]; Hershon, Malka[1]; Talwar, Victoria[1]; Kiafar, Anita[1]; Pennestri, Marie-Hélène [1,2]

[1]Educational & Counselling Psychology, McGill University, Montreal, Canada; [2]Sleep Laboratory, Rivière-des-Prairies Mental Health Hospital, Montreal, Canada

Submission ID 131

ABSTRACT Context: Parental relationship dissolution, a family transition associated with high stress and changes in daily routines, is considered one of the most common adverse childhood experiences. Although sleep is crucial for healthy development of children and very sensitive to environmental changes, it is poorly studied in the context of parental relationship dissolution. Objective: To systematically review and critically assess the existing literature on the associations between parental relationship dissolution and child sleep (0-18 years old). This review was registered on PROSPERO (CRD42021272720). Data Sources: PsycInfo, MEDLINE, Scopus, ProQuest

Dissertations and Theses Global, Social Work abstracts, and Web of Science Core Collection were searched. Study Selection: Published empirical quantitative studies were included if they reported statistics regarding the association between parental relationship dissolution and any child sleep variable. Data Extraction: Extracted data included publication year, country, study aims, sample description, study design, sleep measures, principal results, and covariables. Results: Out of the 358 articles screened, 14 articles met inclusion criteria. All but one article found an association between parental relationship dissolution and poor child sleep. These studies reported on several sleep dimensions: sleep quality, dreams and nightmares, and sleep disorders (enuresis, night terrors, bruxism). Limitations: Few studies were identified, and the quality of the studies was generally low to moderate. Many articles were also dated or were lacking important covariables. Only two articles used a validated sleep measure. Conclusions: Existing literature indicates that parental relationship dissolution is associated with poorer child sleep. Physicians and health professionals should prioritize child sleep in the context of a parental relationship dissolution. Indeed, intervening on child sleep may support children's positive adaptation and help prevent further family stress.

Associations Between Perioperative Sleep Health and Patient Centred Outcomes Following Total Knee or Hip Arthroplasty: A Systematic Review

Chen, Xin Mei (Alisia)[1]; Pappu, Ameya[2]; Brull, Richard[3]; Kumar, Vivek[4]; Bhatia, Anuj[5]; Peer, Miki [6]; Singh, Mandeep[1,7]

[1]University of Toronto, [2]Women's College Hospital, Toronto Western Hospital, and University of Toronto, [3]University of Toronto, Toronto Western Hospital, Women's College Hospital, [4]Toronto Western Hospital, Women's College Hospital, [5]University of Toronto, Toronto Western Hospital, [6]Toronto Western Hospital, [7]Women's College Hospital, Toronto Western Hospital

Submission ID 137

ABSTRACT INTRODUCTION: While sleep disturbance may be associated with impaired patient-centred outcomes, this has not been evaluated systematically following major surgery. The objective of this systematic review was to evaluate the impact of disturbances to sleep health on perioperative pain and outcomes like quality of life, quality of recovery, and functional outcomes following total knee or hip arthroplasty (TKA/THA). METHODS: The following databases were systematically searched from database inception to June 5, 2022: MEDLINE, Embase, PsychINFO, the Cochrane library, Web of Science, PubMed, ClinicalTrials.gov, and WHO ICTRP. Two reviewers performed the screening, data extraction, and study quality appraisal. RESULTS: 46 articles (13 randomized controlled trials, 33 observational studies) evaluating 8,768 patients were included. There was considerable heterogeneity observed in the choice of validated tools used to assess sleep health, pain, functional outcome, and quality of life. Most studies employed non-validated tools to assess pain intensity (27/46 studies) and sleep health (21/46 studies). The most assessed sleep domains were sleep quality (32/46 studies) and sleep duration (20/46 studies). Thirty-one positive associations were reported between sleep health disruption and decline in patient-centred outcomes (Figure 1). Cumulatively, disruptions to preoperative and postoperative sleep quality were found to be positively associated with all patient-centred outcomes assessed in our study, with acute pain and functional outcome decline being the most reported associations. CONCLUSION: Disruptions to preoperative and postoperative sleep quality were associated with all

patient-centred outcomes assessed in our study. However, significant heterogeneity in the use of validated tools makes comparison between studies difficult even when the same domain is being assessed. Thus, more research is needed to comprehensively assess sleep health as a predictive factor for postoperative patient-centred outcomes.

Automated identification of arousal states in mice using machine learning

Wang, Jeffrey[1]; **Fraigne, Jimmy J.[1]

[1]Dept. of Cell & Systems Biology, University of Toronto, ON, Canada

Submission ID 93

ABSTRACT INTRODUCTION: Analysis of sleep-wake behaviors rely on the identification of arousal states, traditionally via human inspection of raw EEG/EMG recordings. This task is highly subject to inter-rater variability and is extremely time-consuming. Previous approaches of automated scoring system have had varied success. Here we aimed to construct an arousal state classifier that is efficiently comparable to skilled human visual scoring abilities but process data in a fraction of the time used by human scorer. METHODS: We used a novel machine-learning approach, the time-series ensemble, to create SleepEns, our automated processing of EEG/EMG signals for sleep-wake identification. In brief, EEG/EMG signals were pre-processed to extract 17 distinct features, which were then input into a successive tree of Gradient Boosting Classifier (GBC). SleepEns learned from 14 recordings totaling 30,245 epochs to validate the machine-learning algorithm. Five recordings totaling 10,180 epochs were used to test the automated algorithm and analyze its performance. Accuracy of the algorithm was tested by comparing it with the scoring from two human experts against the same source expert. RESULTS: SleepEns achieved 90% accuracy to the source expert, which was statistically similar to the performance of the two other human experts ($p=0.359$, RM-ANOVA). Considering the capacity for classification disagreements that are still physiologically reasonable, SleepEns had an acceptable performance of 99% accuracy, as determined blindly by the source expert. Importantly, SleepEns was able to extract, process, classify, and export predictions in an average time of 6.26 ± 0.14 seconds, which is a fraction of the time that human scorers took to classify the same recordings (~74 min, $p<0.001$, t-test). CONCLUSION: Here, we show a useful approach to automated scoring system using a time-series ensemble. Our approach achieves results comparable to human ability in a fraction of the time.

Barriers and Facilitators to the Better Nights, Better Days during COVID-19 Program for Parents and Healthcare Providers: A Qualitative Perspective

Dockrill, Mya[1]; Keys, Elizabeth[1]; Myatt, Amber[1]; Corkum, Penny[1]

[1]Dalhousie University

Submission ID 200

ABSTRACT Background. Due to concerns surrounding children's mental health during the COVID-19 pandemic, and the link between mental health and sleep, an existing eHealth sleep program for children, Better Nights, Better Days (BNBD), was modified to support parents of children with sleep difficulties during the COVID-19 pandemic. The objective of this study was to understand the

barriers and facilitators that parents and healthcare providers (HCPs) faced when completing (parents) and referring to (HCPs) the BNBD-COVID-19 program. Methods. Researchers conducted virtual, semi-structured interviews to learn about the experiences of parents who fully, partially, or had not completed the program (n = 34), and HCPs who referred parents to the program (n = 15). Interview questions corresponded to the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework and content analysis was used to create codes that corresponded to barriers or facilitators. Results. Most parents (68%) believed the BNBD-COVID-19 program was effective in helping them improve their child's sleep, sleep knowledge, and/or daytime behavior, or believed it would be effective if they didn't complete the program. Half of the parents interviewed reported that the COVID-19 pandemic made the program harder to implement, and most parents (79%) mentioned that time commitment and/or other external circumstances impeded their ability to complete the program. Nearly half of the HCPs (47%) believed that the online format benefitted parents and that the COVID-19 pandemic enhanced trust in virtual care. Conclusions. Feedback from the interviews will be used to modify and improve the Better Nights, Better Days program to better support children with sleep difficulties, as well as to improve HCP experiences when referring to the program in the context of a crisis. This feedback can also be considered by other professionals when implementing other eHealth behavioural sleep interventions and mental health programs.

Biopsychosocial factors and adherence to CPAP for sleep apnea

**Bertrand, Michel[1,2,3]; Vallières, Annie [1,2,4]

[1]École de psychologie, Université Laval, Québec, Québec, Canada; [2]Centre de recherche CERVO, Québec, Québec, Canada; [3]Dalhousie University, Halifax, Nova Scotia, Canada; [4]Faculté de Médecine, Université Laval, Québec, Québec, Canada

Submission ID 210

ABSTRACT Adherence to CPAP therapy is often poor in patients suffering from obstructive sleep apnea syndrome (OSAS). Through trying to understand poor CPAP adherence, the biopsychosocial model proposed to study various factors that could be related to this phenomenon. The relationships between those factors and CPAP adherence remain unclear. The present study aims to contribute to the Biopsychosocial model of adherence to CPAP treatment for sleep apnea by studying the link between adherence to CPAP treatment and the following psychosocial variables in people suffering from OSAS: self-efficacy, quality of life, degree of sleepiness, marital satisfaction, presence of depressive and anxiety symptoms, motivation to follow treatment by CPAP, the acceptance of the treatment and the presence of impact of OSAS on the patient's life. Another objective is to verify whether the psychosocial variables studied in the first objective can be used to predict CPAP use. Pearson's correlations were conducted to answer the first objective and mean CPAP use was significantly correlated to internal motivation, CPAP inconvenience acceptance, CPAP long-term, CPAP constraints acceptance, CPAP side-effects acceptance, CPAP effectiveness acceptance, general acceptance, outcome expectancy, self-efficacy, and the absence of sleepiness. Psychosocial factors were included in an exploratory multiple regression model using the STEPWISE method. Results show a statistically significant moderate relationship between the factors included in the model and mean CPAP use per night. The most statistically optimal predictive model of CPAP mean use per night contains the following factors: "side effect

acceptance score" and "general acceptance score". These predictors explain 18% and 13.8% of the variance of the dependant variable, respectively. The other factors did not significantly contribute to the regression model. While not all psychosocial factors were related or predictive of CPAP use, acceptance, motivation, outcome expectancy, self-efficacy and the absence of sleepiness should be taken into consideration when studying CPAP adherence.

Bolstering Access by Building Competence in First-line Insomnia Care: Results from a Canadian Interdisciplinary Educational Program

Fretz, K. M.[1], Davidson, J. R.[1], DeBruyn, J.[1], Soleas, E.[1], Gardner, D.[2], Lynch, S.[1], Leung, C.[1], Desmarais, E.[1], Watson, S.[1], Sloan, E.[3]

[1]Queen's University, Kingston, Canada; [2]Dalhousie University, Halifax, Canada; [3]University of Toronto, Toronto, Canada

Submission ID 139

ABSTRACT Introduction: In Canada, there is a major access issue for Cognitive Behavioural Therapy for Insomnia (CBT-I) – the first-line treatment for chronic insomnia. Although CBT-I is superior to sedative-hypnotics in terms of efficacy and safety, medications remain the default treatment intervention for insomnia in many practice settings. One reason for the gap between insomnia treatment recommendations and practice is the lack of CBT-I knowledge and experience among healthcare providers. In an effort to close this practice gap, our team developed an educational program to build competence in first-line insomnia care among providers.

Materials and Methods: In collaboration with Queen's Faculty of Health Sciences Continuing Professional Development, our interdisciplinary team presented eight online interactive synchronous and asynchronous training sessions to help providers across professions incorporate evidence-based insomnia care into their practice. Our stepped-care model illustrated how all healthcare providers have a place in insomnia care. Topics covered included: insomnia assessment and treatment, applying the components of CBT-I (stimulus control therapy, sleep restriction, cognitive restructuring, and relaxation training), delivering group-based CBT-I, deprescribing sedative-hypnotics, and providing insomnia interventions within brief appointments. The programming was then transformed into on-demand learning modules to increase its availability. Both iterations of the program were evaluated via pre- and post-session evaluations of key learning objectives.

Results: N = 177 learners completed the synchronous and asynchronous program and n = 173 have completed the on-demand learning modules thus far. The learners come from across Canada and represent diverse healthcare professions (e.g., medicine, pharmacy, psychology). Both iterations of the program produced improvements in all learning outcomes.

Conclusions: This programming provides a feasible and effective educational model for bolstering nationwide capacity across healthcare providers to provide optimal insomnia care.

Cerebral activation differences between slow wave-coupled and uncoupled spindles correlate with intellectual abilities

Baena, Daniel,[1] Fang, Zhuo,[2] Gibbings, Aaron,[1] Smith, Dylan [1], Ray, Laura B.,[2] Doyon, Julien,[4] Owen, Adrian M.[5,6] , Fogel, S. M.[1,2,3,4,5]

[1]Sleep Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, Canada [2]School of Psychology, University of Ottawa, Ottawa, Canada; [3]University of Ottawa Brain & Mind Research Institute, Ottawa, Canada; [4]McConnell Brain Imaging Centre, McGill University, Montreal, Canada; [5]The Brain & Mind Institute, Western University, London, Canada; [6]Department of Physiology and Pharmacology and Department of Psychology, Western University, London, Canada

Submission ID 35

ABSTRACT Sleep is necessary for optimal memory consolidation, via reactivation at the systems level. Memory consolidation involves transfer of information from the hippocampus to the neocortex. This hippocampal-neocortical dialog is supported by the co-occurrence of spindles (SP) and slow waves (SW). Spindles can occur as part of this complex, or in isolation. Aim 1: However, it is not clear whether these spontaneous activations occur during all spindle events, or specifically during coupled SW-SP complexes. In addition to memory consolidation, spindles are some of the few known electrophysiological neuronal biomarkers of intellectual abilities. Spindle-related activation in specific regions (e.g., thalamus, anterior cingulate, putamen) are correlated with Fluid Intelligence. Aim 2: It remains to be explored whether this relationship differs between uncoupled spindles, coupled SW-SP complexes or uncoupled slow waves. Using simultaneous EEG-fMRI during sleep, we expected to observe dissociable recruitment of brain areas time-locked to SW-SP coupled events as compared to uncoupled spindle events or uncoupled slow wave events. Secondly, we hypothesized that brain activations time locked to SW-coupled spindle complexes will be primarily associated to Fluid Intelligence, especially in subcortical areas. Hippocampal activation was not uniquely related to spindles; recruitment was primarily driven by SW and SW-SP coupling. In addition, SW-SP coupling was critical in the activation of the putamen. Interestingly, we found a negative association between Fluid Intelligence and hippocampal activation time-locked to uncoupled SW that might reflect a refractory mechanism in the absence of new, intensive hippocampal-dependent memory consolidation. Moreover, the strength of the activation of the putamen and thalamus during coupled SW-SP events was positively correlated with Fluid Intelligence. These results suggest that brain areas recruited during SW and spindles depends on whether they are coupled or not, and that brain areas involved in supporting Fluid Intelligence (e.g., putamen, thalamus) are specifically recruited during coupled SW-SP events.

Characteristics and Disease Burden of Patients With Idiopathic Hypersomnia With and Without Long Sleep Time: The Real-World Idiopathic Hypersomnia Outcomes Study (ARISE)

Schneider, Logan D.[1]; Stevens, Joanne[2]; Husain, Aatif M.[3]; Ito, Diane[4]; Fuller, Douglas S [2]; Macfadden, Wayne[2]

[1]Stanford University School of Medicine, [2]Jazz Pharmaceuticals, [3]Duke University Medical Center, [4]Stratevi

Submission ID 17

ABSTRACT Background: This study assessed the symptoms and impact of idiopathic hypersomnia, a central disorder of hypersomnolence. Methods: US-based adults with idiopathic hypersomnia with or without long sleep time (LST; ≥11 hours of sleep per 24-hour period [self-reported]) completed an online survey assessing symptom severity (Epworth Sleepiness Scale [ESS]; Idiopathic Hypersomnia Severity Scale [IHSS]), daily functioning (Functional Outcomes of Sleep Questionnaire [FOSQ-10]), quality of life (Neuro-QoL), cognition (British Columbia Cognitive Complaints Inventory [BC-CCI]), depression (Patient Health Questionnaire-9 [PHQ-9]), work/activity impairment (Work Productivity and Activity Impairment Questionnaire: Specific Health Problem v2.0 [WPAI:SHP]), and treatment satisfaction (Treatment Satisfaction Questionnaire for Medication vII [TSQM]). Results: Of 75 participants, 37 had LST. Most were female (LST, 73.0%; non-LST, 89.5%) and were taking medication for idiopathic hypersomnia (LST, 97.3%; non-LST, 81.6%); mean age was 33.7 (LST) and 34.4 years (non-LST). In LST and non-LST participants, respectively, mean (SD) ESS scores were 15.4 (3.8) and 13.6 (3.0), IHSS scores were 38.2 (7.1) and 32.2 (7.0), and FOSQ-10 scores were 9.6 (2.3) and 11.9 (2.8); mean (SD) Neuro-QoL scores were 22.9 (6.1) and 26.8 (5.7) for ability to participate in social roles/activities and 22.5 (6.6) and 17.4 (5.0) for stigma. Severe cognitive complaints (BC-CCI score 15–18) were reported by 35.1% and 18.4% of LST and non-LST participants, respectively. Severe depression (PHQ-9 score ≥20) was reported by 13.5% and 5.3%. Mean (SD) WPAI:SHP scores in LST and non-LST participants were 57.1 (21.9) and 41.5 (21.4) for presenteeism, 60.1 (24.1) and 45.8 (23.8) for absenteeism+presenteeism, and 72.2 (17.3) and 56.1 (23.2) for activity impairment, respectively. Mean (SD) TSQM scores in LST and non-LST participants were 57.9 (21.4) and 66.7 (20.3) for global satisfaction and 49.1 (16.6) and 56.2 (19.7) for effectiveness. Conclusions: Individuals with idiopathic hypersomnia are adversely impacted by their condition, regardless of LST. Support: Jazz Pharmaceuticals.

Childhood Sleepwalking and Internalizing Problems

**Laganière, Christine[1,2,3]; Gaudreau, Hélène[2]; Pokhvisneva, Irina[2]; Meaney, Michael[1,2]; Pennestri, Marie-Hélène[1,3]

[1]McGill University, [2]Douglas Mental Health Institute, [3]Hôpital en santé mentale Rivière-des-Prairies

Submission ID 162

ABSTRACT Introduction: Sleepwalking is a prevalent NREM-parasomnia in childhood: 14% prevalence in children between 2.5 and 6 years old. Studies have reported links between internalizing problems and sleepwalking in children. Still, many fail to control for family factors

(such as family socioeconomic status and maternal depression) and sleep duration even though these variables are associated with internalizing problems in children. Moreover, longitudinal studies on normative cohorts are lacking. The objective of the present study was to assess the association between sleepwalking and internalizing problems in children while controlling for family factors and sleep duration. Methods: Participants (N=343) were part of the prospective Maternal Adversity Vulnerability and Neurodevelopment (MAVAN) cohort study. The presence of sleepwalking, nighttime sleep duration, and internalizing problems were assessed using maternal reports when children were 4 and 5 years old. Mothers also reported their depressive symptoms and family socioeconomic status (SES). Generalized estimating equation model was used to assess the association between the presence of sleepwalking and internalizing problems in children while controlling for family factors (SES and maternal depressive symptoms), child's sex, and child's nighttime sleep duration. Results: 3% of children in the MAVAN cohort presented sleepwalking at 4 years old, and 6% did at 5. Results showed a significant association between the presence of sleepwalking and increased internalizing problems in children (B=0.070, p=0.015). Sleepwalking in children was more specifically associated with increased scores on Somatic Complaints (B=0.227, p=0.014) and Withdrawn (B=0.225, p=0.018) scales. Conclusion: Sleepwalking is commonly assumed to be a normal childhood phenomenon, but these results suggest an association between sleepwalking and internalizing problems in otherwise healthy children of 4 and 5 years old. A better understanding of what differentiates the normal and abnormal course of sleepwalking could contribute to early detection and intervention in children at risk of developing internalizing symptoms.

Circuit control of cortical theta activity during REM sleep

Taksokhan, Anita[1]; Fraigne, Jimmy[1]; Peever, John[1]; Nikiporets, Vasilisa[1]

[1]Department of Cell and Systems Biology, University of Toronto

Submission ID 71

ABSTRACT One of the many features of REM sleep is theta activity, which is described as neuronal firing within a 4-8 Hz range frequency. Although numerous studies have addressed the importance of these activities in learning and memory, very little is known about the mechanistic nature of theta activity during REM sleep. My working hypothesis is that the glutamate sublaterodorsal tegmental nucleus (SLDGlut) that generate REM sleep communicate with the medial septum (a nucleus involved in theta generation) to control theta activity specifically during REM sleep. The broad goals of my research are to identify the pathways that connect the SLDGlut with the medial septum and determine how these circuits function to engage theta activity during REM sleep. To achieve these goals, we use combinations of viral tracing, electrophysiological, and optogenetic methods in naturally sleeping mice. Current data indicates that the SLDGlut neurons regulate theta activity, such that optogenetic silencing of these neurons decreases power of REM sleep theta. However, they do not directly communicate with the medial septum, but rather via the parabrachial nucleus (PB) and lateral supramammillary cortex (SuML), major hubs for regulation of theta activity. Furthermore, optogenetic silencing SLDGlut projections to the PB nucleus during REM sleep does not change the power of theta activity. The alternative pathway we are now testing in regulating theta activity is the SLDGlut-->SuML. This research is biologically important because it will identify the circuit mechanisms that control theta activity during REM sleep, which

may help better understand why and how theta activity during REM sleep functions to facilitate learning and memory.

Comparing Changes in Sleep Disturbance and Self-reported Sleep Patterns among People with and without Eating Disorders during the COVID-19 Pandemic

Kenny, Samantha[1,2]; Robillard, Rebecca[3]; Saad, Mysa[3]; Kendzerska, Tetyana[3]; Higginson, Caitlin[3]; Pennestri, Marie-Hélène[1,2]

[1]McGill University, Montreal, QC, Canada; [2]Hôpital en santé mentale Rivière-des-Prairies (CIUSSS-NIM), QC, Canada; [3]Ottawa Hospital Research Institute

Submission ID 179

ABSTRACT Introduction: Sleep was negatively impacted by the COVID-19 pandemic, but those with current or past psychological disorders were particularly vulnerable. Individuals with eating disorders (EDs) are prone to experiencing sleep disturbances; however, no studies have investigated how the pandemic affected their sleep. Objective: Compare changes in self-reported sleep patterns and quality during the COVID-19 pandemic among three groups: current ED, history of an ED, and no history of psychiatric diagnoses. Methods: Between April and June 2020, 1037 Canadians completed an online survey. Three groups were identified: 1. current ED, 2. history of ED, and 3. control group. Participants completed the PSQI (1) retrospectively for the month before the pandemic and (2) during the pandemic. One-way ANCOVAs compared the change scores of sleep variables from before to during COVID among the three groups (controlling for age, anxiety, and depression). Results: There was a significant effect of group status on sleep disturbance change ($F(2, 967 = 6.34, p < .01)$). The increase was similar in the ED and history of ED groups but both increases were significantly higher than that of the control group ($p < .05$). Change in sleep quality ($F(2, 967 = 10.79, p < .001)$) and sleep latency both followed a similar pattern ($F(2, 946 = 10.46, p < .001)$). Change in sleep duration differed among groups as well $F(2, 947 = 5.97, p < .01)$. The decrease in sleep duration was higher ($p < .05$) in the current ED group than in the history of ED and control groups. Conclusions: Even when controlling for covariates, individuals with a past ED reported a similar level of sleep worsening than those with a current ED during the COVID-19 pandemic on most variables. These results suggest that even after ED recovery, sleep patterns may still be sensitive to environmental stressors.

Concurrent validation of the Sleep Disordered Breathing subscale of the revised Sleep Disorders Questionnaire (2nd edition) against the STOP-Bang questionnaire.

**Douglass, Alan[1,3], Groll, Dianne[4], James, Loi [5], Biard, Kathleen[2], Savage, Eva[6], Skof, Matthew[6], Higginson, Caitlin[1,2], Lanthier, Malika[1], Richards, Carley[1], Robillard, Rébecca[1,2]

[1] Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada; [2] School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada [3] Psychiatry Dept., Faculty of Medicine, University of Ottawa, K1N 6N5, Canada; [4] Departments of Psychology & Psychiatry, Queen's University, Kingston, ON, Canada; [5] College of Nursing, Washington State University, Spokane, WA, USA; [6]Ottawa Police Association, Ottawa, Canada

Submission ID 145

ABSTRACT *Introduction*: Considering the high prevalence of sleep apnea and the difficulty of obtaining a laboratory diagnosis, validated screening tools become important. The sleep apnea subscale of the Sleep Disorders Questionnaire (SDQ-SA) has been in use since 1994, but SDQ has recently undergone an exploratory factor analysis based upon 2500 participants. From this, a revised subscale for sleep-disordered breathing (SDQ2-SDB) was derived. A project to screen members of the Ottawa Police Association for sleep apnea using the new subscale provided an opportunity to also validate it against the well-known STOP-Bang apnea questionnaire.

Methods: The original SDQ-SA scale contained 12 items on a 1 – 5 Likert scale; the new SDQ2-SDB scale has 14 items, scored 0 – 4, maximum possible score 56; the STOP-Bang is an 8-item questionnaire, scored yes/no (0/1), maximum score 8. To perform a concurrent validation of SDQ2-SDB, a Poisson regression was done using SDB total score as the dependent variable and the STOP-Bang total as the predictor variable. A total of 721 police members took part in the study, of whom 572 (353 men and 219 women, average age=44.51, S.D.=9.28) fully completed both the SDQ-2 and the STOP-Bang questionnaires on the same day.

Results: The Poisson regression was highly significant, with intercept alpha=2.493, (S.E.=0.0201, Z-score=124.32, p<0.0001) and estimate of beta=0.1629 (S.E.= 0.0081, Z-score=20.17, p<0.0001). This relatively healthy group of participants did not have STOP-Bang scores higher than 5. Using the regression formula, STOP-Bang values 0 to 5 reliably predicted SDB subscale scores of 12, 14, 17, 20, 23, and 27, respectively.

Conclusion: The significant Poisson regression validates a consistent relationship between the STOP-Bang and the SDQ2-SDB scales. Further work is required to include people with more severe sleep apnea in order to validate higher scores. Biological validation is underway in a subgroup undergoing nocturnal polysomnograms.

CPAP treatment incidentally improves insomnia in patients with COMISA

**Huynh, Nelly[1]; Bailes, Sally[2,3]; Baltzan, Marc[4,5,6,7]; Lavigne, Gilles[8]; Libman, Eva[9]

[1]Faculty of Dentistry, Universite de Montreal, Montreal, Canada; [2]Centre Intégré Universitaire des Soins et Services Sociaux de l'ouest de l'île, Lady Davis Institute for Medical Research, Montréal, Québec, Canada; [3]Department of Psychiatry, McGill University, Montréal, Québec, Canada. [4]Faculty of Medicine, Department of Epidemiology Biostatistics and Occupational Health, McGill University, Montréal, Canada; [5]Centre Intégré Universitaire des Soins et Services Sociaux du Nord de L'île de Montréal, Montréal, Canada; [6]Mount Sinai Hospital, Centre Intégré Universitaire des Soins et Services Sociaux du Centre-ouest de L'île de Montréal, Montréal, Canada; [7]Institut de Médecine du Sommeil, Montréal, Canada; [8]Faculty of Dental Medicine at the Université de Montréal, Canada; [9]Jewish General Hospital

Submission ID 75

ABSTRACT Background: OSA and insomnia are both very common in the general Canadian adult population. Among older individuals unrecognized OSA may be as high as 80% and up to 40% have insomnia. An important percentage of individuals with OSA also have comorbid insomnia (COMISA) which may result in additive impairments to patients' sleep, brain function, and quality of life. This study explores the long-term impact of CPAP on self reported symptoms related to insomnia. Methods: 94 patients were assessed for OSA in 2012 (Time 1) using polysomnography (PSG) and re-assessed 3 more times: 3 years later (Time 2), 8 years later (Time 3), and 10 years later (Time 4). 71 participants were diagnosed with OSA (Mean age=57.69, SD=11.14). All participants completed the Insomnia Subscale from the Sleep Symptom Checklist (SSC) where higher scores indicate worse insomnia symptoms; none received insomnia treatment. A GLM Repeated Measures was used to analyze the longitudinal trajectory of insomnia symptoms among adherent and non-adherent participants. Results: Of the 71 diagnosed with OSA at Time 1 (Baseline), 26 (37%) were adherent to treatment 10 years after diagnosis. Participants who were adherent to CPAP had an initial decrease in severity of insomnia symptoms (p=.014), but that effect stabilized after Time 2. There was no such improvement for the Non-adherent group. 50 of the 71 participants diagnosed with OSA (70.4%) were above the SSC insomnia cut-off (>6) at Time 1. Conclusions: Our longitudinal data shows that CPAP may play a role in reducing the severity of insomnia symptoms. Possibly, improvement in symptoms related to insomnia may have motivated some participants to continue CPAP therapy. This study suggests that, with COMISA, treating both the OSA and the insomnia will enhance treatment outcome.

Defining poor nights for optimizing prediction of sleep patterns in insomnia

Laroche, Dave[1]; Bastien, Célyne[1,2]; Vallières, Annie[1,2,3]

[1] École de psychologie, Université Laval, Québec, QC, Canada; [2] Centre de recherche CERVO, Québec, QC, Canada; [3] Centre de recherche du CHU de Québec-Université Laval, Québec, QC, Canada

Submission ID 205

ABSTRACT : Background: Some studies have shown predictable sleep patterns of poor nights in insomnia while other have not. Furthermore, identified sleep patterns were dissimilar amongst studies. One reason might be that resulting sleep patterns may be influenced by the definition of what is a 'poor night'. Objective: Our objective is to identify the best strategy to define poor nights in insomnia before attempting to predict sleep patterns. Methods: Sleep diary data were collected from 77 participants from the Sleep Clinic of Université Laval from 2015 to 2022. Participants were aged from 18 to 74 years old (M = 43.64, SD = 13.70), 49% were women, and met diagnostic criteria for insomnia. Three different 'poor night' categorization strategies were used based on previous studies: 1) SOL and/or WASO ≥ 60 min with a SE ≤ 80%; 2) SOL and/or WASO ≥ 60 min with an SE ≤ 80% or when TST ≤ 300 min, and 3) SOL and/or WASO ≥ 60 min with a SE ≤ 80% or when TST ≤ 360 min. Results: The strategy used to define a series of poor nights significantly affects the average percentage of reported poor nights ($F(1.403,106.662) = 53.296$, $p < .001$, $\eta 2 = .412$). Multiple comparisons test with Bonferroni correction showed that the average percentage of poor nights with strategy 3 (M = 49.59, SD = 30.04) was higher compared to strategy 2 (M = 40.25, SD = 30.28), and strategy 1 (M = 31.74, SD = 26.95) ($p < .001$ for both comparisons). Moreover, the average percentage was higher for strategy 2 than for strategy 1 ($p < .001$). Conclusion: The total number of poor nights by participant varies according to the strategy used. Surprisingly, a total sleep time less than 6h instead of 5h seems to provide the greatest number of poor nights. Future studies should attempt to identify sleep patterns considering both wake and sleep time in the definition of poor nights.

Demographics, Military, Health and Wellbeing Characteristics Associated with Self-Reported Nightmares in Canadian Veterans: Secondary Analyses of the Life After Service Survey 2019

**Kendzerska, Tetyana[1], Reyes Vélez, Julián[2], Poirier, Alain[2], Robillard, Rébecca[3,4]

[1]The Ottawa Hospital Research Institute, University of Ottawa, Ottawa, K1H 8L6, Canada
[2]Research Directorate, Veterans Affairs Canada, Canada; [3]Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada
[4]School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada

Submission ID 135

ABSTRACT Introduction: Nightmares are common in Veterans, often leading to daytime distress and impaired functioning. While post-traumatic stress disorder (PTSD) is a key factor likely contributing to nightmares in this population, other factors may be at play. Filling this knowledge gap is important to identify subgroups at elevated risk who may benefit from early intervention. The current cross-sectional study explores the demographic, military, health, and wellbeing characteristics associated with self-reported nightmares in Canadian Veterans. Methods: Univariate logistic regressions were performed on linked administrative data and the Life After

Service Survey (LASS) 2019, a cross-sectional survey about Veterans who were released from the Regular Force between 1998 and 2018. Results: Data was available for 1,283 LASS participants. In this sample of Veterans, 41% reported nightmares. Of the 46 variables considered, 21 variables reflecting different domains were significantly associated with greater odds of nightmares: (i) deployment experience, with the strongest association in individuals who witnessed widespread suffering during military service (vs. not; OR = 3.54, 95%CI: 2.54-4.94); (ii) among health-related variables, the top five were PTSD (13.95, 9.82-19.83), mood disorders (6.07; 4.40-8.36), suicidal ideation (5.13, 3.31-7.96), reimbursement for cannabis for medical purposes (3.54, 2.46-5.10), and pain (2.48, 1.75-3.53); (iii) among wellbeing-related variables, dissatisfaction with family members (vs. very satisfied, 7.47, 2.61-21.34), dissatisfaction with a financial situation (vs. satisfied, 3.27, 2.01-5.34), dissatisfaction with life (vs. satisfied or very satisfied, 4.02, 2.63-6.15), being unable to work (vs. employed, 2.05, 1.50-2.80), and life stress ("quite a bit/extremely" vs. not, 10.54, 6.97-15.94). Conclusion: These results provide preliminary information on Canadian Veterans who may be at higher risk of nightmares. Further studies are needed to assess the relationships identified while controlling for confounders and understand how PTSD influences these relationships.

Determining the Role of GABA/Glycine Neurons in the Ventromedial Medulla in REM Sleep Behaviour Disorder and Cataplexy

Yulin Ruan, Ryan[1], Peever, John[1]

[1]Department of Cell and Systems Biology, University of Toronto

Submission ID 38

ABSTRACT Rapid Eye Movement (REM) sleep is an extraordinarily distinctive and crucial phase of sleep in mammals, reptiles, and birds, characterized by rapid movement of the eyes in conjunction with skeletal muscle paralysis known as atonia. During REM sleep, muscle atonia is achieved when somatic motor neurons are hyperpolarized by inhibitory postsynaptic potentials. However, this typical paralysis is lost in up to 2.1% of the population due to a neurological condition known as REM sleep behaviour disorder (RBD). Accompanying motor behaviours are often so vigorous that self injury or injury of bed partners could occur. Most peculiarly, nearly 91% of patients diagnosed with RBD ultimately develop neurodegenerative diseases that are synucleinopathic in nature such as Parkinson's Disease (PD) and Multiple System Atrophy (MSA) within 6-15 years of the initial diagnoses. The tight association between RBD and diseases like PD or MSA suggest that RBD is the most powerful prodromal predictor of synucleinopathy-driven neurodegenerative diseases. Contemporary research indicates that GABAergic neurons of the ventromedial medulla (vmM) innervate the spinal dorsal, and hypothesize that these GABA/glycine neurons may be responsible for generating REM sleep atonia. However, the role of these neurons remain unknown and it is unclear whether targeted lesioning of vmM GABA/glycine neurons emulating synucleinopathic degeneration is responsible for the loss of REM sleep atonia. To explicate the roles of vmM GABA/glycine neurons in REM sleep atonia, I will 1) Selectively ablate these neurons in mouse models via expression of diphtheria toxin receptor followed by application of diphtheria toxin and 2) Investigate whether the absence of vmM GABA/glycine neurons result in loss of REM sleep atonia.

Development, Implementation and Evaluation of a Primary Care Clinical Pathway for Uncomplicated Obstructive Sleep Apnea

Zouboules, Shaelynn[1]; Ip-Buting, Ada[1]; McBrien, Kerry[2]; Tsai, Willis[3]; David, Oliver[4]; Gerlitz, Reg[5]; Woiceshyn, Jaana[6]; Fabreau, Gabriel[3]; Hanly, Patrick Joseph[7]; Donald, Maoliosa[3]; Povitz, Marcus[7]; Pendharkar, Sachin[3]

[1]Cumming School of Medicine, University of Calgary, [2]Departments of Family Medicine and Community Health Sciences, Cumming School of Medicine, University of Calgary, [3]Departments of Medicine and Community Health Sciences, Cumming School of Medicine, University of Calgary, [4]Mosaic Primary Care Network, [5]Medicine Strategic Clinical Networks, Alberta Health Services, [6]Haskayne School of Business, University of Calgary, [7]Department of Medicine, Cumming School of Medicine, University of Calgary

Submission ID 55

ABSTRACT Introduction: Management of uncomplicated obstructive sleep apnea (OSA) by primary care providers (PCPs) has been proposed to address barriers to accessing timely care. We previously identified obstacles to OSA management by PCPs including knowledge gaps, inadequate role clarity and system navigation difficulties. The aim of this project was to develop and implement clinical tools to address these gaps to support OSA management by PCPs in Calgary. Methods: Building from the aforementioned prior work, we undertook a series of quality improvement initiatives. To evaluate the impact of these initiatives, we obtained data on usage and new referrals to the Foothills Medical Centre (FMC) Sleep Centre during distinct referral periods. We categorized referrals as uncomplicated or complicated OSA and compared the proportion of complicated referrals across periods. Results: The first initiative was a clinical guideline document. Subsequently, with engagement from sleep physicians, primary care leaders and respiratory homecare, we developed a primary care clinical pathway that incorporated real-time specialist telephone access. The pathway was published on multiple websites and attached to referrals deemed uncomplicated and returned to PCPs. The pathway download rate averaged 18.3 downloads/month. Triage data was separated into distinct referral periods: prior to (period 1) and after (period 2) guideline release, and after pathway publication (period 3). Preliminary analysis did not demonstrate an increase in complexity of patients referred to the FMC Sleep Centre after pathway release (% complicated referrals in periods 1, 2, 3: 49.5%, 43.6%, 42.6%, respectively). Conclusions: Through an evidence-based, stakeholder-engaged approach, we developed and implemented tools to support OSA management by PCPs. Preliminary analysis suggests pathway access was relatively low. A corresponding increase in the complexity of referrals received after pathway release was not observed. This may indicate the pathway was not effective and/or accessible enough to support PCPs to independently manage patients with uncomplicated OSA.

Dim-Light Melatonin Onset as a Circadian Marker in Children and Adolescents: Scoping Review

Ramil, Joanne M.[1]; McGrath, Jennifer J.[1]

[1]*PERFORM* Centre & Department of Psychology, Concordia University, Montreal, Qc

Submission ID 158

ABSTRACT Melatonin is commonly considered the gold standard for identifying circadian timing. Predominant melatonin measures used today are based on Dim Light Melatonin Onset (DLMO) protocols that were developed in adult populations in the 1980s. Most studies have measured melatonin in children and adolescents using the same DLMO protocol that is typically used with adults. However, less is known about the quantification of melatonin using DLMO among youth. Some have criticized the use of thresholds to quantify melatonin onset timing, as pediatric populations often have baseline melatonin levels that are higher than adults. The aim of this study was to conduct a scoping review of the extant literature to summarize the current melatonin measurement practices in pediatric populations. A systematic literature search yielded 22 studies meeting inclusion criteria (DLMO protocol, mean age 8 to <18 years). Coded variables included sample demographics (age, sex, pubertal status, body mass index), sleep routine behaviors (bedtime, waketime), circadian markers (chronotype, sleep midpoint), and DLMO metrics (timing, rate, concentration). Among the 22 studies reviewed, sample sizes ranged from 6 to 240 participants (mean 60), aged 9 to 17 years (mean 14.6 yrs), and 48% female (range 0-63%). Bedtime (mean 22:50 hh:mm, range 20:08-01:32) and waketime (mean 07:43, range 4:28-11:23) were reported by about half of the studies; although, few stratified by age or weeknight (school night vs. weekend). DLMO metrics focused exclusively on timing of melatonin surge onset (mean 21:22 for >3pg/mL; mean 21:56 for >4pg/mL). Few studies reported information on pubertal stage, body mass index, time of year (season or school-in-session), melatonin supplement use, jet lag or weekend oversleep, sleep midpoint, or chronotype preference (morningness/eveningness). Findings of this scoping review consolidate knowledge among studies using DLMO as a circadian marker among children and adolescents and highlight remaining gaps within the pediatric literature.

Distracted driving: A test of the Yerkes Dodson Law.

**MacLean, Alistair[1]; Chu, Alanna[2]; Zhou, Yuling[1]; York Markell, Morgan[1,3]

[1]Queen's University, [2]University of Ottawa, [3]York Computer Technologies Inc.

Submission ID 95

ABSTRACT While intrusive events during driving may contribute to crashes due to competition for cognitive resources, sleepy drivers often adopt behaviours - such as turning on the radio - which appear to increase attentional demand. Data from three studies examining the effects of prolonged wakefulness and distraction on simulated driving were used to test Yerkes and Dodson's hypothesis that performance demands an optimal level of arousal which may be enhanced or worsened by external stimulation. The three studies included potentially distracting events of increasing number and complexity. It was predicted that, as the number of events increase, driving behaviour will improve and sleepiness and fatigue will decrease. A total of 90

participants completed four simulated 30-minute driving sessions in the York Driving Simulator at 2400, 0200, 0400 and 0600. Stanford Sleepiness and Fatigue Scale ratings were obtained before and after each session. Consistent with prediction, driving performance measured by mean road position and road position variability improved with exposure to larger number of events. Other measures were inconsistent with the prediction. Although competing explanations are possible, the issue of whether external events act to improve or deteriorate driving performance, and the underlying mechanisms involved, demands further exploration.

DLMO Across Lifespan

**Siddiqui, Muhammad Aarish[1]; Shapiro, Colin[2]; Rahman, Shadab A.[3]

[1]McMaster University; [2]University of Toronto; [3]Harvard Medical School

Submission ID 208

ABSTRACT Dim light melatonin onset, DLMO, is the most accurate assessment of an individual's circadian rhythm. It is used to determine if an individual's melatonin secretion falls within the standard 24-hour light/ dark (LD) cycle or if they are either shifted in their rhythm or in a free running state. The objective of this study was to see how factors such as stress, anxiety, and depression impacted an individual's DLMO result.A post hoc-analysis of the DLMO's from 271 patients from 2017-2020 were included in this study. This group of 271 individuals was split into the following age ranges, 5-18, 19-29, 30-45, 46-60, and 61-82. These results were determined by using a fixed threshold model, where the timing of an individual's DLMO was determined when the melatonin levels crossed 3 pg/mL. The DLMO results were divided into four categories: normal, abnormal advanced, abnormal delayed, and non-discernible.The first conclusion drawn from the data was that the first two age ranges had the highest number of individuals who were abnormally delayed (n= 32 in 5-18, n= 48 in 19-29). The second conclusion that was drawn from the data was that neither males nor females were more likely to obtain an abnormally delayed result. A third conclusion that was drawn from the data was that in the upper age ranges (45-82), the incidence of a non-discernable DLMO result was greater than in the lower age groups. These findings are in their preliminary stages, and there are plans to alter criteria , such as changing the age ranges, to lead to more in-depth conclusions.

Does a Multimodal Prehabilitation Program Improve Sleep Quality and Duration in Patients Undergoing Colorectal Resection for Cancer? Pilot Randomized Control Trial

Atoui, Sarah[1], Carli, Francesco[2], Bernard, Paquito[3,4], Lee, Lawrence[5,6,7], Stein, Barry[5], Charlebois, Patrick[5], Liberman A. Sender [1,5]

[1]Division of Experimental Surgery, Department of Surgery, McGill University Health Centre, Montreal, Quebec, Canada; [2]Department of Anesthesia, McGill University, Montreal, Quebec, Canada; [3]Department of Physical Activity Sciences, Université du Québec à Montréal, Montreal, Quebec, Canada; [4]Research Centre, University Institute of Mental Health in Montreal, Montreal, Quebec, Canada; [5]Department of Surgery, McGill University Health Centre, 1650 Cedar ave, D16-116, Montreal, QC, H3G 1A4, Canada; [6]Steinberg-Bernstein Centre for Minimally Invasive Surgery and Innovation, McGill University Health Centre, Montreal, QC, Canada; [7]Department of Epidemiology, McGill University, Montreal, QC, Canada

Submission ID 211

ABSTRACT Study objectives: Sleep difficulties are a common symptom in cancer patients at different stages of treatment trajectory and may lead to numerous negative consequences for which management is required. This pilot randomized controlled trial aimed to assess the impact of a multimodal prehabilitation program compared to a standard of care (SOC) group on sleep quality and parameters in colorectal cancer adults during the preoperative period and after surgery. Method: One hundred two participants (48.3% female, mean age 65 years) scheduled for elective resection of colorectal cancer were randomized to the prehabilitation intervention (n = 50) or the SOC (n = 52) groups. Measures were completed at the baseline and preoperative, 4- and 8-weeks after-surgery follow-ups. Results: No significant differences between groups were observed over time for all subjective and objective sleep parameters. A small positive change in the perceived sleep quality only at the preoperative time point for the prehabilitation group compared to the SOC group (delta (T1-T0) = -1.1, 95% CI (-2.1 to -.1); p = .048). However, the moderating effect of anxiety symptoms on improving sleep duration objectively assessed was statistically and clinically significant for the prehabilitation group (d = .51, 95% CI (92.3-108.7), p= .02) only at 8 weeks after the surgery. Conclusions: Multimodal prehabilitation intervention may significantly improve sleep duration in cancer adults undergoing colorectal resection with high anxiety symptoms. Future large-scale RCTs are needed to confirm our results.

Dreams and nightmares in adolescents admitted after a suicide attempt

Gaber, Lina[1]; Desjardins, Emma [1]; Benoit, Antoine[1]; Boafo, Addo [2]; De Koninck, Joseph[1,3]

[1]School of Psychology, University of Ottawa, [2]Children's Hospital of Eastern Ontario; [3]Brain and Mind Research Institute, University of Ottawa

Submission ID 122

ABSTRACT This study aimed to determine if suicidal adolescents experience dreams that are more disturbed, contain more emotional distress as well as suicidal ideation than a control group of normal adolescents, So far, thirteen adolescents who were admitted following a suicidal attempt in an inpatient psychiatric hospital accepted to write their dreams upon awakening from one night of their stay. They also rated their mood prior to sleep, upon awakening in the morning, and

retrospectively their dream mood. They completed a dream diary which contains a questionnaire about sleep habits, ability to recall dreams, frequency of nightmares and sources of dreams. Their dream narratives were analyzed for presence of suicidal ideation themes. All measures obtained were compared to those of normal adolescents matched for age and gender from the University of Ottawa normative study of dreams of Canadians. This preliminary sample was comprised of two biological males and 11 biologically females which included five trans males and one non-binary participant. Analyses of variance showed that the suicidal adolescents reported experiencing significantly more nightmares than the control group. Their dream mood was also significantly more negative and their mood prior to sleep, and in the morning was less positive. Surprisingly, the suicidal group reported a slightly lower level of suicidal ideation themes in their dreams. These preliminary results support the continuity hypothesis between waking and dreaming with respect to mood and the presence of nightmare suggesting the potential value of treating nightmares in suicidal adolescents. However, the lower level of dream suicidal ideations in the suicidal adolescents suggests a potential compensatory process that needs to be further explored. The fact that five out of the thirteen suicidal adolescents where trans gender will require further exploration as well. Adding future participants will also allow more sophisticated dream content analyses.

DRIFT-OFF - Diabetes Related Insomnia in Families and Teenagers - Optimising control and Facing Fears

Killeen, Jack[1]; Thomas, Megan[1]; Pinto, Teresa[1]

[1]IWK Health, Dalhousie University

Submission ID 11

ABSTRACT Type 1 diabetes mellitus (T1D) is a chronic condition that occurs when the pancreas makes little to no insulin, thereby causing raised levels of blood glucose. Sleep disturbances are common in people with T1D due to symptoms of high or low blood glucose levels, anxiety around glucose levels and monitoring throughout the night. Current research focuses on sleep disturbances in adults with T1D, with less known about the relationship in younger populations. This correlational, mixed methods, exploratory study, will use questionnaires, a 7-day sleep diary, and metabolic parameters to focus on the relationship between glycaemic control and sleep in children and adolescent patients and their parents/caregivers. A maximum of 50 children/adolescent and parent/caregiver pairings will be recruited through a tertiary children's hospital diabetes clinic in 2022 with final analysis being completed by March 2023. We hypothesize that poorer glycaemic outcomes will be related to more disrupted sleep in both children/adolescents and parents/caregivers. We also hypothesize that the use of diabetes related technologies, such as Continuous Glucose Monitors (CGM), will decrease Fear of Hypoglcaemia (FoH), the anxiety surrounding low blood glucose levels and its symptoms, in both children/adolescents with CGMs and their parents/caregivers. The results of this study may influence sleep management recommendations for children and adolescents with T1D and their caregivers. Our aim is to create a familial view of diabetes related sleep differences and stress in the home and empower patients and their families to make informed choices to optimize their health. Promoting healthy sleep is an important public health measure, especially in

children/adolescents with diabetes as T1D already has widespread negative effects on an individual's health and well-being.

Effect of Biotic Supplementation on Infant Sleep: A Systematic Review and Meta-Analysis

Matin, Mahtab[1]; Brockway, Meredith[2]; Janke, Robert[3]; Badejo, Abimbola[4]; Kouroupis, Allison[5]; **Keys, Elizabeth [6]

[1] Ph.D. student of Nursing, University of British Columbia Okanagan, Kelowna, British Columbia, Canada; [2] Faculty of Nursing, University of Calgary, Calgary, Alberta, Canada; [3] Associate Chief Librarian, Research and Administration Library, University of British Columbia Okanagan, Kelowna, British Columbia, Canada; [4] University of Calgary, Calgary, Alberta, Canada; [5] Thompson Rivers University, Kamloops, British Columbia, Canada; [6] Faculty of Health and Social Development, University of British Columbia Okanagan, Kelowna, British Columbia, Canada

Submission ID 77

ABSTRACT Background: Poor infant sleep can negatively affect later development. In addition, each individual's gut microbiota profile is modulated by their dietary patterns, which has a close relationship with health and may influence sleep behaviors. Aim: To determine the effect of biotic supplementation on sleep behaviors in infants aged 0 to 12 months. Methods: In August 2022, we searched Medline, Embase, CINAHL, PsycINFO, DARE, CENTRAL, and one trial registry using search terms, synonyms and subject headings of "infant" AND "sleep" AND "biotic" (PROSPERO registeration: CRD42022358822). Our search yielded 572 records. Two reviewers independently screened 425 unique records, and of these, 379 were excluded after title and abstract screening. Sixteen records were excluded at the full-text screen stage, resulting in 30 randomized controlled trials in the extraction stage. All data on infant sleep behavior outcomes will be extracted, as well as the type of biotic used (probiotic, prebiotic, synbiotic, postbiotics, paraprobiotics, and fermented food). If reported, data on gut microbiota composition, co-morbid conditions, reported side effects, and/or adverse outcomes, and crying related outcomes will be collected. Data extraction is currently being finalized. Results: In the preliminary analysis, 65% of articles described probiotic supplementation interventions, while 9% and 26% of them prescribed prebiotic and synbiotic supplementation to healthy full-term infants, respectively. Most studies (90%) used biotic supplementation in formula and suspension form and only 10% of studies used powder of biotic supplementation in their interventional groups. Sleep duration was the most common (95%) reported outcomes. Final analyses, with meta-analyses, will be completed February 2023. Conclusions: Future studies need to assess the full range of sleep behavior outcome measures and report all severe and adverse effects. Long-term outcome and safety follow-ups are vital to move the evidence base forward. Future studies focusing on specific patient groups and specific biotic supplementation are also needed.

Effect of peak airflow-triggered adaptive servo-ventilation on sleep structure of patients with heart failure and obstructive or central apnea

Yatsu, Shoichiro[1]; Horvath, Christian M.[2,3]; Floras, John S.[3]; Logan, Alexander G.[3]; Ryan, Clodagh M.[1,3]; Bradley, T. Douglas[1]

[1]Sleep Research Laboratories of the University Health Network, Toronto Rehabilitation Institute (KITE) and Toronto General Hospital and University of Toronto, Toronto, Canada, [2]leep Research Laboratories of the University Health Network, Toronto Rehabilitation Institute (KITE) and Toronto General Hospital and University of Toronto, Toronto, Canada, [3]Department of Medicine, University Health Network and Sinai Health and University of Toronto, Toronto, Canada

Submission ID 194

ABSTRACT Introduction: The randomized controlled Adaptive Servo-Ventilation for Therapy of Sleep Apnea in Heart Failure (ADVENT-HF) trial found that abolishing sleep disordered breathing (SDB) with peak airflow-triggered adaptive servo-ventilation (ASVPF) improved patients' quality of life and Epworth Sleepiness Scale Score. Aims and objectives: We hypothesized that improved sleep quality contributed to such improvement in daytime symptoms. Methods: After baseline polysomnography (PSG), patients with a left ventricular ejection fraction ≤ 45% and an apnea-hypopnea index (AHI) ≥15 events/hour were randomized to control or ASVPF and 1 month later underwent repeat PSG. Changes in sleep structure after 1 month in the ASVPF treated and control groups were then compared. Results: 375 patients were allocated to the control arm and 356 to ASVPF treatment. Baseline AHI was 42.80±20.90 in the control group and 43.27±20.53 in the ASVPF group. Sleep structure was comparable in the control and ASVPF groups: total sleep time (TST): 302.77±75.42 and 311.68±80.75 min, arousal index: 41.31±22.89 and 41.08±19.87, stage N1: 14.83±11.68 and 14.76±11.67 min, stage N2: 62.72±11.77 and 63.26±13.03 min, stage N3: 10.14±8.78 and 9.54±8.49 min, rapid eye movement (REM): 12.62±6.95 and 11.89±7.15 min, respectively. Compared to the control group, ASVPF reduced the AHI and arousal index and increased mean and minimum arterial oxyhemoglobin saturation (SaO2) ($P<0.001$ for all) (see Figure). TST did not change, but Stage N1 sleep decreased, and Stage N3 and REM sleep increased ($P<0.001$ for all). Conclusion: These are the first randomized controlled trial data that demonstrate, in a large cohort of patients with HFrEF, that alleviation of SDB by ASVPF consolidates sleep through reductions in arousal frequency and a significant shift from the lighter stages to the more restorative deeper stages of sleep. Such improvements in sleep structure likely contribute to the symptomatic improvement reported by ASVPF-treated patients in the ADVENT-HF trial.

Effects of OSA and short sleep duration on insulin resistance in overweight/obese children and adolescents

Au, Chun Ting[1]; Voutsas, Giorge[1]; Katz, Sherri[2,3,4]; Narang, Indra[1,5,6]

[1]Translational Medicine, Research Institute, Hospital for Sick Children, Toronto, [2]Department of Pediatrics, Children's Hospital of Eastern Ontario, Ottawa, [3]Children's Hospital of Eastern Ontario Research Institute, Ottawa, [4]University of Ottawa, Ottawa, [5]Division of Respiratory Medicine, Hospital for Sick Children, Toronto, [6]University of Toronto, Toronto

Submission ID 82

ABSTRACT Insulin resistance has been showed to be associated with obstructive sleep apnea (OSA) and short sleep duration in children. However, the synergistic effect of OSA and sleep duration on insulin resistance in children with obesity remains unclear. This study was to evaluate the independent and combination effects of OSA and sleep duration on insulin resistance in children who are overweight and obese. This was a prospective study of children aged 8-18 years with obesity and symptoms suggestive of OSA. All participants underwent an overnight polysomnography and completed the Pittsburgh Sleep Quality Index (PSQI) to assess their sleep quantity and quality. Fasting blood sample was taken for glucose and insulin level determination in the morning following polysomnography. Homeostatic model assessment for insulin resistance (HOMA-IR) was calculated as fasting insulin (μU/mL) x fasting glucose (mmol/L)/22.5. Participants were classified as non-OSA [obstructive apnea hypopnea index (OAHI) <1 event/h, mild OSA (OAHI 1–<5 events/h), and moderate-severe OSA (OAHI >=5 events/h) based on their OAHI. A total of 54 overweight/obese children (70% male, age: 14.0y±3.0, body mass index (BMI): 40.6kgm-2±9.8) were included in this analysis, of whom 19, 9, and 26 were non-OSA, mild, and moderate-severe OSA, respectively. The moderate-severe group had greater proportion of males and BMI than the other two groups. HOMA-IR positively correlated with BMI z-score (r=0.38, p=0.005) and log-transformed OAHI (r=0.50, p<0.001), and negatively correlated with self-reported sleep duration (r=–0.31, p=0.029). After adjusting for age, sex, BMI z score, log-transformed OAHI [β=2.1(SE 0.5), p<0.001] and the total sleep duration (in hour) [β=–0.09(SE 0.04), p=0.021] were both independently associated with HOMA-IR. The interaction effect between log-transformed OAHI and total sleep duration on HOMA-IR was also significant [β=–0.75 (SE 0.35), p=0.021]. In conclusion, OSA severity and shorter sleep duration are both independently associated with lower insulin sensitivity in obese children. The effects of OSA and sleep duration on insulin sensitivity may modify each another.

Efficacy of Lemborexant in Adults with Insomnia Is Supported by Improvements in Both Objective and Subjective Measures

Moline, Margaret[1]; Morin, Charles M[2]; Kumar, Dinesh[1] ; Lundwall, Christie[1]; Pinner, Kate[3]; Ramos, Barbara[4]; Desautels, Alex[5]

[1] Eisai Inc., Nutley, New Jersey, USA; [2] Sleep Research Center at Université Laval in Quebec City, Canada; [3] Eisai Ltd, Hatfield, UK; [4] Eisai Ltd, Mississauga, Ontario, Canada; [5] Department of Neurosciences, Université de Montréal, Montréal, Québec, Canada, and Centre d'Études Avancées en Médecine du Sommeil, Hôpital du Sacré-Coeur de Montréal, Montréal, Québec, Canada

Submission ID 151

ABSTRACT Improvements in sleep onset and maintenance as well as daytime functioning are all important outcomes in the treatment of insomnia and are assessed both by objective (polysomnography) and patient-reported (subjective) measures (sleep diaries and questionnaires). There is an increasing focus on the impact of insomnia on daytime functioning and indeed, insomnia disorder criteria include daytime impairment. Some sleep-promoting drugs do not report consistently aligned subjective and objective results. Thus, it was important to examine the concordance between change from baseline in the sleep parameters and change from baseline in the daytime function measures in the lemborexant clinical program. Lemborexant is a dual orexin receptor antagonist approved in Canada and multiple other countries for the treatment of patients with insomnia. In results from 2 phase 3 studies, lemborexant provided significant improvement versus placebo in objective and subjective measures of sleep onset latency, sleep efficiency, wake after sleep onset, and total sleep time. After 1 month of continuous treatment, these improvements were also consistently aligned with significant improvements in the Insomnia Severity Index (ISI) and Patient Global Impression-Insomnia, which are measures of the impact of therapy from the patients' perspective. Further, the ISI daytime function items were improved. Improvements on the Fatigue Severity Scale (FSS) were observed later than the sleep measures but showed larger and significant decreases as assessed at 3 and 6 months of continuous treatment. Thus, the totality of the data show a coherent change in the direction of improvement for LEM versus placebo at 1 month and through 6 months. When deciding on which sleep agent to prescribe, it is important to ensure that improvement can be demonstrated in both objective and subjective measures.

Efficacy of Precision Oral Appliance Therapy in Obstructive Sleep Apnea

Remmers, John[1], Charkhandeh, Shouresh[1], Mosca, Erin[1]

[1]ProSomnus Sleep Technologies, Pleasanton, California

Submission ID 204

ABSTRACT Introduction: Mandibular advancing oral appliance therapy (OAT) efficacy appears to vary by device design, resulting in a wide range of reported efficacy and an underestimation of the potential efficaciousness of the therapy. Materials and Methods: Data from two prospective studies that assessed an in-home auto-titration test that predicted response to OAT (Remmers, 2017; Mosca, 2022) were evaluated. Study participants (n = 109) received a precision OA

generated from digital intraoral scans (ProSomnus® Sleep Technologies, Pleasanton, CA). Once participants were habituated to OAT, 2-night home sleep apnea tests were conducted to assess treatment efficacy. Results: Eighty male and 29 female participants with a mean age of 50.2 ± 9.4 years, mean BMI of 31.9 ± 5.0 kg/m2, mean baseline ODI of 30.1 ± 20.3 h-1, and median Epworth Sleepiness Scale (ESS) score of 8 (range: 0-23) participated in the studies. Of the 109 participants, 29 had mild, 39 had moderate, and 41 had severe OSA. Therapeutic success was as follows: 81.7% of participants achieved an ODI < 15 h-1 and 74.3% achieved an ODI < 10 h-1. By severity, 93.1%, 87.2%, and 68.3% of mild, moderate, and severe participants, respectively, achieved an ODI < 15 h-1; 93.1%, 82.1%, and 53.7% of mild, moderate, and severe participants, respectively, achieved an ODI < 10 h-1. Of those who achieved an ODI < 10 h-1, the mean protrusive position of the OA was 65.2 ± 14.7% (range: 34.7-100%), 77.8 ± 17.9% (range: 36.4-100%), and 86.4 ± 16.2% (range: 53.8-100%) in participants with mild, moderate, and severe OSA, respectively. Conclusions: Precision OAT provided efficacious treatment for most individuals, including many with severe OSA. While participants with moderate and severe OSA tended to need more protrusion than those with mild OSA, the range of protrusion over which the OAs were efficacious varied little by severity.

Employing the RE-AIM framework to assess the implementation success of Better Nights, Better Days during the COVID-19 pandemic

Myatt, A.[1], Keys, Elizabeth[2], Corkum, Penny[1]

[1] Dalhousie University, [2] University of British Columbia Okanagan

Submission ID 199

ABSTRACT Background. To address worsening sleep problems in children during the pandemic, an existing eHealth program for sleep problems in children, Better Nights, Better Days (BNBD), was modified to be appropriate in the pandemic context. This study used the Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) framework to examine implementation of the BNBD-COVID program during the COVID-19 pandemic. The study's overarching objective is to understand how families of children with behavioural sleep problems implemented the program in the context of COVID-19. Methods. Using the RE-AIM framework, implementation was assessed based on: the best way to reach parents during COVID-19 (Reach); the effectiveness of the program in terms of child sleep and family resilience (Effectiveness); how the program was adopted and used at a user level within families (Adoption); the percentage of parents who accessed and/or completed the program and the fidelity in which the implemented the program strategies (Implementation); and if parents maintained use of program strategies after program completion (Maintenance). This information was collected through online surveys. Results. Preliminary results suggest that most parents were reached through online advertisements (74.2%) but that many parents who enrolled in the program did not end up accessing it (70.5%) or completing a clinically significant dose (84.5%). However, those that did complete the program had high fidelity in implementing the strategies. Additional results on the effectiveness of the program in terms of child sleep and family resilience and if families continue to use program strategies after completion will be presented. Conclusions. With the ever-evolving nature of the COVID-19 pandemic, these findings will inform future studies on eHealth interventions during

stressful times by providing an understanding of how best to reach parents and encourage them to adopt and implement eHealth programs.

Estimates for the national prevalence of moderate or severe OSA and clinically diagnosed individuals: comparison of tiredness cut-offs for the STOP-BANG score of the Canadian Longitudinal Study on Aging

**Baltzan M [1,2], Rizzo D[1], Sirpal S[3], Pahwa P[4], Dosman J[4], Kaminska M[5], Chung F[6]

[1]Mount Sinai Hospital Center, 5690 boul Cavendish, Montreal, QC, Canada; [2]Faculty of Medicine, McGill University; St Mary's Hospital, Montréal, Quebec, Canada; [3]Department of Emergency Medicine, CIUSSS Nord-de-l'Ile-de-Montreal, 5400 Gouin Street West, Montreal, QC H4J 1C5, Canada; [4]Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan, Saskatoon, Saskatchewan, Canada; [5]Respiratory Epidemiology and Clinical Research Unit, Respiratory Division and Sleep Laboratory, Department of Medicine, McGill University Health Center, 3605 De la Montagne Street, Montreal, QC H3G 2M1, Canada; [6]Department of Anesthesia and Pain Management, Toronto Western Hospital, University Health Network, University of Toronto, Toronto, Ontario, Canada

Submission ID 28

ABSTRACT Background: The STOP-BANG questionnaire is a validated estimate of the risk of OSA that requires the following risk factors for OSA: snoring, tiredness, observed interruption of breathing during sleep, high blood pressure, body mass index (BMI) more than 35 kg/m^2, age over 50 years, neck circumference and gender. In the CLSA dataset, the tiredness risk factor is derived from the K10 scale where participants are asked "About how often during the past 30 days did you feel tired out for no good reason — would you say all of the time, most of the time, some of the time, a little of the time, or none of the time?" (variable name 'K10_TIRED_MCQ'). The question is then converted into a binary variable, and then factored into the calculation of risk estimate of OSA. The objective of this study is to assess whether 'some of the time' should endorse a positive response for tiredness. The prevalence was then compared to the number participants diagnosed clinically with OSA.

Methods: The CLSA cohort includes 51,337 persons (26,155 females, 25,182 males) across all 10 provinces. The primary analysis of this study is based upon the comprehensive cohort consisting of 30,097 participants (15,320 women, 14,777 men; mean age = 63.0, SD = 10.3) who were recruited through Provincial Healthcare Registration Databases as part of the CLSA. Baseline data reported in this study were collected from data collection sites established in 11 cities across Canada. In the data collection for the CLSA, 7 of the 8 elements of the STOP-BANG questionnaire were collected; neck circumference was not routinely measured but is well-known to be highly correlated to the body mass index (BMI) which was explicitly measured. We refer to this measure as STOP-BAG which has been validated as an equivalent estimate for the risk of moderate and severe OSA. Tired was defined either strictly to be positive if either "all of the time" or "most of the time " were answered, or more inclusively if "all of the time" or "most of the time" or "some of the time" were endorsed on the questionnaire. For the 21,240 participants of the tracking cohort, questions about snoring, tiredness and witnessed apnea were not collected. In order to estimate the prevalence of OSA in Saskatchewan, New Brunswick, or Prince-Edward Island, the missing questionnaire elements were imputed by regression from complete data available in neighbouring

provinces. Analytic sampling weights were used to account for unequal probability of selection and to ensure the findings were generalizable to the Canadian population. Participants who already had a clinical diagnosis of OSA were counted.

Results: When including 'tired some of the time' to qualify as 'tired', the prevalence of tiredness was 23.1% (95% confidence interval of 22.8 – 23.4%) compared to a strict definition where only 7.1% (6.8 – 7.4%) were considered tired. Including participants who endorsed 'tired some of the time' into STOP-BAG risk estimates, estimates for risk based upon the STOP-BAG questionnaire showed that the national prevalence of moderate and severe OSA in Canada is 30.3% (95% confidence intervals: 30.0 to 30.6%). When excluding 'tired some of the time' from individual STOP-BAG calculation, the national prevalence of moderate and severe OSA in Canada is estimated at 28.1% (95% confidence intervals: 27.8 to 28.4%). The regional prevalence estimates vary between provinces ($p < .001$). The number of individuals clinically diagnosed with OSA varied by province from 0.8 to 1.8% of the population.

Conclusions: Including 'tired some of the time' into STOP-BAG risk estimates yields a national prevalence of OSA screen positives in Canada that is 2.2% higher. The Public Health Agency of Canada reported that over one in four Canadian over the age of 18 (26%) was at high risk for having obstructive sleep apnea and 76% of those cases were over the age of 50 years. We conclude that both tiredness cut-offs are appropriate and useful for identifying potential risk of OSA. Current provincial healthcare systems have left more than 90% of the prevalent cases of moderate or severe OSA undiagnosed.

Evaluation of the Implementation of Better Nights, Better Days for Children with Neurodevelopmental Disorders (BNBD-NDD): Understanding Levels of Engagement and Readiness for Change Within the COVID-19 Context

Wildeboer, Emily[1,2]; Corkum, Penny[1,2]; Andrea, Brooklyn[1]; Dockrill, Mya[1]; Silver, Hailey[1]

[1]Dalhousie University, [2]IWK Health

Submission ID 197

ABSTRACT Background. Children with neurodevelopmental disorders experience high rates of sleep problems. The Better Nights, Better Days for Children with Neurodevelopmental Disorders (BNBD-NDD) program is an online intervention for parents of children with NDD. The program is undergoing a national implementation study (recruitment completed), where parental adherence and engagement are being evaluated. Results have shown less utilization than expected. As this study has largely been conducted during the COVID-19 pandemic, this may have impacted parental engagement and adherence. Research shows that one's motivation and readiness for change often impacts engagement and adherence in an intervention. The objective of the current study is to better understand engagement with the BNBD-NDD program concerning parental motivation and readiness for change, while considering COVID-19 impacts. Methods. Parents of children with NDD (target n=27) enrolled in the BNBD-NDD program for a minimum four months will complete an exit interview using a researcher-generated, semi-structured interview guide. Participants will be asked about readiness for change, engagement in the program, and opinions about additional supports needed. Currently, nine parents have participated. Results. Data

collection and analysis are ongoing. Qualitative responses are analyzed to identify common themes using an inductive content analysis approach. Emerging themes include high levels of parental motivation to change due to the severity and impact of sleep problems, cautious optimism about the program, and identification of external factors that impede engagement. Surprisingly, several parents commented that the pandemic has improved their engagement with the program due to remote work, reduced activities, and having more time to engage with the program. Conclusion. As the BNBD-NDD implementation study concludes, understanding parents' engagement levels within the program related to their motivation and readiness for change is crucial. Study results can lead to improvement of the BNBD-NDD program's implementation and sustainability, continuing to help affected children and parents sleep better.

Sleep portrait in children part of Child Protective Services: a pilot study

**Touchette, Evelyne[1,2,3,4], Servot, Sabrina[1,2], Rousseau, Michel[1,2], Simard, Valérie[5], St-Amand, Annick[1,2]

[1]Department of Psychoeducation and Social Work, Université du Québec à Trois-Rivières, Québec, Canada; [2]Centre de recherche universitaire sur les jeunes et les familles, Québec, Canada [3]Research Unit on Children's Psychosocial Maladjustment, Québec, Canada; [4]Centre d'études avancées en médecine du sommeil, Montréal, Canada ; [5]Department of Psychology, Université de Sherbrooke, Québec, Canada

Submission ID 123

ABSTRACT Sleep portrait in children part of Child Protective Services: a pilot study Little is known about sleep in children who experience adversity/vulnerability contexts such as abuse or neglect during early childhood. This research project aims to draw a portrait of objective and subjective sleep measures among preschoolers who are a part of Child Protective Services (CPS) compared to those who are not. A total of 91 preschoolers from 3 to 5 years of age (49,4±7,1 months) participated in the present study: n=21 were part of CPS and n=70 were not. Actigraphic sleep parameters were recorded over 72 hours during the week and sleep logs were filled out by parents (nighttime) and childcare specialists (daytime). Parents filled out the Child Sleep Habits Questionnaires to measure their perception about their child's sleep. The BASC-2 was also completed to assess behavioral problems. Chi-square tests, ANOVAs, linear and logistic regressions were used to analyze the data. Analyses revealed no significant differences on actigraphic sleep measures between preschoolers who were part of CPS and those who were not. However, preschoolers who were part of CPS signaled their nighttime awakenings to their parents significantly less (Cramer's V=.25, P=0.02) and took more time to fall asleep (actigraphic sleep time to fall asleep minus reported parental bedtime) (η2=0.12; (95% CI = 0.02 – 0.25, P=0.001) compared to preschoolers who were not part of CPS. These significant associations were still present after adjusting for sociodemographic factors and externalizing behavioral problems. In sum, children part of Child Protective Services signaled their nighttime awakenings less and had a longer sleep onset compared to preschoolers who were not. Understanding the underpinnings of these sleep etiologies and exploring the possible link between these differences with sleep ecology (sleep hygiene and bedtime routine) and parent-child attachment is an interesting avenue for future research.

Event and Cost Offsets of a Comprehensive Program to Improve Adherence of Continuous Positive Airway Pressure Treatment in Obstructive Sleep Apnea Patients in Spain.

Alami, Sarah[1]; Lázaro y de Mercad, Pablo[2]; Rudilla, David[1]; Tarle, Krystle[1] ; Zammit, Danielle C.[3]

[1]Air Liquide Healthcare, [2]Independent Health Services Researcher, Madrid, Spain, [3]Independent Researcher - Switzerland

Submission ID 138

ABSTRACT INTRODUCTION : Lack of adherence is the main challenge to CPAP effectiveness. An individualized sleep apnea adherence improvement program (PIMA), deployed in Spain, based on patient stratification and personalized care plans, improved adherence to CPAP treatment versus standard follow up. OBJECTIVE AND METHOD : A health economic model was developed in Microsoft® Excel to estimate the clinical and economic outcomes of PIMA from the payer (Spanish Healthcare System) and societal perspectives over a 1-year time horizon after the onset of CPAP therapy. Model inputs were informed by the PIMA randomized controlled trial for the rate of adherence with and without PIMA, and by literature review for the clinical and economic data by level of adherence. The model was used to simulate different eligible patient populations: Simulation 1: Impact if all patients treated by CPAP were followed by PIMA -> 775 850 patients in 2021 Simulation 2: Impact of the patients already followed by PIMA -> 5000 patients until April 2022 RESULTS : Considering the simulation 1, the model predicted 32 260 cardiovascular events avoided, 8,662 road traffic accidents avoided and 1,274 occupational accidents avoided. This led to annual savings of €186,734,338 in direct costs, €13,043,828 in direct non-medical costs, and €292,831,954 in indirect costs. Considering the simulation 2, the cost offsets attributed to PIMA amounted to €1,287,479 in direct costs and €3,174,648 in total (direct + indirect) costs. These results correspond to net cost savings of €257 and €635 per patient per year in direct and total costs respectively. CONCLUSION : The implementation in the Canadian setting of interventions to increase CPAP adherence such as PIMA, could represent a significant immediate health benefit to patients and substantial cost savings for the Healthcare System and society as a whole.

Examining the impact of daily repetitive transcranial magnetic stimulation on sleep in patients with treatment-resistant depression

**Cuda, Jennifer[1]; Drodge, Jessica[1]; McMurray, Lisa[2]; Robillard, Rébecca[1,3]; Tremblay, Sara[1,3,4,5,6]

[1]The Royal's Institute of Mental Health Research, Ottawa, Canada, [2]The Royal Ottawa Mental Health Centre, Ottawa, Canada, [3]School of Psychology, University of Ottawa, Ottawa, Ontario, [4]Department of Cellular and Molecular Medicine, University of Ottawa, Ottawa, Canada, [5]Département de psychoéducation et psychologie, Université du Québec en Outaouais, Gatineau, Québec, [6]Neuroscience Department, Carleton University, Ottawa, Canada

Submission ID 206

ABSTRACT Background: Theta-burst stimulation (TBS), a novel form of repetitive transcranial magnetic stimulation (rTMS), targeting the dorsolateral prefrontal cortex (DLPFC) has emerged as a safe and effective treatment for treatment-resistant depression (TRD), although research investigating its impact on sleep is limited. This study examined the impact of TBS on subjective

sleep and its relation to depression outcomes in people with TRD. Methods: 20 participants with TRD completed four-to-six weeks of daily TBS treatments targeting the left or bilateral DLPFC in a randomized, double-blind clinical trial. Clinical assessments were administered at baseline, week 4 and week 6. The Leeds Sleep Evaluation Questionnaire (LSEQ) was used to measure: getting to sleep (GTS), quality of sleep (QOS), awake following sleep (AFS), and behaviour following wakefulness (BFW). The Hamilton Rating Scale for Depression (HRSD-17) was used to assess treatment response, defined as a ≥50% decrease from baseline scores. Repeated-measures ANOVAs and Pearson correlations were conducted to examine changes in sleep and depression, while ANOVAs were used to determine whether changes in sleep differed between responders/non-responders. Results: HRSD-17 scores significantly improved from baseline to week 4 and 6 ($p<0.0001$) and 70% of participants responded to treatment by week 6. AFS scores also significantly improved from baseline to week 6 ($p=0.021$). Furthermore, there was a strong correlation between improvements in HRSD-17 and BFW scores at week 4 ($p=0.015$) and 6 ($p=0.017$). There was a significant difference between changes in GTS scores reported by responders and non-responders at week 6, with non-responders reporting a greater decrease in scores ($p=0.022$). Conclusions: These results suggest that some aspects of sleep may be positively impacted by daily TBS treatments for depression and that these changes are proportional to the degree of alleviation in depression symptoms. This suggests that sleep restoration may be closely tied to the antidepressant response to rTMS.

Excessive daytime sleepiness does not predict reduced social interaction or difficulty with activities of daily life in older adults living in communal residences

Fry, Zachary[1]; Rodgers, Alexandre[1]; Langlois, Krissy[1]; Beaulieu, Maude[1]; Messier, Marc-Etienne[1]; Dunne, Erin[1]; **Hood, Suzanne[1]

[1]Department of Psychology, Bishop's University, Sherbrooke, Québec, Canada.

Submission ID 215

ABSTRACT Previous research indicates that excessive daytime sleepiness (EDS) in older adults predicts increased risk of physical illnesses and cognitive decline, and reduced capacity to carry out activities of daily life. More recent evidence also suggests an association between EDS and social interaction, whereby community-dwelling adults with EDS report less social contact and withdraw more frequently from social activities, thereby increasing risks of loneliness and isolation (Nakakubo et al., 2019; Holding et al., 2020). Given the impacts of social isolation on health and quality of life, we examined whether an association between EDS and social interaction was present in a sample of older adults living in a communal, assisted-living context. A cross-sectional sample of older adults (N=53, age range 69–102 years old, 81% female) living in communal, assisted-living residences completed a self-report questionnaire that included the Epworth Sleepiness Scale (ESS); Activities of Daily Living (ADL); questions concerning the frequency of and satisfaction with social interactions within the past two weeks; and questions concerning physical health conditions including chronic sleep problems. Approximately 20% of participants met ESS scoring criteria for EDS (score > 10), and participants with EDS were significantly more likely to report chronic sleep problems ($p < 0.05$). ESS score was not associated with frequency of social interactions in the past two weeks or with satisfaction derived from social interactions. EDS also did not predict greater impairments in carrying out ADLs. Contrary to findings reported in

community-dwelling older adults, we did not find any links between EDS and social interaction or the ability to carry out activities of daily life in our sample of adults residing in a communal setting. Our results could suggest that contextual factors associated with group housing may affect how EDS interacts with social engagement and the capacity to manage one's personal needs and affairs.

Exploring varsity athlete's sleep characteristics and perspectives of sleep on training, recovery and athletic performance: a systematic review.

**Belchos, Melissa[1,2,3]; Mior, Silvano[3,4]; Hogg-Johnson, Sheilah[3,4]; Papaconstantinou, Efrosini[2,3]

[1]Department of Clinical Diagnosis, Canadian Memorial Chiropractic College (CMCC); [2]Faculty of Health Sciences, Ontario Tech University; [3]Institute for Disability and Rehabilitation Research at Ontario Tech and CMCC; [4]Department of Research and Innovation, Canadian Memorial Chiropractic College (CMCC)

Submission ID 166

ABSTRACT Background: Healthy sleep is a critical component for overall health and wellbeing, and deemed an important behaviour to improve public health. In athletes, high-quality and sufficient sleep is necessary for sports performance, physical and mental recovery from rigorous training regiments, and prevents in-game fatigue and lapses in concentration. Methods: In order to be included in the systematic review, studies fulfilled the following inclusion criteria: 1) Published in a peer-reviewed journal, 2) Study designs including: RCTs, cohort studies, case-control studies, cross-sectional studies or qualitative studies, 3) Study population including adults (18 years of age or older) who are members of a varsity or collegiate sport team, and 4) outcome measures must include at least one of: any measures of sleep characteristics, sleep quality, chronotype, or qualitative measures of perspectives on sleep in relation to recovery, training and performance, 5) Studies that are available in English. Results: The following electronic databases were systematically searched from inception to May 31, 2022: MEDLINE, SportDiscus, Cochrane and CINAHL.1163 items entered Phase 1 (after duplicates removed). 187 items were deemed relevant in Phase 1. These items proceeded to full text screening, where 26 items will proceed in to critical appraisal and data extraction. Implications: Before sleep interventions can be developed, implemented and rigorously evaluated, it is important to benchmark sleep health, including sleep quality and sleep duration, of individual and team sport athletes across a wide range of sport. Therefore, our study aims to fill an important gap in the literature and investigate the sleep characteristics of varsity athletes, as well as their perspectives on sleep in relation to performance, training and recovery. Understanding these relationships and sleep behaviours in varsity athletes will inform many future studies in this population. Furthermore, it will identify potential areas for interventions to improve sleep, recovery and performance in athletes.

Full-term infants sleep-wake rhythms at 6 months following hospitalization in the Neonatal Intensive Care Unit

**Kiafar, Anita[1,2]; Laganière, Christine[1,2]; Pokhvisneva, Irina[3]; Meaney, Michael [3,4]; Gaudreau, Hélène[2]; Pennestri, Marie-Hélène[1,2]

[1]Department of Educational and Counselling Psychology, McGill University, Montreal, Quebec, Canada; [2]Once Upon a Night Pediatric Sleep Laboratory, Hôpital en santé mentale Rivière-des-Prairies, CIUSSS du Nord-de-l'Ile-de-Montréal, Montreal, Quebec, Canada; [3]Douglas Mental Health University Institute, Centre intégré universitaire de santé et de services sociaux de l'Ouest-de-l'Ile-de-Montréal, Montreal, Quebec, Canada; [4]Department of Psychiatry, McGill University, Montreal, Quebec, Canada

Submission ID 68

ABSTRACT Newborns hospitalized in the Neonatal Intensive Care Unit (NICU) are exposed to several stressors that may interfere with the development of their sleep-wake rhythms (such as high light and noise levels). However, most infants admitted to the NICU happen to be pre-term infants, also known to present altered sleep patterns. As such, it is hard to disentangle the mere effect of being hospitalized in the NICU without the confounding influence of prematurity. The current study sought to compare mother's perception of their infant's sleep patterns between infants who stayed in NICU and infants who did not in a sample of full-term infants. A sample of 506 mother-child dyads (63 in NICU), who were part of a larger longitudinal study, reported their perceptions of their child's sleep patterns at 6 months of age. Independent samples t-test revealed significantly longer nocturnal sleep duration for non-NICU infants (M = 10:17, SD = 1:32) than NICU infants (M = 9:46, SD = 1:24) t(510) = 2.52, p = .012. Also, non-NICU infants had significantly shorter daytime sleep duration (M = 2:53, SD = 1:24) compared to NICU infants (M= 3:20, SD = 1:08) t(513) = -2.46, p = .014). However, no differences were observed between NICU and non-NICU infants for nocturnal sleep latency t(504) = -.344, p > .05 or consecutive sleep t(510) = .31, p > .05. Interestingly, despite longer nocturnal and shorter daytime sleep duration in non-NICU infants, it appears that, on average, both groups spent the same amount of time sleeping in 24 hours. Although preliminary, the results suggest that the circadian rhythms of NICU versus non-NICU full-term infants are developing differently. Whether this difference persists over time remains to be clarified.

Home Sleep Apnea Testing: Bringing Quality to Unregulated Health Care

Manship, Sharan[1]; Homewood, Laura[1]; **Rakhra, Navdeep[1]; Markin, Aleksei[1]

[1]College of Physicians and Surgeons of British Columbia

Submission ID 104

ABSTRACT Introduction. Historically, home sleep apnea testing (HSAT) in British Columbia was provided by private unregulated and unaccredited providers. Growing concerns from the sleep medicine community in 2019 prompted the Ministry of Health to launch a comprehensive review of the HSAT service delivery environment and recommended to develop of a formal accreditation process that would ensure consistent quality of practice and patient care. Intervention The first step was to identify the unaccredited HSAT providers and have them register with the College.

And after that, HSAT facilities were required to submit initial assessment applications, including an attestation signed by the medical director, stating they meet a critical subset of 16 standards. Measurement 172 HSAT facilities achieved provisional accreditation and are now subject to a desktop audit. 21 facilities have completed the audit of 53 standards and 243 nonconformances have been identified. The number of nonconformances per facility ranges from 3 to 39. Results For each standard, an average of 33% of facilities did not meet the criteria. The highest nonconformances, per standard category, are seen in patient focus, equipment, and global HSAT. These standards include patient complaints, equipment safety, and accurate reporting. In addition, there were 44 nonconformances cited for nine of the standards that had previously been attested to by the medical director. Discussion The use of regulation has become a widely accepted policy instrument to ensure the protection of the public from unqualified, incompetent, or unsafe healthcare providers. Regulation achieves this through the establishment and enforcement of professional practice and education standards. Conclusion Accreditation of HSAT facilities has already had a positive impact on patient-centered outcomes. Our pilot study, showing the first phase of the HSAT accreditation process, strives to create a path for further research on the positive influences of accreditation programs on public health indicators.

How is the Use of Electronic Devices in Bed Impacting Sleep and Subjective Pre-Sleep Arousal

Gallo, Olivia[1,2]; **Dion, Karianne[1,2]; Lee, Elliott[1,3]; Kendzerska, Tetyana[4]; Pennestri, Marie-Hélène[5]; Godbout, Roger[6]; Gallson, Dave[7]; Robillard, Rébecca[1,2]

[1]Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada; [2]School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada
[3]Sleep Disorders Clinic, Royal Ottawa Mental Health Centre, Ottawa, K1Z 7K4, Canada
[4]The Ottawa Hospital Research Institute, University of Ottawa, Ottawa, K1H 8L6, Canada
[5]Department of Educational & Counselling Psychology, McGill University, Montréal, Canada
[6]Faculty of Medicine, Université de Montréal, Montréal, H3T 1J4, Canada; [7]Mood Disorders Society of Canada, Belleville, K8P 4S2, Canada

Submission ID 147

ABSTRACT Introduction: Previous studies reported a link between electronic device use in bed and poorer sleep quality and quantity. Little is known about the frequency of this behavior and how its impacts on sleep relate to the light emitted from these devices and pre-sleep arousal. Methods: A survey investigating sleep and mental health was distributed in September 2021 to a representative sample of 1,200 Canadians. It included questions on screen time, sleep patterns and the Insomnia Severity Index (ISI-3). Results: In this sample, 797 (66%) acknowledged using a computer or mobile device while in bed, and 25% (n=303) said they were doing so almost every night. Of all those using electronic devices in bed, 21% felt that this prolonged their sleep latency and 28% felt that this altered their sleep quality. Self-reported sleep latency and insomnia symptoms severity progressively increased with the frequency of in-bed electronic devices use. Sleep latency (mean+SD) ranged from 25+35min in non-users to 45+56min in daily users ($F(3)=11.2$, $p<.001$). ISI-3 scores ranged from 3.3+2.9 in non-users to 4.7+3.1 in daily users ($F(3)=14.7$, $p<.001$). Only 15% of people stated that they use a screen filter with amber/orange hue when using electronic devices in the evening. There was no significant difference in sleep latency or insomnia symptoms based on screen filters usage (all $p>.050$). However, the proportion

of people feeling mentally alert and wired at bedtime significantly increased with the frequency of in-bed electronic devices use (Chi-squared=74.7, p<.001). Conclusion: These findings suggest an association between device use in bed and sleep difficulties including longer sleep onset, poorer sleep quality, and increased insomnia symptoms. Cognitive and emotional activation associated with device use may represent a key factor in this relationship. Further research is required to evaluate how the type of content viewed through electronic devices in bed impacts sleep.

Investigating Endophenotypes of OSA in People with Comorbid Insomnia and Depression

**Pierre-Louis, Libny[1], Higginson, Caitlin[2,3], Sands, Scott[4], Alex, Raichel M.[4], Kendzerska, Tetyana[5], Lee, Elliott[2,3], Spitale, Naomi[2,3], Robillard, Rebecca[1,2]

[1] School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada; [2] Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada
[3] Sleep Disorders Clinic, Royal Ottawa Mental Health Centre, Ottawa, K1Z 7K4, Canada
[4] Division of Sleep and Circadian Disorders, Brigham and Women's Hospital, Boston, MA, 02130, USA; [5] The Ottawa Hospital Sleep Center, Ottawa Hospital – Civic Campus, Ottawa, K1Y 4E9, Canada

Submission ID 213

ABSTRACT Introduction The prevalence of comorbid Insomnia and obstructive sleep apnea (COMISA) is getting increasingly recognized. Each one of these sleep disorders is also a risk factor for increased incidence and severity of depression. Recent studies have started investigating the endotypes and phenotypes of OSA, with and without depressive symptoms. However, the endophenotypic traits of patients with COMISA and depression remain unclear. Methods: Secondary data analysis was conducted in three groups of patients who underwent diagnostic polysomnography: OSA only (n=50), OSA+depression (n=279), COMISA+Depression (n=32). All patients had a Respiratory Disturbance Index of ≥5 events/hour. Using established methods, four OSA endotypic traits were derived based on standard polysomnography: upper airway collapsibility, upper airway muscle compensation, ventilatory instability (loop gain, chemoreflex delay), and arousal threshold. Results: Both the OSA only and the COMISA+Depression groups had significantly higher chemoreflex delay compared to the OSA+Depression group (H=7.0, p=.030). Compared to the OSA only group, both the OSA+Depression and the COMISA+Depression groups had significantly shorter total sleep time (H=8.1, p=.017) and shorter respiratory event duration across the whole night (H=8.1, p=.017) and in REM (H=19.2, p=.006). Conclusions: These findings suggest the endophenotypic profiles of patients with COMISA and depression share some overlaps and differences with that of mentally healthy patients with OSA only and from those with OSA and depression. Those with COMISA and depression have a more unstable respiratory control system reflected in a longer chemoreflex delay following a respiratory event than those with OSA and depression. Additionally, they had shorter total sleep time and shorter respiratory event durations than those with OSA only. Future work will examine how these differences in endophenotypic profiles may relate to apnea severity, symptom-based phenotyping and therapeutic interventions.

L'incidence annuelle et les facteurs prédisposants de l'insomnie parmi de bons dormeurs ayant vécu un stress relationnel

Côté, Abygaëlle[1,2]; Roberge, Jolianne[1,2]; Ivers, Hans[1,2]; Morin, Charles[1,2]

[1]École de psychologie de l'Université Laval; [2]Centre de recherche CERVO (Cervo Brain Research Centre)

Submission ID 207

ABSTRACT Objectif : Le but de cette affiche est d'estimer l'incidence de l'insomnie des personnes qui ont rapporté avoir vécu un événement stressant en lien avec des difficultés relationnelles conjugales et d'identifier les facteurs prédisposants au développement de l'insomnie. Méthode : Les données utilisées ont été obtenues dans le cadre d'une enquête longitudinale sur le sommeil. L'échantillon est composé de 101 hommes et de 243 femmes sélectionnés à partir du fait qu'ils étaient tous de bons dormeurs au temps 1 et rapportaient avoir vécu un évènement relationnel stressant au cours de l'année subséquente au temps 2. Les participants ont répondu à des questionnaires qui évaluent le statut du sommeil, les stratégies de gestion du stress, le support social et les comportements de santé. Une analyse de variance (ANOVA) a été effectuée sur les données afin d'identifier les facteurs associés à l'incidence de l'insomnie. Résultats : Parmi l'échantillon total, 5,5% (n = 19) ont développé le syndrome d'insomnie, 24,4% (n = 84) ont développé des symptômes d'insomnie et 70,1% (n = 241) sont restés bons dormeurs. L'étude révèle une différence significative entre les trois groupes quant au coping émotionnel et la présence d'antécédents personnels de difficultés de sommeil. Le score moyen au Coping Inventory for Stressful Situations, orienté vers les émotions, du groupe de syndrome d'insomnie (M = 44,7) était significativement plus élevé que celui du groupe symptômes (M = 42,4) et celui de bons dormeurs (M = 39,1). Conclusion : Le développement de l'insomnie à la suite d'un événement relationnel stressant pourrait s'expliquer en partie par l'utilisation de stratégies de coping émotionnel, une variable qui est associée à une élévation de l'activation cognitive avant le coucher.

OSA and higher risk of cardiovascular diseases

Uzma, Nazia[1], Hasan, Ashfaq[2]; Narasimhan, C[3]

[1] Department of Physiology, Deccan College of Medical Sciences, Hyderabad, Telangana, India [2] Department of Respiratory Medicine, Deccan College of Medical Sciences, Hyderabad, Telangana, India; [3]Department of Cardiology, Care Hospital, Hyderabad, Telangana, India

Submission ID 120

ABSTRACT Obstructive sleep apnea (OSA) is a common condition being increasingly recognized and is associated with long-term morbidity and mortality. OSA is accompanied by episodic increases in left ventricle afterload due to large negative swings in intra-thoracic pressure and repetitive surges in arterial pressure. Brain natriuretic peptide (BNP) is released by ventricular myocytes in response to pressure and volume overload. The objective of this study was to evaluate the relationship between severity of OSA and plasma BNP concentration with the risk of cardiovascular diseases. The study involved 225 OSA patients and 75 healthy controls. A standard

full-night polysomnography was performed in study population. OSA defined as having an Apnea-hypopnea index (AHI) of ≥5 per hour of sleep and depending on AHI, OSA patients were divided into 3 categories. Participants with an AHI <5 constituted the comparison group. In this study, the change in BNP levels from morning to evening was recorded (between 8 am and 10 am, and 8 pm-10 pm). Plasma BNP was measured by fluorescence immunoassay quantification.The results of the assay showed that the average concentration of BNP (evening and morning) increased significantly with severity of OSA, the BNP levels in morning samples significantly increased than evening. Log transformed overnight BNP values showed that maximum change in nocturnal to diurnal BNP occurred for severe OSA patients however least concentration of BNP was found in healthy individuals (control group) (Figure 1). Among OSA subjects (entire cohort), very strong positive correlation with statistical significance was revealed for BNP with independent predictors. The findings of the study established a dose-response relationship between increasing severity of obstructive sleep apnea and elevated plasma BNP concentration. The increase in BNP with severity of OSA shows that patient in this category are at a higher risk of cardiovascular diseases.

Parental perceptions of the impact of the COVID-19 pandemic on the sleep of children with neurodevelopmental disorders

Pizzo, Alex[1]; Keys, Elizabeth[2]; Corkum, Penny[1]

[1]Dalhousie University, [2]University of British Columbia Okanagan

Submission ID 198

ABSTRACT Background: Sleep problems in children with neurodevelopmental disorders (NDDs) are highly prevalent and associated with poorer daytime functioning and quality of life. Changes in daily routines, like those that occurred during the COVID-19 pandemic, can have a negative impact on sleep habits, especially in children living with NDDs who benefit from routines and schedules. As such, it is important to understand the impacts of the COVID-19 pandemic on sleep difficulties in children with NDDs. Objectives: The present study aimed to: 1) determine and describe parental perceptions about the impact of the COVID-19 pandemic on the sleep of school-aged children with NDDs who were already experiencing insomnia symptoms, and 2) identify and describe parental perceptions about contributing factors. Methods: Canadian parents of school-aged children with NDDs and insomnia symptoms (n = 100) were surveyed to determine if their child's sleep had changed as a result of the COVID-19 pandemic. Parents who reported changes were asked to describe how the pandemic influenced their child's sleep. Results: Most parents (66%) reported the pandemic had not changed their child's sleep; 30% stated their child's sleep had worsened and 4% reported an improvement. Stress and anxiety about the pandemic, disrupted routines, and increased screen time were common parent-identified contributing factors that were thought to have worsened their child's sleep. Parents who reported an improvement in their child's sleep quality attributed this change to improvements in daily routines (i.e., reduced extracurricular activity and school commitments), leading to less stress and better sleep. Conclusions: For some children with NDDs, the COVID-19 pandemic may have exacerbated existing sleep difficulties but for others, the pandemic may have improved sleep quality. Researchers and clinicians should explore strategies to mitigate contributing factors that were reported to worsen sleep, such as anxiety about the pandemic, disrupted routines, and increased screen time.

Perceived impact of the COVID-19 pandemic on sleep and fatigue of frontline healthcare workers

Boudreau, Philippe[1]; Perez-Medina-Carballo, Rafael[1]; Ferrari, Manuela[1]; Perreault, Michel[1]; Power, Niamh[1]; Grenier, Stéphanie[2]; Debergue, Patricia[2]; Hori, Wendy[3]; Boivin, Diane B.[1]

[1] Douglas Mental Health University Institute, Department of Psychiatry, McGill University, Montreal, Quebec, Canada.; [2] National Research Council of Canada, Boucherville, Quebec, Canada.; [3] Beth Israel Deaconess Medical Center, Clinical Research Center, Boston, MA, USA.

Submission ID 61

ABSTRACT The increased physical and psychological workload during the COVID-19, combined with limited resources, results in particularly stressful work conditions for healthcare workers that can lead to substantial sleep disturbances and fatigue. The aim of the present study is to document the perceived impact and contributing factors of COVID-19 on sleep and fatigue in healthcare workers. A survey was administered in the summer 2021 to a convenience sample of healthcare workers from Montreal. The survey included questions on perceived sleep disturbances, fatigue and their contributing factors. Descriptive statistics were used for multiple-choice questions, whereas content analyses were applied to open-ended questions. Answers were available for 1,411 respondents (~15% of the total eligible population). The majority (67%) worked regular day shifts. In total, 34.5% of respondents reported insomnia symptoms most or all the time, 37.0% reported that their sleep interfered very much or extremely with their daily functioning, and 40.1% reported fatigue most or all the time. Worsening of sleep and fatigue during the pandemic was reported by 55.1% and 69.8% of the respondents, respectively. Worse insomnia symptoms and daily functioning were associated with working at night vs during the day ($p \leq 0.0016$), working >40h/week ($p \leq 0.025$) and being in contact with COVID patients ($p \leq 0.038$). Greater fatigue levels were associated with working at night ($p=0.0086$) and with identifying as female ($p=0.001$). Mental health symptoms were perceived as the main factors contributing to sleep disturbances. Sleep duration, workload and general mental health were perceived as the main contributing factors of fatigue levels. The prevalence and increase of sleep and fatigue problems reported during the pandemic by frontline healthcare workers is high, and related to personal and occupational factors. The identified factors could be used to design interventions that meet their specific needs. This study was supported by a grant from the National Research Council Canada.

Physician acceptability of the Sleepwell direct-to-patient mailed intervention to reduce sedative-hypnotic use in the YAWNS NB study

Gardner DM[1,2], Murphy AL[1,2], Rajda M[1], Turner J[3], Allen K[1]

[1] Department of Psychiatry, Dalhousie University, Halifax, NS; [2] College of Pharmacy, Dalhousie University, Halifax, NS; [3] Faculty of Pharmacy and Pharmaceutical Sciences, Monash University, Melbourne, Australia

Submission ID 101

ABSTRACT Objectives Patient-participants of the Your Answers When Needing Sleep in New Brunswick (YAWNS NB) were mailed information about reducing and stopping prescription

sedatives and increasing the use of behavioural methods for improving sleep without medication. After completion of the randomized trial, prescribers of patient-participants were invited to complete a survey evaluating their acceptability of the direct-to-patient Sleepwell intervention package. Methods Prescribers of YAWNS NB study participants were sent a copy of the Sleepwell package and invited to participate in an online survey, encouraged by three weekly reminders. Content of the YAWNS NB Prescribers Survey was developed in alignment with the constructs of the Theoretical Framework of Acceptability: affective attitude, intervention coherence, ethicality, burden, self-efficacy, opportunity cost, and perceived effectiveness. 34 items were used to measure acceptability across the 7 construct components. Demographic data and experience with discontinuing benzodiazepine receptor agonists (BZRAs) were also collected. Results Forty prescribers completed the survey: age 45±11 years, female 50%, family physician 90%, urban (62.5%), solo (47.5%) medical practice setting. Most respondents indicated practice challenges regarding BZRA use in older adults including pressure to continue prescriptions. 90% disagreed that BZRA benefits outweigh the risks. There was broad acceptability of the Sleepwell package intervention. The proportion of positive, neutral, and negative response per survey respondent across 34 items was 83%, 14%, and 3%, respectively. The construct burden had the most negative responses (8%) and intervention coherence had the least negative responses (1%). Conclusion: Prescribers of BZRA to older adults were generally accepting of the Sleepwell information package content and its direct delivery by mail to their patients without their notification or pre-approval.

POSITIVE AIRWAY PRESSURE THERAPY ADHERENCE AND OUTCOMES IN OBSTRUCTIVE SLEEP APNEA: A RETROSPECTIVE LONGITUDINAL RANDOMIZED TRIAL

Morrison, Debra[1,2]; **Title, Michaela[3]; Stevens, Daniel[3]; Spurr, Kathy[4]

[1]Sleep Clinic and Laboratory, QEII Health Sciences Centre, Halifax, NS, Canada; [2]Department of Medicine, Dalhousie University, Halifax, NS, Canada; [3]School of Health and Human Performance, Division of Kinesiology, Faculty of Health, Dalhousie University, Halifax, NS, Canada
[4]School of Health Sciences, Faculty of Health, Dalhousie University, Halifax, NS, Canada

Submission ID 103

ABSTRACT Positive airway pressure (PAP) therapy is commonly prescribed to patients with obstructive sleep apnea (OSA). Presently, there is limited evidence and no established guidelines to support the minimum wear time of the PAP device to discern clinically meaningful outcomes in patients with OSA. A commonly used definition for PAP adherence is based upon the minimum adherence requirements to receive Medicare coverage in the US, and is defined as PAP usage of four or more hours per night on 70 percent of nights for at least 30 consecutive days. Purpose: To determine the efficacy of the present definition of PAP therapy adherence on clinical outcomes in patients with OSA. Methods: A longitudinal retrospective randomized design was used to assess mortality, frequency and duration of hospitalizations, and development of co-morbidities between patients with OSA defined as PAP therapy adherent (n=50) and non-adherent (n=50) during an eight-year period. Results: No significant differences were shown between groups for any of the outcomes during the study period. However, logistic regression showed a significant increase in odds of being adherent if the patients were male (OR=8.519; 95%CI=1.301–55.756; p=0.0254); and significant decrease in odds of being adherent in patients reporting higher normal daytime

sleepiness (OR=0.039; 95%CI=0.005–0.392; p=0.0029); mild (OR=0.039; 95%CI=0.003–0.517; p=0.0139); or severe (OR=0.088; 95%CI=0.012–0.635; p=0.0159) excessive daytime sleepiness compared to those reporting lower and normal daytime sleepiness. An increasing number of hospitalizations also corresponded with a significant decrease in odds of being adherent (OR=0.741; 95%CI=0.551–0.995; p=0.0460). Conclusion: Between group comparison of the adherent and non-adherent groups did not support the Medicare definition of PAP therapy adherence. However, logistic regression showed that being adherent did increase the odds of being less sleepy during the day, and corresponded with a decreased number of hospitalizations. Further studies should be conducted to investigate clinically meaningful criteria for PAP therapy adherence.

Pre-motor cholinergic circuitry controlling upper airway musculature in-vivo

**Ladha, Raina A.[1]; Liu, Wen-Ying[1]; Liu, Hattie[2]; Horner, Richard L.[1,2]

[1]Department of Physiology, University of Toronto, Toronto, Ontario, Canada; [2]Department of Medicine, University of Toronto, Toronto, Ontario, Canada

Submission ID 87

ABSTRACT Obstructive sleep apnea (OSA) is a common and serious breathing disorder occurring during sleep, primarily due to a loss of tongue muscle tone. The hypoglossal motor nucleus (HMN) innervates the tongue musculature and helps maintain an open upper airway for effective breathing. Acetylcholine strongly suppresses tongue motor activity during rapid-eye-movement (REM) sleep (1) via an inhibitory muscarinic receptor mechanism that dominates nicotinic excitation at the HMN (2). It is unknown if premotor cholinergic neurons from the intermediate reticular nucleus (IRt) modulate the HMN and tongue motor activity. To identify pre-motor cholinergic circuitry controlling the upper airway musculature in-vivo, we modified a protocol (3) to optically stimulate light-sensitive cation channels (channelrhodopsin, ChR2) expressed exclusively on cholinergic neurons in transgenic mice (ChAT-ChR2(H134R)-EYFP). Tongue motor output was measured in response to 0 (sham), 1, 3, 5, 10, 15 and 20mW photo-stimulations (10Hz; 2 sec durations; 473nm light pulses) delivered from an optical fibre positioned 0.5mm above the HMN and IRt in isoflurane-anesthetized mice. Photo-stimulations elicited a power-dependent increase in tongue motor output, with threshold responses at 3mW at the HMN and 20mW at the IRt ($P<0.05$ vs. 0mW controls, n=12). Within the same mice, 20mW stimulations elicited significantly larger responses at the HMN (601±103µV) vs. the IRt (147±29µV) ($P<0.001$, n=12). The findings suggest functional connections between cholinergic IRt neurons and the HMN. Smaller motor responses to the same stimulation intensity at the IRt vs. the HMN may reflect net inhibitory influences and/or photo-activation of a smaller population of neurons at the IRt compared to the HMN. To distinguish between these explanations, ongoing studies pharmacologically manipulate the HMN while stimulating the IRt and anatomically identify cholinergic neurons and their projections. Overall, these findings help identify the motor circuitry underpinning control of upper airway motor activity relevant to REM sleep motor suppression and OSA pathophysiology.

Preclinical Pharmacology of Solriamfetol: Potential Mechanisms for Wake Promotion

Gursahani, Hema[1]; Jolas, Thierry[2]; Martin, Maryse[2]; Cotier, Sandrine[2]; Hughes, Sandrine[3]; Parks, Gregory[4]; Chepke, Craig[5,6] ; Benard, Marc-Andre[4]

[1]Jazz Pharmaceuticals, [2]Eurofins Cerep, [3]E-Phy-Science, [4]Axsome Therapeutics (New York, NY, USA), [5]Excel Psychiatric Associates, [6]Atrium Health

Submission ID 96

ABSTRACT Introduction: Solriamfetol is a wake-promoting agent (WPA) approved for the treatment of excessive daytime sleepiness associated with narcolepsy and obstructive sleep apnea. The wake-promoting mechanism of solriamfetol may result from dopamine and norepinephrine reuptake inhibition, but other mediators of cognition and arousal warrant exploration. Preclinical studies in rodents and non-human primates indicate that TAAR1 agonists may have wake promoting properties. Preclinical pharmacology studies were conducted to identify additional targets activated by solriamfetol and compare them to that of WPAs and traditional stimulants. Methods: In vitro binding and functional studies were conducted to measure the activity of solriamfetol and comparator WPAs. Electrophysiology studies were conducted in slice preparations from mouse ventral tegmental area (VTA). Locomotor activity studies were conducted in mice. Results: In vitro studies showed agonist activity of solriamfetol at human, mouse, and rat TAAR1 receptors. hTAAR1 EC50 values (10–16 µM) were within the clinically observed therapeutic plasma concentration range and overlapped with the observed DAT/NET inhibitory potencies of solriamfetol in vitro. Solriamfetol also exhibited agonist activity at serotonin 1A (5HT1A) receptor in vitro, with lower potency (EC50=25µM). Neither modafinil nor the DAT/NET inhibitor bupropion had TAAR1 agonist activity. Solriamfetol (1–10 µM) dose-dependently inhibited the firing frequency of dopaminergic VTA neurons in mouse brain slices, similar to known TAAR1 agonists. Unlike traditional stimulants, solriamfetol did not increase locomotor activity in naive mice, but inhibited locomotor activity in DAT knockout mice. Conclusions: Preclinical studies have identified agonist activity at the TAAR1 receptor and lower potency agonist activity at 5-HT1A receptors for solriamfetol, in addition to its activity as a DAT/NET inhibitor. TAAR1 agonists are modulators of monoamine transmission with potential wake-promoting effects seen in preclinical studies, so hTAAR1 activity may represent an additional mechanism underlying the effects of solriamfetol.

Predicting the Efficacy of Stepped-Care Cognitive Behavioral Therapy for Insomnia in Cancer Patients Using Resting State Heart Rate Variability

Garneau, James [1]; Gouin, Jean-Philippe[1] ; Savard, Josée[2,3,4]

[1]Department of Psychology, Concordia University, Montréal, Canada., [2]Centre de recherche du CHU de Québec, Université Laval, Québec, Canada, [3]Centre de recherche sur le cancer, Université Laval, Québec, Canada, [4]Department of Psychology, Université Laval, Québec, Canada

Submission ID 127

ABSTRACT Introduction: Insomnia affects between 30-60% of cancer patients. Savard and colleagues (2021) showed that a stepped-care approach to cognitive behavioural therapy for

insomnia (CBTi) was non-inferior to the current gold standard CBT-I, rendering it more accessible. The goal of this study was to examine a potential moderator of treatment response within this stepped-care approach. Lower high frequency heart-rate variability (HF-HRV) is a marker of parasympathetic functioning associated with risk for insomnia. We hypothesized that lower pre-treatment HF-HRV might be associated with poorer response to stepped-care CBTi. Materials & Method: 177 cancer patients (86.3% female; Mage=55.3, SD=10.4) with comorbid insomnia were randomized to receive either stepped-care or standard CBTi over a 6-week period. Insomnia (Insomnia Severity Index; ISI) and sleep-diary derived sleep efficiency were assessed at pre-treatment, post-treatment and at 3-, 6- and 12- month follow-up. Resting HF-HRV was assessed pre-treatment. Results: Linear regressions were used to test whether initial HF-HRV predicted sleep efficiency and ISI score at baseline. HF-HRV significantly predicted sleep efficiency and not ISI score. No significant interaction effect of time and HF-HRV was found, indicating that pre-treatment HF-HRV does not significantly predict treatment outcomes across groups. Furthermore, there was no time x CBTi group x HF-HRV interaction, indicating that HF-HRV did not predict differential responses to the treatment delivery modality. In exploratory analyses, we separated the sample into clinical (ISI>=15) and subclinical (ISI<15) groups based on pre-treatment insomnia severity. There was a significant 3-way interaction between time, insomnia severity and HF-HRV, such that HF-HRV predicted treatment responses in the clinical group, but not in the subclinical group. Conclusion: Although resting state HF-HRV did not significantly predict response to either form of CBTi overall, it may predict certain treatment outcomes when initial insomnia severity is considered, albeit the overall effect size is small and of unclear clinical significance.

Preliminary Findings on GABA Levels in the Brain and Slow Wave Sleep in Veterans Exposed Trauma

**Leveille, Chloe[1,2]; Higginson, Caitlin[1]; Taylor, Reggie[1];Porteous, Meggan[1,2], Lanthier, Malika[1]; Richard-Malenfant, Claude[1,2]; Douglass, Alan[1]; Cassidy, Cliff[1]; Kaminsky, Zachary[1], Jaworska, Natalia[1]; McQuaid, Robyn[1], Shlik, Jakov[3]; Robillard, Rebecca[1,2]

[1]The University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, ON, Canada, [2]School of Psychology, University of Ottawa, Ottawa, ON, Canada, [3]Operational Stress Injury Clinic, Royal Ottawa Mental Health Center, Ottawa, ON, Canada

Submission ID 14

ABSTRACT Objective: Sleep is commonly disrupted following trauma exposure, resulting in difficulties falling and staying asleep, nightmares and changes in sleep architecture. Considering that GABA is the primary inhibitory neurotransmitter in the generation of slow wave sleep and that elevated GABA levels have been observed in the brain of people with insomnia, it has been hypothesized that chronic hyperarousal linked to sleep disturbances may result in an adaptive increase in GABA. There are some indications of a GABA deficiency in the anterior cingulate cortex in trauma-related illnesses, but findings have been inconsistent. This preliminary report used magnetic resonance spectroscopy to determine whether brain GABA levels in trauma-exposed veterans may relate to sleep abnormalities and psychiatric symptom severity. Method: Nineteen trauma-exposed veterans (6 female; M=48.9, SD=8.3) completed the PTSD Checklist (PCL-5) and a structured psychiatric interview, including the Clinician-Administered PTSD Scale for DSM-5 and the Mini International Neuropsychiatric Interview. Magnetic resonance spectroscopy was used to quantify GABA ratios relative to N-acetylaspartate in the evening before in-lab polysomnography

was recorded. The relationships between GABA levels, sleep architecture variables, and total scores on the PCL-5 were analyzed using Spearman correlations. Results: Psychiatric interviews indicated that all participants met DSM-5 criteria for PTSD (n=15) or MDD (n=4). Higher PTSD symptom severity on the PCL-5 negatively correlated with lower GABA levels (rs=-0.44, p =.058). There was a significant negative correlation between GABA levels and the percentage of slow wave sleep (NREM3) (rs =-0.47, p =.042). Conclusions: These preliminary findings align with previous reports that low GABA levels are associated with increased PTSD symptom severity and provide new evidence about potential links with sleep architecture. Further work is required to decipher the complex interactions between sleep and neurochemical mechanisms influencing the physiology of trauma-related conditions.

Preliminary validation of a headband for ambulatory electroencephalographic sleep monitoring

Tavakoli, Paniz[1], **Higginson, Caitlin[1,2], Lanthier, Malika[1], Porteous, Meggan[1,3], Fogel, Stuart[1,3], Ray, Laura[3], Robillard, Rébecca[1,3]

[1] Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada; [2] Sleep Disorders Clinic, Royal Ottawa Mental Health Centre, Ottawa, K1Z 7K4, Canada; [3] School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada

Submission ID 88

ABSTRACT Introduction: Most current ambulatory sleep monitors are restricted to accelerometry or heart rate sensors to estimate sleep. While this has proved to be very helpful to delineate sleep-wake profiles outside of the laboratory environment, sleep estimates collected with these devices have limited accuracy and only provide indirect estimations of sleep and wake states as they do not enable direct measurements of brain activity. The proposed study aims to validate a novel electroencephalography headband for ambulatory sleep monitoring. Methods: Twenty-two participants underwent one night of in-laboratory sleep recording with the ambulatory electroencephalography headband (MUSE-S, Interaxon) and simultaneous standard polysomnography (Embla N7000/RemLogic, Natus) with a minimum of three scalp EEG leads, along with EOG and EMG signals. MUSE-S data was scored using an automated sleep staging algorithm and polysomnography was scored by an independent registered technologist who was blinded to the MUSE-S algorithm-based scoring. Statistical analyses were conducted by an independent scientist who does not have any commercial ties to the MUSE-S. Results: On average, the MUSE-S overestimated total sleep time by 4.3 minutes (SD=18.7 minutes). Strong correlations were found between sleep parameters derived with the MUSE-S and standard polysomnography: total sleep time (r=.99, p<.001), sleep efficiency (r=.95, p<.001), number of minutes of NREM2 (r=.90, p<.001), NREM3 (r=.72, p<.001) and REM sleep (r=.91, p<.001). Conclusion: Relative to standard polysomnography, ambulatory electroencephalography-based sleep monitoring with the MUSE-S shows good validity for sleep macroarchitecture variables. Further work is being done to refine signal processing and sleep stage-scoring algorithms and validate these tools in a broader range of sleepers to ensure robustness across age, sex and sleep pathologies.

Preoperative Assessment of Patients at Risk of Postoperative Respiratory Hypoxemia

**Assadi, Atousa [1,2,3]; Chung, Frances[4]; Yadollahi, Azadeh[2]

[1] Institute of Biomedical Engineering, University of Toronto; [2] Toronto Rehabilitation Institute, University Health Network; [3] Temerty Center for AI Research and Education in Medicine, University of Toronto; [4] Department of Anesthesia and Pain Medicine, Toronto Western Hospital, University Health Network, University of Toronto

Submission ID 187

ABSTRACT RATIONALE: Opioids induced respiratory hypoxemia is a major health challenge. Identifying patients at risk before surgery and proper postoperative care can prevent cardiorespiratory complications and mortality. METHODS: Oxyhemoglobin saturation (SpO2) level of 172 surgical patients was analyzed retrospectively. SpO2 was recorded continuously (Embletta X100, Embla, Broomfield, CO) on the preoperative and 3rd postoperative nights. Individuals with ≥1 postoperative episode of SpO2≤85% lasting ≥3 minutes were classified as high-risk. Preoperative SpO2 signals were analyzed to extract 30+ features to characterize overnight SpO2 and desaturation episodes. Desaturation episodes with ≥3% or ≥4% drops were characterized using pre-drop baseline, lowest, and maximum recovered SpO2 level, drop durations, recovery durations, burdens, and overall hypoxic burden. Data were split into development(85%) and test(15%) sets. Feature selection and model training were performed on the development set over 100 runs using randomly selected training(70%) and validation(15%) sets. Patients' demographics, cardiorespiratory comorbidities, and extracted SpO2 features were used in a semi-automatic technique to select risk factors associated with postoperative hypoxemia. The risk factors were used to train and validate logistic regression models. A voting system over all trained models were used to indicate high-risk patients on the test set. Due to the low number of high-risk individuals (N:26), class weights were used to penalize misclassification of high-risk patients. Sensitivity, specificity, and AUC-ROC were used to evaluate model's performance. RESULTS: Sex, BMI, respiratory diseases (asthma and COPD), hypoxic burden of desaturation episodes with ≥3% drops, standard deviation of pre-drop baseline SpO2, and average ratio between recovery and drop duration of all desaturation episodes with ≥4% drops were selected. The model's performance on the validation set was sensitivity:0.8 [95%CI:0.75-0.85], specificity:0.78 [95%CI:0.76-0.80], and AUC-ROC:0.84 [95%CI:0.82-0.86], and on the test set was sensitivity:0.75, specificity:0.68, and AUC-ROC:0.71. CONCLUSIONS: Patients' demographics, comorbidities, and preoperative SpO2 characteristics can identify high-risk individuals for postoperative hypoxemia.

Protective and Risk Factors for Insomnia Over 5 Years in a Population-Based Sample of Adults in Canada

**Morin, Charles M.[1,2,3]; Vézina-Im, Lydi-Anne [1,2,3]; Ivers, Hans [1,2,3]; LeBlanc, Mélanie[1,2,3]; Savard, Josée [1,4]

[1]École de psychologie, Université Laval, Quebec, Canada [2]Centre d'étude des troubles du sommeil, Université Laval, Quebec, Canada, [3]Centre de recherche CERVO/BRAIN Research Center, Quebec, Canada, [4]Axe oncologie, Centre de recherche du CHU de Québec, Québec, Canada.

Submission ID 175

ABSTRACT Introduction: Insomnia is a major public health concern and one of the most prevalent health issues among adults in Canada. Identifying protective and risk factors for insomnia could help identify vulnerable populations and design public health interventions to prevent some adverse medical and mental health consequences. Objective: The aim was to identify protective and risk factors for insomnia in a population-based sample of adults. Methods: Data is from a large epidemiological cohort study on the natural course of insomnia conducted before the COVID-19 pandemic. Insomnia and potential protective and risk factors for insomnia were measured annually over 5 years with self-reported questionnaires. Insomnia was measured using the Insomnia Severity Index and Pittsburgh Sleep Quality Index. Protective and risk factors for insomnia were measured using validated questionnaires. Risk factors for insomnia were divided as predisposing or precipitating factors. Results: From a cohort of 3,413 participants 1,709 adults were identified as good sleepers at baseline and were included in the analyses. A total of 202 people developed an insomnia syndrome during the 5-year follow-up. Using survival analysis for discrete events, the following variables were significant predisposing factors for insomnia: anxiety (HR=1.037; p=0.018), depression (HR=1.082; p<0.001), stress (HR=1.073; p<0.001), number of negative life events (HR=1.478; p=0.02), perceived worse general health (HR=1.606; p=0.006), pain (HR=1.475; p=0.002), vulnerability to stress (HR=1.089; p<0.001), and maladaptive emotional coping (HR=1.044; p<0.001). The following variables were identified as precipitating factors for insomnia: loss of income (HR=1.346; p=0.03), increased anxiety (HR=1.070, p<0.001), depression (HR=1.119; p<0.001) and stress (HR=1.083; p=0.001), decline in perceived general health (HR=2.061; p=0.006), and increased pain (HR=1.353; p=0.013). Physical activity was not a significant protective factor for insomnia (p=0.54). Conclusion: These results provide new information that could be helpful to prevent the onset and chronicity of insomnia by targeting specific predisposing and precipitating factors for insomnia.

Psychosocial Determinants of Healthy Sleep Habits in Adults with Type 1 and Type 2 Diabetes

Vézina-Im, Lydi-Anne[1,2]; Turcotte, Stéphane[2]; Beaulieu, Dominique[1,2,3]; Boudreau, François[4]; Morin, Christine[5]

[1]Département des sciences de la santé, Université du Québec à Rimouski (UQAR), Campus de Lévis, [2]Centre de recherche du CISSS de Chaudière-Appalaches, [3]Axe Santé des populations et pratiques optimales en santé, Centre de recherche du CHU de Québec-Université Laval, [4]Département des sciences infirmières, Université du Québec à Trois-Rivières (UQTR), [5]Clinique de diabète, Hôtel-Dieu de Lévis

Submission ID 39

ABSTRACT Introduction: Sleep is essential for physical and mental health. This is especially true for adults with diabetes as short and poor sleep quality is associated with hyperglycemia and risks of complications. Our previous results indicated that adults with type 1 (T1D) and type 2 diabetes (T2D) were more at risk of having short and poor sleep quality and insomnia compared to adults without diabetes. Objective: The aim was to identify psychosocial determinants of healthy sleep habits (HSH) in adults with T1D and T2D based on the Reasoned Action Approach. Methods: Adults with diabetes were recruited through diabetes associations and a clinic in the province of Québec. To be eligible, participants had to be 18-64 years of age and have T1D or T2D. Participants completed a 15-20 minutes Web-based survey on one of two HSH of their choice: avoiding screen use in bed or having a regular sleep schedule. Sleep and insomnia were measured using validated French versions of the Pittsburgh Sleep Quality Index, Sleep Health Index and Insomnia Severity Index. Results: A total of 170 adults with diabetes (T1D: 54; T2D: 116) completed the entire survey. More than half of participants (52.4%) selected the HSH of avoiding screen use in bed. Only 33.5% of participants reported not having used screens in bed in the past month and among those who reported screen use in bed, most (50.4%) mentioned doing this every day. Only 17.6% of participants reported having a regular sleep schedule every day in the past month. The psychosocial determinants of each HSH and those of intention to adopt them will be presented. Conclusion: These results will be useful to develop behavioral interventions aimed at promoting HSH and adequate sleep in adults with diabetes, which could prevent complications associated with hyperglycemia as well as promote physical and mental health.

Regular, Intermittent, and Spontaneous: Patterns of Preschool Children's Nap Behavior and their Correlates

**Newton, Adam[1]; Reid, Graham[1]

[1]Western University

Submission ID 60

ABSTRACT Background: Daytime sleep during the preschool years (i.e., 1-5-years-old) is characterized by high inter-child variability in several components of nap behavior, including nap duration, nap timing, and the proportion of sleep during daytime. However, few studies have investigated which factors are correlated with these components of nap behavior using an integrative empirical approach. This study: (1) integrated multiple components of preschool

children's nap behaviour into profiles using an empirical approach and (2) investigated the correlates of these profiles. Methods: A large, nationally representative sample (N = 702) of Canadian parents completed an online survey, including a one-month retrospective report of their 1.5-to-5-year old's daytime and nighttime sleep behavior and other questionnaires. In this sample, 68.7% of parents were white, 67.5% were birth mothers, and 47.9% had a undergraduate degree or higher. Among children, 53.8% were male and age was distributed in half-year increments. To understand patterns of children's nap behaviors we applied Latent Profile Analysis (LPA) to typical nap duration, typical timing of naps, frequency of naps, proportion of sleep during the daytime, and the proportion of naps which were spontaneous (i.e., child just fell asleep). Then, multinominal logistic regression was used to examine correlates of profile membership. Results: Four profiles of children emerged: (1) regular nappers (25.4%); (2) intermittent nappers (31.8%); (3) spontaneous nappers (15.4%); and (4) non-nappers (27.5%). After controlling for demographic variables (e.g., child age, sex, ethnicity) and known correlates of napping behaviors (e.g., birthweight, nighttime sleep duration), profile membership was related to parents' beliefs about napping, parents' own nap behaviors, family functioning, and child nighttime sleep problems in a multinominal logistic regression. Conclusions: An empirical approach aided in understanding the inter-child variability in napping amongst preschool-age children. Parental beliefs about napping and the home environment were shown to be critical factors influencing this variability.

Relationship Between Daytime Functioning and Fatigue Over 6 Months in Lemborexant-Treated Subjects with Insomnia Disorder

Chepke, Craig[1]; Yardley, Jane[2]; Pinner, Kate[2]; Lundwall, Christie[3]; **Moline, Margaret[3]

[1] Excel Psychiatric Associates, Huntersville, NC and SUNY Upstate Medical University, Syracuse, NY, USA; [2] Eisai Ltd., Hatfield, UK; [3] Eisai Inc., Nutley, NJ, USA

Submission ID 201

ABSTRACT An effective insomnia treatment should improve sleep and reduce daytime impairments and fatigue in patients reporting these symptoms. Lemborexant (LEM) is a dual orexin receptor antagonist approved for the treatment of adults with insomnia. Study E2006-G000-303 (Study 303; NCT02952820) showed that LEM provided significant benefit versus placebo (PBO) on patient-reported outcomes, including insomnia severity (Insomnia Severity Index [ISI]) and fatigue (Fatigue Severity Scale [FSS]). This analysis investigated the impact of LEM on the ISI and FSS and on the correlation between the two measures. Study 303 was a 12mo, randomized, double-blind PBO-controlled (first 6mo) phase 3 study in subjects (age ≥18y) with insomnia disorder and baseline (BL) ISI Total Score (TS) ≥15. There was no fatigue criterion for study eligibility. Subjects were randomized to PBO (n=318), LEM 5mg (LEM5;n=316) or 10mg (LEM10;n=315) for 6mo. ISI and FSS were administered at BL and Months 1, 3, and 6. Mean changes from BL in ISI daytime functioning score (ISI-DFS; items 4-7) and FSS-TS were assessed. Mean (SD) ISI-DFS (PBO, 11.0 [2.1], LEM5, 11.4 [2.0], LEM10, 11.0 [2.2]) and FSS-TS (PBO, 35.2 [13.6], LEM5, 37.4 [12.7], LEM10, 36.0 [13.0]) at BL were similar between groups. At 6mo, mean (SD) ISI-DFS decreased (improved) from BL (PBO, −4.3 [3.66]; LEM5, −6.0 [3.76] and LEM10, −5.7 [4.00], both P<0.0001 versus PBO). Mean FSS-TS decreased (improved) (PBO, −6.3 [12.07]; LEM5, −10.1 [13.56], P=0.0134 versus PBO; LEM10, −8.9 [14.91], P=0.0128 versus PBO) more in the LEM groups versus the PBO group. Pearson analysis showed a positive correlation over time between

reductions in ISI-DFS and FSS-TS (correlation: PBO, 0.513; LEM5, 0.553; LEM10, 0.539; all P<0.0001; no significant differences between treatment groups). Most adverse events were mild/moderate in severity. Compared with PBO, LEM significantly improved daytime functioning and fatigue in subjects with insomnia, and improvements in both measures were correlated.

Relationship between sleep architecture and frontal attentional processing in PTSD

**Lanthier, Malika[1,2]; Higginson, Caitlin[1,3]; Porteous, Meggan[1,2]; Richard-Malenfant, Claude[1,2]; Murkar, Anthony[1]; Leveille, Chloe[1,2]; Robillard, Rebecca[1,2]; Kaminsky, Zachary[1]; Tavakoli Paniz[1]

[1] University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada
[2] School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada; [3] Sleep Disorders Clinic, Royal Ottawa Mental Health Centre, Ottawa, K1Z 7K4, Canada

Submission ID 81

ABSTRACT Background: PTSD is a complex disorder which triggers a cascade of biological and neurocognitive dysfunctions. Sleep disturbances and difficulties with the frontal lobe's attentional processing are key interacting features of PTSD. A multidomain investigation is needed for a more comprehensive understanding of the PTSD. The present study, thus, aims to assess the interplay between attention and sleep in PTSD. Methods: Thirteen adults with PTSD (1 female, mean age=49 years; SD=8.9 years) and 12 healthy controls (4 females, mean age=52 years; SD=8.5 years) were recruited for the study. All participants in the PTSD group met diagnosis based on DSM-V criteria. Event-related potentials (ERPs) were recorded in two conditions, prior to bedtime: 1) an auditory stimulus presented rapidly (every 2s) or 2) slowly (every 16s). ERPs elicited in the slow condition are known to activate the frontal lobe's attentional networks. Polysomnography was recorded throughout the night. Pearson correlations were conducted to assess associations between sleep parameters and ERPs reflecting attentional processing. Correlations were run separately for the PTSD and control groups. Results: For controls, the P2 ERP in the rapid condition was significantly positively correlated with minutes spent in N3 sleep (r=0.62, p=.032). For the PTSD group, the P2 in the slow condition was significantly negatively correlated with REM latency (r=-0.69, p=.008) and positively correlated with minutes spent in REM (r=0.59, p=.033). There were no other significant correlations for either group. Conclusions: Shorter REM latency combined with higher amounts of REM reflects increased REM pressure, a common phenomenon in people with PTSD. The present study reveals that REM abnormalities, linked to PTSD, are associated with increased frontal attentional processing. The frontal lobe's attentional circuitry may, thus, offer a unique window for understanding sleep abnormalities in PTSD.

Relationship between slow-wave characteristics and grey matter volume after extensive brain damage in chronic moderate to severe TBI

Kalantari, Narges[1,2]; Daneault, Véronique[1,2]; Blais, Hélène[2]; Sanchez, Erlan[3]; Carrier, Julie[1,2]; Gosselin, Nadia[1,2]

[1] Département de psychologie, Université de Montréal, Montreal, Quebec, Canada; [2] Centre d'études avancées en médecine du sommeil, Hôpital du Sacré-Cœur de Montréal, Montreal, Quebec, Canada; [3] Cognitive Neurology Research Unit, Sunnybrook Research Institute, Toronto, Ontario, Canada

Submission ID 34

ABSTRACT Electroencephalographic slow waves are low-frequency and high-amplitude oscillations that are mostly generated in the orbitofrontal cortex. Slow waves travel from the anterior to posterior brain regions, particularly through a mesial pathway including the insula, cingulate, and precuneus. Furthermore, their full expression depends on the interaction between the thalamus and the cortex as well as the structural integrity of the cerebral matter. In this study, we assessed the relationship between grey matter volume and slow-wave characteristics including the peak-to-peak amplitude, negative-to-positive slope, frequency, as well as slow-wave density, and slow-wave spectral power (0.6–4 Hz) during NREM sleep in adults at the chronic stage of moderate to severe traumatic brain injury (TBI) and in healthy controls. We recruited 27 community-dwelling moderate to severe TBI patients (mean age = 32.0 ±12.2 years) and 32 healthy controls (mean age = 29.2 ±11.5 years). T1 MRI sequences were processed with the Computational Anatomy Toolbox of the SPM 12 and the grey matter volume was extracted from the orbitofrontal cortex, insula, cingulate, precuneus, and thalamus. We found that Group significantly interacted with grey matter volume in all regions, except the thalamus, to predict slow-wave slope and frequency. Specifically, lower grey matter volume predicted slow waves with slower frequency and less steep slope in healthy controls but not in TBI subjects. Our results corroborate previous studies on healthy adults where grey matter volume is positively associated with the synchrony of cortical neurons during NREM sleep. The present study suggests that grey matter volume cannot explain slow-wave characteristics in the context of extensive grey matter loss following moderate to severe TBI.

Respiration organizes gamma synchrony in the wake prefronto-thalamic network of cats

Basha, Diellor[1,2]; Chauvette, Sylvain[1,2]; Timofeev, Igor[1,2]

[1]Université Laval, [2]CERVO Brain Research Centre

Submission ID 195

ABSTRACT Prefrontal gamma oscillations underlie multiple cognitive operations. Using local field potential recordings of the cat brain, we show that prefrontal gamma oscillations are nested in respiratory cycles during waking but not sleep. In waking, respiration phase organized long-range gamma synchrony between the prefrontal cortex and the nucleus reuniens, a thalamic nucleus that links the prefrontal cortex and the hippocampus. In vivo intracellular recordings of the thalamus show that respiration drives synaptic activity in the nucleus reuniens, preceding

prefrontal gamma bursts. The findings highlight respiration as an important substrate for the organization of waking brain activity.

Role of melatonin on EEG frequency bands after menopause

**Pérez-Medina-Carballo, Rafael[1,2]; Kosmadopoulos, Anastasia[2,3]; Boudreau, Philippe[2]; Robert, Manon[2,4]; Walker, Claire-Dominique[5]; Boivin, Diane B.[1,2]

[1]Integrated Program in Neuroscience, McGill University, Montreal, Quebec, Canada; [2]Centre for Study and Treatment of Circadian Rhythms, Douglas Mental Health University Institute, Department of Psychiatry, McGill University, Montreal, Quebec, Canada; [3]Appleton Institute for Behavioural Sciences, Central Queensland University, Adelaide, South Australia, Australia. [4]Centre de Recherche du Centre Hospitalier de l'Université de Montréal, Université de Montréal, Montréal, Quebec, Canada; [5]Douglas Mental Health University Institute, Department of Psychiatry, McGill University, Montréal, Québec, Canada. H4H 1R3

Submission ID 47

ABSTRACT Postmenopausal women (PMW) are at high risk of developing sleep disturbances. Since melatonin administration has shown to decrease sleep spindle activity in humans, we aimed to investigate melatonin rhythms and associated changes in the microstructure of sleep of PMW. Data from 8 healthy PMW (54.8±3.4 years, one taking hormones) were compared to those from 12 healthy young women (YW; 25.8±3.4 years) in mid-follicular phase. All participants were healthy sleepers. Participants entered the laboratory for a baseline sleep period, followed by a 48-h (PMW) or 72-h (YW) ultradian sleep-wake cycle procedure (USW) consisting of alternating wake and nap opportunities. Melatonin was assayed in saliva (~1/h). Sleep was polysomnographically recorded. EEG spectral analysis was performed on non-REM sleep of central derivations. Naps were classified as either day or night naps based on their occurrence during the habitual wake or sleep period, respectively. Circadian parameters were calculated and aligned to time elapsed into the USW. Linear mixed-effects models were used for between-group comparisons for the first 48 h of the USW. PMW presented a dampened rhythm of melatonin compared to YW ($p=0.050$). Significant circadian variations were observed on alpha, beta, and sigma activities [13-14 Hz; 15-16 Hz] in both groups ($p<0.001$). YW additionally showed circadian variations of delta and sigma [12-13 Hz] activities ($p\leq0.014$). Compared to YW, PMW presented dampened amplitude of sigma [13-14 Hz] ($p=0.001$); and lower mesor of delta, theta, and sigma [14-16 Hz] ($p\leq0.001$). During nighttime naps, PMW presented less power at frequencies 0.75-1.5 and 13-14 Hz corresponding to delta and sigma, respectively ($p\leq0.049$). Group differences were not observed during daytime naps. The dampened rhythms of melatonin, delta, and sigma power may contribute to the sleep disturbances commonly reported after menopause. Although causality cannot be determined, the lower sigma activity might be associated with the melatonin decline observed in PMW.

Self-reported sleepiness as a predictor of OSA treatment adherence 3-10 years after diagnosis

Bailes, Sally[2,3]; Baltzan, Marc[4,5,6,7]; **Huynh, Nelly[1]; Lavigne, Gilles[8]; Libman, Eva[9]; Rizzo, Dorrie[3]

Submission ID 76

[1]Faculty of Dentistry, Universite de Montreal, Montreal, Canada; [2]Centre Intégré Universitaire des Soins et Services Sociaux de l'ouest de l'île, Lady Davis Institute for Medical Research, Montréal, Québec, Canada; [3]Department of Psychiatry, McGill University, Montréal, Québec, Canada. [4]Faculty of Medicine, Department of Epidemiology Biostatistics and Occupational Health, McGill University, Montréal, Canada; [5]Centre Intégré Universitaire des Soins et Services Sociaux du Nord de L'île de Montréal, Montréal, Canada; [6]Mount Sinai Hospital, Centre Intégré Universitaire des Soins et Services Sociaux du Centre-ouest de L'île de Montréal, Montréal, Canada; [7]Institut de Médecine du Sommeil, Montréal, Canada; [8]Faculty of Dental Medicine at the Université de Montréal, Canada; [9]Jewish General Hospital

ABSTRACT Background: OSA is under-recognized in primary care settings and little is known about the long-term trajectory of OSA and treatment usage. The objective of the present study was to assess the 10-year prospective trajectory of OSA treatment in middle- to older-aged patients followed in a Canadian primary public healthcare setting. An additional goal was to develop a predictive model for estimating treatment outcome in patients with OSA. Methods: 94 patients were assessed for OSA in 2012 (Time 1) using polysomnography (PSG) and re-assessed 3 more times: 3 years later (Time 2), 8 years later (Time 3), and 10 years later (Time 4). 71 participants were diagnosed with OSA (Mean age=57.69, SD=11.14). All participants completed the Empirical Fatigue and Sleepiness Scale (EFSS) and Sleep Symptom Checklist (SSC). Participants with OSA were considered adherent CPAP if they reported using their treatment at least 4 hours per night, at least 80% of the time, in the 6 months preceding post-treatment testing. This was validated with periodic downloads of CPAP machine memory. A general linear model (GLM) univariate analysis was used. Results: Of the 71 diagnosed with OSA at Time 1 (Baseline), 26 (37%) adherent to treatment by Time 3. The linearly independent pairwise comparisons among the estimated marginal means for Sleepiness, Fatigue, and Insomnia revealed that sleepiness was positively associated with Adherence for Time 3 ($p = 0.005$) and Time 4 ($p < 0.001$). Symptoms related to insomnia or fatigue were not positively associated with adherence.

Conclusions: Sleepiness, compared with fatigue and insomnia, was found to be a better predictor of treatment adherence 10 years after initial diagnosis. This supports using sleepiness scales not only to recognize OSA, but also to identify predictors of CPAP adherence in clinical settings.

Sleep Characteristics and Cancer Incidence in the Canadian Population: Prospective Analysis of the Canadian Longitudinal Study on Aging (CLSA)

**Anagnostopoulos, Johnny[1,2]; Choi, Yun-Hee[1,2]; Stranges, Saverio[1,2]; Patel, Shreni[1,2]

[1]Western University, [2]Schulich School of Medicine and Dentistry

Submission ID 214

ABSTRACT Introduction: There is still much unknown about the complex relationship between sleep patterns and the risk of cancer. This study intends to investigate five sleep characteristics; duration, satisfaction, time required to fall asleep, difficulties staying and falling back asleep, and snoring. Using data from the Canadian Longitudinal Study on Aging (CLSA), our objective is to examine these factors and their prospective association with cancer incidence among aging adults in Canada. Methods: The CLSA is an ongoing prospective cohort study among individuals 45 years and older living in Canada. This study will analyze data from the 2015 baseline and the 2018 follow-up data. A sex-based multivariate analysis will be conducted to examine the differences in sleep characteristics, in addition to determining the association between sleep habits and the risk of cancer. The adjusted analysis will control for multiple confounders including, but not limited to; age, smoking, alcohol use, body mass index and socioeconomic status. This analysis will allow us to inspect the independent association between each sleep factor and cancer incidence. Results: Of the 30,097 CLSA participants with sleep data, 30,004 individuals had information on their cancer status. At baseline, there were 4,637 (15.45%) prevalent cases of cancer, and 22,671 (75.32%) participants were cancer-free and had cancer status data at follow-up. From these individuals, it was determined that 1,176 (5.19%) incident cancer cases arose, with a cumulative incidence of 5.19% over the course of the three-year period. Results from multivariate analyses will be available at the time of the conference. Conclusion: Large and in-depth prospective cohort studies, such as the CLSA, help provide an understanding of the potential role of sleep patterns in cancer risk in the aging Canadian population. We intend to uncover any sex-based differences in sleep patterns, which may lead to a disparity in the incidence of cancer.

SLEEP CORRELATES OF DIFFICULTIES WITH ATTENTION AND COGNITIVE FLEXIBILITY IN THE CONTEXT OF POST-TRAUMATIC STRESS DISORDER

Lanthier, Malika[1], Higginson, Caitlin[1], Richard-Malenfant, Claude[1,2], Leveille, Chloe[1,2], Porteous, Meggan[1,2], Kaminsky, Zachary[1], Shlik, Jakov[3], Robillard, Rébecca[1,2]

[1] The University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, ON, Canada
[2] School of Psychology, University of Ottawa, Ottawa, ON, Canada; [3] Operational Stress Injury Clinic, Royal Ottawa Mental Health Center, Ottawa, ON, Canada

Submission ID: 216

ABSTRACT Objective: Sleep abnormalities, like prolonged sleep onset latency, shallower sleep, and increased REM pressure, are a hallmark of Post-traumatic Stress Disorder (PTSD). While sleep problems can have clear impacts on cognitive performance, little is known about how they may contribute to cognitive difficulties affecting people with PTSD. The current study investigated associations between sleep architecture, attention and cognitive flexibility.

Method: Thirty-six trauma-exposed veterans underwent psychiatric interviews including the Clinically Administered PTSD scale. Two nights of polysomnography were recorded: the first one was used as an adaptation night, the second one was retained for final analysis. On the morning following the second night, participants completed the Trail Making Test A and B.
Results: Slower performance on the attentional component of the task (i.e. Trail Making Test A) correlated with longer sleep onset latency (r=.35, p=.037), higher amounts of NREM1 and NREM2 sleep (r>.35, p<.037), and tended to correlate with longer REM sleep latency (r=.32, p=.056). Non-significant trends were also fund between higher number of errors committed for the attentional component and longer sleep onset latency and higher amounts of NREM1 sleep (r=.30, p=.070). Slower performance on the cognitive flexibility component of the task (i.e. Trail Making Test B) tended to correlate with higher REM sleep latency (r=.33, p=.051) and lower sleep efficiency (r=-.31, p=.065).
Conclusions: These preliminary findings highlight that some of the abnormalities commonly seen in people with PTSD are associated with the severity of cognitive difficulties they face. Since sleep is known to actively contribute to the integrity of several cognitive functions, this stresses the relevance of assessing whether sleep restoration may help attenuate some of the disabling effects of PTSD on cognition.

Sleep Disorder and Incident Dementia in Traumatic Brain Injury: A Province-wide Sex-Stratified Retrospective Cohort study.

Mollayeva, Tatyana[1,2,3,]*, Hurst, Mackenzie[2]; Escobard, Michael[4]; Colantonio, Angela[1,2.3]

[1]Rehabilitation Sciences Institute, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada; [2]Toronto Rehab-University Health Network, Toronto, Ontario, Canada; [3]Acquired Brain Injury Research Lab, University of Toronto, Toronto, Ontario, Canada; [4]Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

Submission ID 157

ABSTRACT Background: We aimed to examine the association between the category of sleep disorder (SD) and incident dementia in persons with traumatic brain injury (TBI), emphasizing early-onset dementia. Methods: We analyzed a province-wide cohort of consecutive adults (≥ 18 years) admitted to the emergency department or acute care hospital with diagnoses of TBI between 2003 and 2013 who were free of dementia at baseline. The primary exposure was the presence of a SD, and the primary outcome was dementia, defined by the International Classification of Diseases. Associations were studied in sex-specific Cox Proportional Hazard models. Results: 712,708 individuals with TBI of all severities were included: median age, 44 years; 59% males; and 6,999 with SD at baseline, of which 59% were sleep-related breathing disorders and 36% were insomnia disorders. Over a median follow-up of 52 months (interquartile range, 19-86 months), 4.6% developed dementia, 2.8% of which were early-onset dementias. Controlling for confounders, SD was associated with a 25% increased hazard of developing dementia and 70 % of developing early-onset dementia compared with no SD (hazard ratio (HR) 1.25 [95% CI, 1.15-1.36] and HR 1.70 [95% CI, 1.23-2.36], respectively. When results were stratified by sex, SD was associated with a 26% increased hazard in male and 23% increased hazard in female participants (HR 1.26 [95% CI, 1.11-1.42] and HR 1.23 [95% CI, 1.09-1.40]). The association with early-onset dementia remained significant in males only: HR 1.93 [95% CI, 1.29-2.87]; in females: HR 1.38 [95% CI, 0.78-2.44], driven by a specific category of a SD. Sensitivity analyses utilizing Fine and Grey regression models confirmed robustness of the results. Conclusions: In a large TBI cohort free of dementia, the presence of a SD at injury date was

independently associated with incident dementia. Targeted SD strategies in patients at risk for dementia evolution are timely.

Sleep for Health in Hospital and Home

Mathieson, Mitchell[1]; Raja, Momina[1]; Smith, Isabel[1,2]; Corkum, Penny[1]; Thomas, Megan[2]

[1]Dalhousie University, [2]IWK Health Centre

Submission ID 172

ABSTRACT Title: Sleep for Health in Hospital and at Home (Shhh Study) Background: Research suggests that environmental, physiological, psychological, and institutional factors all influence opportunities for quality sleep for in-patients and their co-resident parents admitted to hospital. Improving sleep in hospital will provide higher quality of care and provides an opportunity for sleep education. Aim: To explore factors impacting sleep for children/youth and their accompanying guardian in hospital and at home. Methods: This was an observational, mixed methods exploratory study of child/parent dyads in a pediatric medical inpatient unit (PMU). The PMU contains all individual rooms, where one guardian is encouraged to stay with their child. Sound was noted as the greatest disrupter of sleep in this study. Sound data from the hospital room, and the child's bedroom at home for 48 hours will each be presented. Recordings from 3 parent/child dyads in hospital, and 4 parent/child dyads in hospital and at home were obtained. Factors associated with the COVID-19 pandemic impacted recruitment and retention. Results: Sound regularly exceeded the WHO standardized guidelines regarding appropriate sound levels in hospital, recommending average levels not exceed 35 dB and a maximum of 40 dB overnight. These levels were exceeded at home and in hospital. Averaged over the 24-hour period sound exceeded 48dB for 41.9% of the time within hospital and 33.4% at home. Sound exceeded 59dB 25.6% of the time within hospital but only 2.5% at home. Extreme sound levels >77 occurred for an average of 0.4% of the time in hospital and 0.2% of the time at home. Conclusions: Despite individual hospital rooms, sound was a major concern in hospital and was also above recommended levels within the home environment. By reducing sound and educating families and staff about sleep health we can improve sleep for families in hospital and at home.

Sleep medicine knowledge and patient care

**Ankalagi, Basavaraj[1]; Qureshi, Fahad[1,]; Pappu, Ameya[1,]; McConville, Sarah[2]; Bahrey, Lisa[1]; Nagappa, Mahesh[3]; Auckley, Dennis[4]; Singh, Mandeep[1]

[1]Women's College Hospital, and Toronto Western Hospital, University Health Network, University of Toronto, Ontario; [2]Department of Anesthesia, Oregon Health and Science University, Oregon; [3]St. Joseph Health Centre, University of Western Ontario, London, Ontario; [4]Metro Health, Case Western Reserve University, Cleveland, Ohio

Submission ID 44

ABSTRACT Sleep medicine knowledge is integral to patient care, with sleep disorders having a direct impact on clinical and patient-reported outcomes in the perioperative setting. Anesthesiologists often manage patients having pre-existing sleep disorders during the

perioperative period, and options for inclusion of sleep knowledge in anesthesiology curriculum as well as fellowship training in sleep medicine exist, yet unclear about the interest and barriers to this approach. North-American anesthesiology trainees, practicing anesthesiologists, and dual-credentialed physicians participated in this prospective need assessment survey. The survey received 342 responses (193 trainees, 141 practicing anesthesiologists, and 8 dual-trained physicians). 146 trainees responded from the USA, and 40 from Canada. More than a third of respondents (34.8%) expressed interest in sleep medicine fellowships. Motivating factors to training in sleep medicine included an opportunity to develop additional skills, to work in a multidisciplinary setting and facilitate longitudinal patient follow-ups, and better marketability for job opportunities (Fig 1A). Barriers to pursuing this interest included – a lack of awareness or information on sleep medicine training programs tailored to the anesthesiologist, a lack of opportunity to be able to practice anesthesiology during the training period, and financial concerns (Fig 1B). Mentorship, sleep knowledge resources, and information about publication opportunities and academic pursuits were identified as significant barriers to exploring interests All eight dual-credentialed physicians who responded to the survey had an academic/clinical interest in sleep medicine. The majority of them (75%) had the clinical experience of more than 15 years. We found that anesthesiology trainees reported interest in sleep medicine, with a third of the respondents willing to explore fellowship training. However, in order to support this interest, it is prudent for the academic anesthesiology departments, and sleep medicine training programs to incorporate sleep knowledge in the anesthesiology curriculum and provide information with regard to sleep medicine training programs.

Sleep Medicine Tweet-by-Tweet, an Electronic Platform for Collaborative Medical Education

Liu, Ran[1]; Thomas, Robert[2]; Heckman, Eric[2]; Mak, Michael[3,4,5]

[1] Division of Neurology and Sleep Medicine, Markham Stouffville Hospital; [2] Division of Pulmonology and Sleep Medicine, Beth Israel Deaconess Medical Center, Harvard University [3] Assistant Professor, Department of Psychiatry, Temerty Faculty of Medicine, University of Toronto; [4] Centre for Addiction and Mental Health, Toronto, Ontario; [5] Adjunct Research Professor, Department of Psychiatry, Schulich School of Medicine, Western University

Submission ID 190

ABSTRACT Twitter is a novel and accessible platform for the dissemination of medical education, and it is used by many medical practitioners (1). Many physicians have used Twitter as a means of meeting continuing medical education needs. This can manifest as Twitter-based Journal Clubs, curated conference data and webinars (2). I have created a Sleep Medicine Medical Education Twitter account @SleepyNeuroDoc to share complex cases in all areas of sleep medicine, including sleep-disordered breathing, movement disorders in sleep, circadian rhythm disorders and nocturnal epilepsy. I share notable images of polysomnogram outputs, home sleep apnea tests, compliance data, neuro-imaging, electroencephalogram, cardiopulmonary coupling and more. This digital education platform allows rapid circulation of unique cases and promotes in-depth scholarly discussion, with no geographical limit. Polls are conducted for complex topics to facilitate knowledge exchange and consumer engagement. This educational twitter is followed by the entire spectrum of professions within the sleep medicine care team, including physicians, allied health, and researchers. To date, there are 41 cases posted. We conducted online questionnaires with

consumers of this Twitter account, and the results so far indicate greater practitioner comfort with the management of various sleep medicine conditions. Some consumers report having changed their approach to practice. Our work suggests that this unique use of a social medical platform is beneficial for continuing medical education and knowledge exchange in the field of Sleep Medicine. References: 1. Chretien KC, Azar J, Kind T. Physicians on Twitter. JAMA. 2011;305(6):566-568. 2. Thamman R, Gulati M, Narang A, et al. Twitter-based learning for continuing medical education? Eur Heart J. 2020;41(46):4376-4379.

Sleep quality and cortisol level in aging

**Lorrain, Dominique[1,2], Bélisle, Denis[1,3], Viens, Isabelle[1]; Ledoux, Étienne[1]; Ouattara, Malick[1]

[1]Research Centre on Aging, University institute of geriatric of Sherbrooke, [2]Department of Psychology, University of Sherbrooke, [3]Department of Communication, University of Sherbrooke

Submission ID 161

ABSTRACT INTRODUCTION: Circadian rhythm changes occurring with age may deregulate cortisol secretion and impact sleep architecture. Cortisol level often heighten with age (Harman et al., 2001) and lead to higher nighttime levels (Buckley, 2010; Nater et al., 2013; Van Cauter, 1996). This could explain rarefying deep sleep et more frequent awakenings in elderly people. METHOD: Forty-four subjects (W=59.1%, M=40.9%) age over 60 years old (X=65,8 ⍰ 8,8) without sleep complaint (PSQI<5) had their sleep recorded for three nights. Sleep stages were scored according to Rechtschaffen and Kales and AASM criteria. Participants completed a sleep diary and continuously wore an actigraph for a week, including during the polysomnographic recordings. Salivary samples were collected at bedtime and immediately upon awakening in the morning of the third night for analysis of cortisol level. RESULTS: Objective sleep parameters from polysomnographic recordings of the third night revealed correlations between bedtime cortisol level and sleep efficiency (-0,409; $p < 0,01$). A correlation was also found between bedtime cortisol level and subjective sleep efficiency as computed from sleep diaries (-0,336; $p < 0,05$). There were no significant results with any actigraphic measurements. CONCLUSION: These results suggest that cortisol levels are a mediating factor in the regulation of sleep maintenance and deep sleep initiation, while circadian variations could contribute to an homeostasis where causes of stress and need of rest are interactively regulating.

Sleep spindle trains during daytime sleep are associated with improved declarative memory consolidation in healthy young adults

Mutreja, Vaishali[1,2]; Gupta, Prakriti[1,2]; Lungu, Ovidiu[1,3,4]; Sharp, Madeleine[5], Lazzouni, Latifa[1]; Boré, Arnaud[3], Vlieghe, Thibault[1]; Carrier, Julie[6]; Boutin, Arnaud[7]; Gabitov, Ella[1]; Doyon, Julien[1,3]

[1] McConnell Brain Imaging Centre and Department of Neurology and Neurosurgery, McGill University, Montreal, Canada; [2] Integrated Program in Neuroscience, McGill University, Montreal, Canada; [3] Centre de recherche de l'Institut Universitaire de Gériatrie de l'Université de Montréal; [4]Département de psychiatrie et addictologie, Université de Montréal; [5]Department of Neurology and Neurosurgery, McGill University, Montreal, Canada; [6]Department of Psychology, University of Montreal, Montreal, Canada. [7]Faculty of Sports Sciences, Université Paris-Saclay, France

Submission ID 21

ABSTRACT Memory consolidation refers to the process whereby freshly encoded memories are strengthened and retained over time. There is ample evidence indicating that sleep facilitates the consolidation of both procedural and declarative memories (DM). While memory traces are believed to be reactivated and reprocessed during non-rapid eye movement (NREM) sleep in synch with specific events, like slow waves and spindles, it is unclear whether similar mechanisms subserve consolidation of different memory types or not. We reported previously that procedural memory consolidation is related to spindles grouped in 'trains' (i.e., occurring less than 6 seconds apart). Here, we investigated whether the same holds for the consolidation of DM by demonstrating that: (1) a 90-minute nap improves DM consolidation and (2) sleep-related memory performance correlates with spindle train metric(s). Participants were assigned to either nap (N=23) or no-nap (N=15) groups and were required to perform an object spatial location task. Parametric and non-parametric tests compared group differences in memory performance and its association with spindle train metrics (mean number of spindles in trains) for the nap group only. From baseline pre-sleep performance, the no-nap group lost 4.63% after a 90-min wake period whereas the nap group performance remained stable [F (1,36)7.28, p = 0.01]. in the nap group, the memory performance correlated positively with the mean number of spindles in trains recorded on Pz during NREM2 sleep [r=.41, df = 21, p = 0.03] and with the local spindle density on Pz and Fz (p = 0.03 and p = 0.05 respectively). Our results indicate that a 90-minute nap improves declarative memory consolidation, and this improvement is associated with NREM2 spindle trains metrics.

Sleep Spindles in Adolescents with Major Depressive Disorder

Baena, D.[1,2]; Toor, B.[1,2]; Ray, L.B.[1]; Smith, D.[1,2]; Kong P.[1]; Lopez, J.[4,5]; Hoffmann, R.[4]; Bertram, H.[4]; Robillard, R.[1,2]; Armitage, R.[4] ; Fogel, S.M.[1,2,3]

[1] School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada; [2]Sleep Research Unit, The Royal's Institute of Mental Health Research, Ottawa, K1Z 7K4, Canada; [3]University of Ottawa Brain & Mind Research Institute, Ottawa, K1H 8M5, Canada; [4]Department of Psychiatry, University of Michigan, Michigan, 48109, USA; [5]Department of Clinical and Diagnostic Sciences, University of Alabama at Birmingham, Birmingham, 35294, USA

Submission ID 41

ABSTRACT Adolescents with major depressive disorder (MDD) have decreased sleep spindle activity compared to healthy adolescents. Given that spindles predominate non-rapid eye movement (NREM) sleep and that acutely delaying the sleep period via a "sleep delay challenge" (SDC) increases NREM sleep duration, it may be possible to increase spindle production in adolescents with MDD, which may provide a therapeutic benefit to depression symptoms via the sleep maintenance and protection function of spindles. Here, we examined the impact of a SDC on spindle production and depression symptomology in adolescents with MDD as compared to healthy controls. Adolescents with MDD (n = 66) and healthy controls (n= 62) were tested across three nights: adaptation, normal sleep, and a SDC night which delayed bedtime by three hours, but maintained normal total sleep duration. Spindles were automatically detected during NREM stage 2 sleep. Spindle characteristics of interest include density (# spindles/min), size (amplitude x duration), and oscillatory frequency (Hz). The results indicated that: (1) no difference in spindle production was observed between groups on the normal sleep night, (2) following the SDC, both males and females with MDD, but not controls, had a decrease in the frequency of slow spindles, while only females with MDD, not males with MDD or controls, had an increase in the frequency of fast spindles. In addition, (3) acute SDC reduced depression symptoms in both MDD and control groups. Following SDC, and regardless of sex or MDD diagnoses, an 8% improvement in depression symptomology was predicted by (4) light sleep on the normal sleep night, and, slow spindle frequency at SDC. Taken together, these results suggest that; (a) sleep spindles may be a useful biological marker of depression, and (b) that acute SDC may help alleviate depression symptoms in adolescents with MDD.

Sleep, Circadian, and Mood Improvements Associated with Light in Individuals with Mood Disorders

**Nixon, Ashley[1]; Strike, Melanie[2]; Foti, Michael-Christopher[3]; De Koninck, Joseph[1,4]; Douglass, Alan[1]; Higginson, Caitlin[1,2]; Leveille, Chloe[1,4]; Robillard, Rebecca[1,4]

[1]Sleep Research Unit, University of Ottawa Institute of Mental Health Research The Royal, 1145 Carling Avenue, Ottawa, Ontario, Canada, K1Z 7K4 ; [2] The Royal Ottawa Mental Health Centre, 1145 Carling Avenue, Ottawa, Ontario, Canada, K1Z 7K4 ; [3] École de Technologie Supérieure, Montréal; [4] School of Psychology, University of Ottawa

Submission ID 69

ABSTRACT Background: The various types of depression and different ways in which light can affect mood have blurred our understanding of the effects of light therapy for mood disorders. This study compares the effects of light therapy to a placebo while identifying potential sleep and circadian treatment predictors and mechanism of action. Methods: Twenty-seven individuals with mood disorders (mean +/- SD: 24 +/- 5.6; 11%male) underwent two weeks of an active light therapy and two weeks of a placebo condition in a cross-over design. Prior to the intervention, they underwent a semi-constant routine protocol and were instructed to use the light therapy glasses for one-hour after their habitual sleep offset thereafter. Self-reported and clinician-rated questionnaires on sleep and mood were completed pre- and post-intervention. Actigraphy and skin temperature were monitored continuously. Results: A significant main effect of time on depression symptoms was found (reduction in symptoms from pre- to post-intervention; $F(1,22)=12.6$, $p=.002$, $\eta p2=.36$). There was a trend for a Time*Condition interaction ($F(1,22)=4.2$, $p=.053$, $\eta p2=.16$) where improvements in depression symptoms were slightly greater in the active compared to the placebo condition. Short REM latency ($\beta=-.45$,$p=.047$) and worse global subjective sleep ($\beta=.53$,$p=.045$) prior to the intervention was associated with improved mood. The degree of improvements in pre-sleep intrusive thoughts ($\beta=.52$,$p=.035$) and skin temperature rhythmicity ($\beta=-1.07$, $p=.032$) during the intervention were significantly correlated with improvements in mood. Conclusions: Light therapy was found to yield mild antidepressant effects overall, but these effects were variable between subjects. Short REM latency and poor sleep may be possible predictors of treatment response. Findings suggested that the reduction of pre-sleep intrusive thoughts and the restoration of skin temperature rhythmicity may be involved in the underlying antidepressant effects of light. Larger studies are needed to better understand the heterogeneous response to light therapy.

Slow waves and sleep spindles: Physiological markers for age-related changes in brain structures supporting problem-solving skills

Toor, Balmeet[1,2]; van den Berg, Nicholas[3,2]; Pozzobon, Alyssa[3,4]; Ray, Laura[1,2]

[1]Univeristy of Ottawa, [2]Sleep Unit, The Royal's Institute of Mental Health Research, University of Ottawa, [3]University of Ottawa, [4]The Royal Institute of Mental Health Research, Sleep Unit

Submission ID 23

ABSTRACT As we age, the added benefit of sleep for memory consolidation is lost, or greatly reduced. One of the hallmark age-related changes in sleep is the reduction of spindles and slow

waves. Grey matter neurodegeneration is related to both age-related changes in memory, and age-related changes in sleep; including memory for problem solving skills. Here, we investigated whether spindles and slow waves might serve as biological markers for the age-related neurodegeneration of grey matter, and for the associated sleep-dependent memory consolidation deficits in older adults. Forty healthy young adults (20-35 years) and thirty healthy older adults (60-85 years), half in each age group were assigned to either nap or wake conditions. Participants were trained on the Tower of Hanoi in the AM, followed by either a 90-minute nap opportunity or period of wakefulness, and were retested afterward. A daytime nap enhanced memory for the ToH strategy in young as compared to all other groups, whereas memory for the ToH after a nap in older adults significantly reduced the benefit of sleep as compared to all other groups. In addition, age-related changes in spindles and slow waves were differentially related to GM density in young (i.e., more positive correlation) vs. older adults (i.e., more negative correlation) in brain regions that support sleep-dependent memory consolidation for problem-solving skills, and exhibited the same differential pattern of correlations. In general, spindles were related to grey matter in neocortical areas (e.g., somatosensory, prefrontal and parietal cortex), and slow waves were related to grey matter in the hippocampus, thalamus, putamen and caudate; all areas known to support problem solving skills. These results suggest that both sleep spindles and slow waves may serve as biological markers of age-related neurodegeneration of grey matter, and the associated memory consolidation deficits in older adults for novel problem-solving skills.

SMU and different dimensions of sleep health in adolescents

Lafontaine-Poissant, Florence[1,2]; Lang, Justin[2,3,4]; Roberts, Karen C.[2,3] ; Chaput, Jean-Philippe[5,6] ; Janssen, Ian[7,8]; Boniel-Nissim, Meyran[9]; Wong, Suzy[10]; McKinnon, Brittany[2]; Gariépy, Genevieve[1,3]

[1]School of Public Health, University of Montreal, Montreal, QC, Canada; [2]Public Health Agency of Canada, Montreal, QC, Canada; [3]Centre for Surveillance and Applied Research, Public Health Agency of Canada, Ottawa, ON, Canada; [4]School of Epidemiology and Public Health, Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada; [5]Healthy Active Living and Obesity Research Group, Children's Hospital of Eastern Ontario Research Institute, Ottawa, ON, Canada; [6]Department of Pediatrics, Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada [7]School of Kinesiology and Health Studies, Queen's University, Kingston, ON, Canada; [8]Department of Public Health Sciences, Queen's University, Kingston, Ontario, Canada [9]School of Social Sciences and Humanities, Kinneret Academic College on the Sea of Galilee, Zemach, Israel; [10]Centre for Health Promotion, Public Health Agency of Canada, Ottawa, ON, Canada

Submission ID 33

ABSTRACT Objectives Public health concerns over adolescent social media use (SMU) and its impact on health and functioning are growing. However, little is known about SMU and different dimensions of sleep health in adolescents. This study investigated the relationship between SMU and six sleep health indicators in Canadian adolescents. Methods We used data from the 2017-2018 Canadian Health Behaviour in School-aged Children (HBSC) study, which included a nationally representative sample of youth aged 11-16. SMU was categorized by intensity/frequency of use (non-active, active and intense) and the presence of addiction-like symptoms (problematic).We used mixed effects logistic regression models to identify associations between SMU and sleep health for each of six sleep health indicators (bedtime on school days, bedtime on weekends,

screen time before bed, insomnia symptoms, daytime wakefulness, sleep variability). Results Odds of having poor sleep health indicators were greater for intense and problematic SMU compared to active SMU, including having a later bedtime on school days (odds ratio (OR) 1.68 (95% CI: 1.45-1.96) and 2.75 (95% CI: 2.09 –3.63), respectively) and on weekends (OR 2.06 (95% CI: 1.79-2.37) and 2.98 (95% CI: 2.38 -3.72), respectively); use of screen time before bed (OR 2.08 (95% CI: 1.69-2.56) and 2.76 (95%CI: 1.82-4.19), respectively); insomnia symptoms (OR 1.08 (95% CI: 0.94-1.24) and 1.87 (95% CI: 1.47 -2.37), respectively); problems with daytime wakefulness (OR 1.16 (95% CI: 1.04-1.29) and 2.67 (95% CI: 2.13 -3.36), respectively); and greater sleep variability (OR 1.80 (95% CI: 1.58-2.06) and 2.19 (95% CI: 1.77 -2.70), respectively). Conclusion Intense and problematic SMU are associated with greater odds of poor sleep health among Canadian adolescents. Further research is needed to determine the mechanisms underlying the associations between SMU and sleep.

Solriamfetol Real World Experience Study: Initiation, Titration, Safety, Effectiveness, and Experience During Follow-Up for Patients with Narcolepsy from Germany

Winter, Yaroslav[1]; Mayer, Geert[2,3]; Kotterba, Sylvia[4]; Burghaus, Lothar[5]; Koch, Andreas[6]; Girfoglio, Daniela[6]; **Parks, Gregory[7]; Kallweit, Ulf[8]

[1]Mainz Comprehensive Epilepsy and Sleep Medicine Center, Department of Neurology, Johannes Gutenberg-University, [2]Hephata Klinik, [3]Philipps University Marburg, [4]Klinikum Leer gGmbH, [5]Department of Neurology, Heilig Geist-Hospital, [6]Jazz Pharmaceuticals, [7]Axsome Therapeutics (New York, NY, USA), [8]Center for Biomedical Education and Research, University Witten/Herdecke

Submission ID 154

ABSTRACT Background: Excessive daytime sleepiness (EDS) is a symptom of narcolepsy that may be managed with wake-promoting agents or sodium oxybate. Solriamfetol (Sunosi™) is a dopamine/norepinephrine reuptake inhibitor approved to treat EDS associated with narcolepsy (75–150 mg/day). Objective: This real-world study characterises dosing/titration strategies among European physicians initiating solriamfetol and patient outcomes following initiation. Methods: This is an ongoing retrospective chart review conducted by physicians in Germany, France, and Italy. Data are reported from 70 German patients with narcolepsy. Eligible patients (≥18 years, diagnosed with EDS due to narcolepsy, reached a stable solriamfetol dose, and completed ≥6 weeks of treatment) were classified into 3 groups based on solriamfetol initiation strategy: changeover (switched/switching from existing EDS medication[s]), add-on (added/adding to current EDS medication[s]), or new-to-therapy (no current/previous EDS medication). Results: Patients' mean±SD age was 36.9±13.9 years. 56% were female. 57% experienced cataplexy. Anxiety/depression was the most frequently reported comorbidity (36%). Changeover was the most common initiation strategy (61%), followed by add-on (27%), then new-to-therapy (11%). The most common starting doses of solriamfetol were 75 (69%) and 150 mg/day (20%). Solriamfetol was titrated in 29 patients (41%), mostly within 7 days. Mean±SD Epworth Sleepiness Scale (ESS) score was 17.6±3.1 (n=61) at initiation and 13.6±3.8 at follow-up (n=51), with a mean decrease of 4.3±2.9 points. Improvements in EDS after solriamfetol initiation were reported for most patients (patient-reported, 91%; physician-reported, 94%). Most patients (72%) reported no change in perceived night-time sleep quality. Common adverse effects were headache, decreased appetite, and insomnia. No cardiovascular events were reported. Conclusions: These real-world

data describe the use of solriamfetol in a cohort of German patients with narcolepsy. Solriamfetol was typically initiated at 75 mg/day; titration was common. ESS scores improved across subgroups; most patients and physicians perceived improvement in EDS. Common adverse events were consistent with those previously reported.

Spindle trains are associated with cognitive performance in patients with Parkinson's disease

Lahlou, Soraya[1,2]; Gagnon, Jean-Francois[3,4]; Carrier, Julie[3,5]; Sharp, Madeleine[1,2]

[1]Montreal Neurological Institute, [2]McGill University, [3]Center for Advanced Research in Sleep Medicine, [4]Université du Québec à Montréal, [5]University of Montreal

Submission ID 212

ABSTRACT Introduction: Sleep spindles have been associated with cognitive performance across the lifespan and across disease and might serve as a marker of cognitive state. In patients with Parkinson's disease (PD), reduction in sleep spindles' density has been associated with impaired cognition across multiple domains and with cognitive decline. Recently, trains of sleep spindles (i.e., occurrence of ≥ 2 spindles within 6 seconds) have been proposed to play a role in sleep-dependent memory consolidation. Whether spindle trains are reduced in PD patients compared to older adults, and whether they are associated with cognitive performance in this population remains unknown. Methods: PD patients (n=58, mean age=65.4) and a preliminary sample of healthy older adults (n=15, mean age=66.1) underwent a comprehensive neuropsychological assessment and overnight polysomnography. Five cognitive domains were assessed: attention, executive functions, learning and memory, visuospatial abilities, and language. Trains of spindles were detected on artefact-free epochs of N-REM 2 and 3, over frontal, central, parietal, and occipital derivations. We performed two-way ANOVAs (Group x Derivation) to compare spindle trains between groups, and Pearson's correlation between spindle train measures and composite scores for each cognitive domain. Results: In preliminary analyses comparing spindle trains between PD patients and controls, number of trains, mean size of trains and proportion of spindles in trains were significantly decreased in PD compared to controls. In patients, lower number of trains during N-REM 2 was associated with lower scores on composites of attention across all derivations, and executive function across central, parietal, and occipital derivations. Conclusion: These preliminary results suggest that the organization of spindles into trains differs in PD patients compared to older adults, with fewer trains and fewer spindles occurring as part of a train in PD. Our results also suggest that these differences are associated with poorer attention and executive functions in this population.

Sub-threshold Apnea Detection Using Automated PSG Scoring with AASM Scoring Rules

**Stewart, Matthew[1]; Higginson, Caitlin[2,3]; Robillard, Rebecca[3,4]; Green, James[1]; Goubran, Rafik[1]

[1]Department of Systems and Computer Engineering, Carleton University, Ottawa, K1S 5B6, Canada; [2]Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada; [3]Sleep Disorders Clinic, Royal Ottawa Mental Health Centre, Ottawa, K1Z 7K4, Canada; [4]School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada

Submission ID 202

ABSTRACT Introduction: Sleep apneas are defined by fixed criteria for duration and percentage of amplitude drop that may not capture the full scope of respiratory events that could affect cardiorespiratory functions. This study investigates the frequency and subsequent effects of respiratory events that fall short of meeting standard criteria based on the American Academy of Sleep Medicine (AASM) scoring guidelines. Methods: Ninety-seven patients with suspected sleep disorders underwent diagnostic polysomnography. We developed and applied an automated apnea scoring algorithm to oronasal thermal flow based on strict AASM criteria (90% decrease in airflow for at least 10 seconds). We then applied a similar algorithm repeatedly with relaxed duration criteria (starting at 9.5 sec minimum duration, to 7sec minimum, with each iteration decreasing by 0.5 sec) to the same signals to detect sub-threshold apneas. The 15 seconds following the start of these sub-threshold apnea events were searched for SpO2 decreases of at least 3%. Results: The standard AASM criteria detected 1,157 apneas in the 97 recordings. The 9.5 sec duration threshold detected an additional 60 apnea events, 80% of which were associated with SpO2 desaturation, with successive decrease in the duration criterion yielding new potential apneas detected. The shortest duration criterion (7 sec) detected an additional 464 apnea events, 77.6% of which were associated with SpO2 desaturation. Conclusions: By lowering the duration threshold for apnea scoring, we unveiled a considerable number of respiratory events that do not meet standard criteria for apneas, but still trigger a concerning decrease in blood oxygen saturation. Future studies scoring apneas by a pattern recognition method, as opposed to using the application of fixed and rigid logical rules, may enable the detection additional respiratory events that are physiologically relevant.

Subjective sleep depth and dream experiences across sleep stages and time of night

Picard-Deland, Claudia[1]; Konkoly, Karen[2]; Pigeon, Wilfred R.[3]; Carr, Michelle[3]

[1]Department of Neuroscience, University of Montreal, Montreal, Quebec, Canada
[2]Department of Psychology, Northwestern University, Evanston, IL, United States
[3]Department of Psychiatry, University of Rochester Medical Center, Rochester, NY, United States

Submission ID 48

ABSTRACT This study aimed to elucidate how the feeling of being deeply asleep varies by sleep stages and time of night and how it relates to dream experiences. Twenty good sleepers (11 F; 24.1 ± 5.7 years) spent a night in the laboratory and were awakened approximately 12 times, spread across early, middle, and late periods of sleep, while covering all stages of sleep (N1, N2, N3, REM). After each awakening, participants were asked to report their mental experience,

whether they felt they had been asleep or awake prior to being called, how deeply asleep they felt, and how immersed and physically present they felt in their mental experience. We found that participants felt awake most often from N1 sleep (54.7%), followed by N3 (23.1%), N2 (12.9%), and rarely from REM sleep (1.7%). Instances of feeling awake while asleep were also more frequent in early N1 sleep (80.0%) than late-night N1 sleep (31.3%). When participants did feel asleep, they rated their sleep as being deeper in early REM sleep compared to early N1 or N3 sleep; and deeper in late-night N1 and N3 sleep compared to early N1 and N3 sleep. In all stages of sleep, subjective sleep depth was strongly correlated with how immersive the dream experience was. The findings replicate previous studies (e.g., Stephan et al., 2021) showing that sleep is perceived as deeper in the presence of richer and more perceptual dreams, which are more common in REM sleep or late-night sleep, contrasting the conception of N3 sleep as the 'deepest' stage of sleep. Further clarifying the temporal course of subjective sleep depth across the night and its relationship with dreaming could inform underlying mechanisms and treatments for sleep disorders, such as paradoxical insomnia and epic dreaming, where conscious experiences may contribute to the feeling of restless sleep.

Suicidal thoughts & behaviors and sleep in adolescents attending psychiatric clinics: a pilot study.

**Chicoine, Marjolaine [1], Richard-Lesage, Justine[1], Godbout, Roger[1,2]

[1]Sleep Laboratory and Clinic, Rivière-des-Prairies Mental Health Hospital, Montréal, Qc Canada
[2]Department of Psychiatry, Université de Montréal, Montréal, Qc Canada

Submission ID 50

ABSTRACT Adolescents are prone to suicidal thoughts or attempts, together with sleep disorders such as insomnia and circadian rhythms. The main objective of this study was to examine the relationship between suicidal thoughts & behaviors and subjective sleep in adolescents attending a pedopsychiatric clinic. Our sample comes from the databank of a pedopsychiatric public hospital. Ninety-two adolescents (29 boys, 63 girls; 14.14 ± 0.87 years old, range: 12-15) were administered the Schedule for Affective Disorder and Schizophrenia for school-age children – Present and Lifetime (K-SADS-PL). The selected items are scored on a four-point scale: 0/1 = no information or symptom not present, and 2/3 = sub-threshold/threshold presentation of symptoms. We extracted items related to a) recurring thoughts of death and suicidal thoughts or attempts, and b) sleep: insomnia, circadian cycle inversion, non-restorative sleep, hypersomnia, and fatigue/lack of energy/tiredness. Correlation analyses evaluated the relationship between clinically relevant items (i.e., score ≥ 2). Items that scored as clinically relevant were: "Recurrent Thoughts of Death (past, present)", "Suicidal Ideation (present)", "Non-Restorative Sleep", and "Fatigue, Lack of Energy and Tiredness". Non-Restorative Sleep was positively correlated with "Recurrent Thoughts of Death", in the past and presently (both r = 0.223, p = .033) as well as with "Suicidal Ideation, presently" (r = 0.297, p = 0.004), which was not the case for "Fatigue, Lack of Energy and Tiredness". The present results suggest a common thread between suicidal thoughts & behaviors and sleep in adolescents treated in pedopsychiatric clinics. Other variables may modulate this association, including alcohol and drug abuse. Specific psychiatric diagnoses may also lead to specific suicidal thoughts & behaviors and sleep and risk factors. Still, the present results suggest that follow-ups on sleep should be regularly performed in pedopsychiatric clinics.

Tailoring Insomnia Treatment for Cancer Survivors: Results of a Needs Assessment for an Evidence-Based Smartphone Intervention (iCANSleep)

Kutana, Samlau[1,3]; Garland, Sheila N.[1,2,3]

[1] Department of Psychology, Memorial University, Newfoundland and Labrador; [2] Discipline of Oncology, Memorial University, Newfoundland and Labrador; [3] Beatrice Hunter Cancer Research Institute, Nova Scotia

Submission ID 79

ABSTRACT Purpose: Cancer patients with insomnia require tailored healthcare interventions to meet their unique needs. iCANSleep is a proposed intervention aimed at providing evidence-based insomnia treatment via a smartphone app. Here we present preliminary findings from a series of needs assessment interviews conducted remotely with cancer survivors who report insomnia to determine the needs and preferences of this patient group for insomnia treatment. Methods: 22 cancer survivors from 5 Canadian provinces completed an online survey and participated in a needs assessment interview. Surveys were analyzed using descriptive statistics, while interviews were transcribed and analyzed using thematic analysis. Results: 81.8% (18/22) of cancer survivors report that their insomnia started or was exacerbated during the time of their cancer diagnosis and treatment. Of the participants who discussed insomnia with a medical provider, hypnotic medications were prescribed in 64.3% (9/14) of cases. Participants reported strong familiarity with smartphone technology, had past experience using apps for health management, and found an insomnia treatment app highly acceptable. Participant-identified advantages of mobile delivery included ease of access, lack of cost, and anonymity. Smartphone ownership, cumbersome user interface, and limited access to internet were raised as potential challenges of implementation. Conclusion: Mobile apps hold promise as an avenue for the effective delivery of insomnia treatment; however, treatments must be evidence-based, and apps must be designed for maximum ease of use. Findings from this study provide novel insight into how to best promote uptake and sustained use of mobile health interventions in cancer survivors and will be used to create iCANSLEEP.

THE DISSOCIATIVE SUBTYPE OF PTSD IS LINKED TO WORSE RUMINATION, HIGHER PRE-SLEEP AROUSAL, AND MORE FREQUENT NIGHTMARES

Richard-Malenfant, Claude[1,2], Lanthier, Malika[1], Leveille, Chloe[1,2], Higginson, Caitlin[1], Porteous, Meggan[1,2], Kaminsky, Zachary[1], Shlik, Jakov[3], Robillard, Rebecca[1,2]

[1]The University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, ON, Canada [2]School of Psychology, University of Ottawa, Ottawa, ON, Canada; [3]Operational Stress Injury Clinic, Royal Ottawa Mental Health Center, Ottawa, ON, Canada

Submission ID 184

ABSTRACT Objective: The latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM–5) introduced a new PTSD dissociative subtype. This dissociative subtype is estimated to affect 15-30% of PTSD cases and is characterized by two main factors: depersonalization (the impression of being disconnected from one's sense of self) and

derealisation (altered sense of the external world). Previous reports suggest that individuals with the dissociative subtype have worse sleep problems. However, the psychological factors that may be associated with these adverse sleep profiles remain vastly unexplored. Method: Thirty-six trauma-exposed veterans underwent psychiatric interviews including and the Clinically Administered PTSD scale. Of those, 13 were met DSM-5 criteria for the dissociative subtype. All participants completed the Ruminative Response Scale and the Pre-Sleep Arousal Scale. Results: Compared to trauma-exposed Veterans without the dissociative subtype, those with PTSD and the dissociative subtype presented with higher levels of ruminations ($t(34) = 2.1$, $p = 0.04$) and pre-sleep arousal ($t(34) = 2.2$, $p = 0.012$). Compared to the rest of the sample, the dissociative subgroup also counted a higher proportion of people who experienced nightmares at least three times a week (chi-squared (4) = 9.2, p= 0.05). Conclusions: These preliminary findings suggest that ruminative processes and pre-sleep arousal may represent modifiable factors that could contribute to adverse sleep and more frequent nightmares often experienced by people with the dissociative subtype of PTSD. This calls for studies assessing whether interventions targeting pre-sleep cognitions may help improve sleep in this subgroup.

The effect of high-intensity interval training prior to acute sleep restriction on vigilance, hippocampal function, and sleep physiology

Gibala, Connor[1]; Heisz, Jennifer[1]

[1]McMaster University

Submission ID 84

ABSTRACT A litany of deleterious effects occurs due to sleep restriction, including attentional problems, memory deficits, and reduction of positive mood. Although effective interventions such as cognitive behavioural therapy for insomnia (CBT-I) exist to improve these deficits in those who chronically lack sleep, these interventions require significant dedication on an individual level and can require months of trial and error before sleep length and quality have noticeably improved. Exercise (in particular, high-intensity interval training, or HIIT) is known to improve sleep quality and many factors that sleep restriction affects. Therefore, the current study will examine how a single HIIT session prior to sleep restriction will affect an individual's cognitive processes and mood. The planned study is a within-subjects acute sleep restriction with exercise and control conditions. Participants will be sleep restricted to 4 hours a night; in the exercise condition, participants will engage in a 10-minute HIIT session on a cycle ergometer prior to the night of restricted sleep. Attentional capacity, hippocampal function, and mood will be measured pre- and post-sleep restriction. To measure sleep physiology, participants will a device called the Muse-S, a commercially available dry EEG device while sleeping in their own homes. Due to past research on the impact of exercise (and specifically HIIT) on cognition and mood, we expect exercise to dampen or negate the effects of sleep restriction on these outcome measures (data collection is expected to be complete by June 2023). The results of this study will inform whether acute HIIT-style exercise can be used to improve cognition and mood in sleep-restricted individuals.

The effect of obstructive sleep apnea on cognitive functioning among Parkinson's disease individuals: Evidence from the Canadian Longitudinal Study on Aging (CLSA).

Gomes, Teresa[1,2]

[1]Department of Integrated Program in Neuroscience, McGill University, Montreal, Quebec, Canada, [2]Translational Research in Respiratory Diseases, Research Institute of the McGill University Health Centre, Montreal, Quebec, Canada

Submission ID 121

ABSTRACT Introduction: Obstructive sleep apnea (OSA) is associated with cognitive decline in the general older population and with lower cognition in PD patients in clinical cohorts. We aimed to evaluate associations between high risk for OSA and cognition in individuals with Parkinson's disease (PD) from a population cohort. Methodology: Participants with PD were identified in Canadian Longitudinal Study of Aging (CLSA) comprehensive cohort at baseline or at 3-year follow-up using a validated algorithm. High risk of OSA was determined using the STOP-B28 (Loud Snoring, Tiredness/Sleepiness, Observed apneas, high blood Pressure¬ and Body Mass Index [BMI]≥28) >2. Cognitive measures included: Rey Auditory Verbal Learning Test; Animal Fluency Test, Mental Alternation Test; Controlled Oral Word Association Test, Stroop Test, Prospective Memory Test, and Choice reaction times task. Linear regression was performed to assess relationships between STOP-B28 dichotomized or continuous scores and cognitive measures, adjusted for age, sex, BMI, income, education, diabetes, hypertension, head trauma and depression. Results: We identified 89 individuals with PD at baseline and 61 additional patients at the 3-yr follow-up. Overall, 76 had a high risk of OSA (mean age 70.9 (9.0) years, 69.7% male, BMI 29.5 (4.5) kg/m2, income 56.6K (33.6), education 13.9 (2.2) years) and 73 did not (mean age 69.1 (8.9) years, 63.0% male, BMI 25.0 (3.0) kg/m2, income 58.6K (36.3), education 13.4 (2.4) years). There was no significant association between STOP-B28 >2 and cognitive measures. Higher STOP-B28 scores were associated with longer time to answer on the STROOP-word in adjusted analyses (p=0.03). Discussion: No association emerged between STOP-B28 >2 and cognitive measures in individuals with PD in the CLSA. Higher STOP-B28 scores were associated with poorer results on an executive function test. Longitudinal assessment within the CLSA may provide additional insights into the potential impact of OSA on the evolution of cognitive function in PD.

The effect of stimulating slow oscillations and sleep spindles with sound on declarative, procedural and complex tasks performance

Jourde, Hugo R.[1], Sita, Katerina Z.[1], Eyqvelle, Zseyvfin[1], Brooks, Mary[1], and Coffey, Emily B. J.[1]

[1]Concordia University, Montreal, Quebec

Submission ID 176

ABSTRACT Slow oscillations (SOs) and sleep spindles are involved in memory consolidation processes. They can be enhanced by Closed-Loop Auditory Stimulation (CLAS) of SO up-states (Ngo et al., 2019). However, CLAS of spindle up-states is more technically challenging due to spindles' short duration and high frequency. We developed a device, the Portiloop, capable of real-time detection and stimulation of endogenous sleep spindles (Valenchon et al, 2022). The current study

implements CLAS of sleep spindles in humans to test whether stimulating spindles offers complementary benefits to SO stimulation on memory performance. Eighty healthy, neurotypical young adults (18-40) are assigned to 4 conditions: SO stimulation, spindle stimulation, no stimulation, and wake. During a 2-hour interval, EEG activity is monitored and participants sleep and are stimulated with sound as per their respective conditions. Participants learn and are tested pre- and post-sleep on three randomly ordered cognitive tasks assessing declarative (Grid-Location Task), procedural (Motor Sequence Learning), and complex auditory-motor memory (piano-learning). The piano learning task is used as a more ecologically-valid measure of integrated declarative and procedural memory. We hope to replicate sleep-dependent improvement in performance, and will compare the nature and effectiveness of stimulating SOs vs. spindles on different types of memory. Our findings aim to advance the field of Closed-Loop Auditory Stimulation of brain events, and improve their effectiveness and specificity, towards potential interventions.

The effectiveness of stimulus control in cognitive-behavioural therapy for insomnia in adults: a systematic review and network meta-analysis

Vallières, Annie[1]; Demers Verreault, Mikael[1]; Granger, Élyse[1]; Pizzamiglio Delage, Julia[1]; Neveu, Xavier[1]; Bastien, Célyne[1]

[1]Université Laval

Submission ID 25

ABSTRACT Background: Stimulus control (SCT) is one of the components of the cognitive behavioural therapy for insomnia (CBT-I). There is a lack of knowledge about its effectiveness and mechanism. The network meta-analysis and systematic review evaluate SCT efficacy when used alone compared to CBT-I or other components included in CBT-I. The review documents SCT mechanisms of actions proposed by authors. Method: A literature search was conducted in several bibliographic databases and two registers from their inception to June 6th, 2022. Complementary research was conducted in websites and by citation searching. To be included, papers needed to 1) have participants aged of 18 and over with a diagnosis of insomnia; 2) provide an intervention including at least one SCT instruction with no other concurrent intervention except sleep hygiene; 3) include a comparison group of a variant of the SCT or another intervention and/or a control group; 4) assess the efficacy of SCT; 5) present a randomized group design or a non-inferiority trial. Risk of bias was assessed with the Quality Assessment of Controlled Intervention Studies. The meta-analysis is registered in Prospero (#CRD42021166959). Results: A total of 23 studies were included. Results indicate that SCT is an effective intervention when used alone compared to any control condition to improve insomnia. However, SCT is not more effective than any other psychological intervention tested. Conclusion: SCT alone is effective for treating insomnia. Interventions that do not use instructions to recondition the bedroom to sleep stimuli or that use counter-control instructions are as effective as SCT. Therefore, instructions such as "getting out of bed" and "keep the bed for sleep and sex" are not that effective. Results should be interpreted with caution given the small number of studies included, bias risk in most of the studies, and the presence of incoherence in the network meta-analysis.

The home sleep apnea testing literature over the past 21 years: a bibliometric analysis

**Lee, Melissa[3]; Chen, Tanya[1]; Constantin, Evelyn[2]; Nguyen, Lily[2]; Gurberg, Joshua[2]

[1]University of Toronto; [2]McGill University; [3]UBC

Submission ID 149

ABSTRACT Background. Home sleep apnea tests (HSAT) have emerged as alternative methods to diagnose obstructive sleep apnea (OSA). A bibliometric analysis was conducted to characterize trends in publications on Levels 3 and 4 HSATs over a 21-year period, which included publication journal, author characteristics, multi-authorship, study type, country of origin, level of evidence (LOE), and HSAT Levels studied. Methods. The Medline, Web of Science and Embase databases were searched for publications between January 2000 to December 2021 whose primary objective was the evaluation of a Level 3 or 4 HSAT in the diagnosis of OSA in either children or adults. Analysis was carried out with linear regression to estimate the annual rates and Cochrane-Armitrage trend tests. Results. Literature search yielded 4257 articles with 400 articles included in the final analysis. The top four publication journals were respiratory and sleep-related, followed by a technology/engineering journal. There was an increase in publication output over time with a growth rate of 0.12% per year ($p < 0.045$), alongside an increase in LOE (OR 3.6, 95% CI 0.4 to 29.4). The United States had the most publications (35.5%). The number of authors with a medical degree, number of institutions, and number of departments increased annually at rates of 0.13% ($p < 0.042$), 1.08 ($p < 0.046$), and 1.82 ($p < 0.039$), respectively. From 2016 to 2021, 60% of articles published were diagnostic cohort studies and 12.3% of studies were feasibility or engineering studies. Conclusion. Home sleep apnea testing is a growing field, which is associated with an increasing rate of research productivity over time, as well as increases in multi-authorship, multi-disciplinary and multi-institutional collaboration. Over the past 21 years, there has been a natural evolution in the HSAT field from early laboratory-based studies to now testing this technology in patient populations. Exciting times lie ahead.

THE IMPACT OF SLEEP DISTURBANCE ON PHYSICAL HEALTH IN A SEVERE ASTHMATIC PEDIATRIC POPULATION

Moraes, Theo[1,2,3]; Subbarao, Padmaja[1,2,3]; Brook, Jeff[3]; To, Teresa[3]

[1]Translational Medicine, Research Institute, Hospital for Sick Children, Toronto, [2]Division of Respiratory Medicine, Hospital for Sick Children, Toronto, [3]University of Toronto, Toronto

Submission ID 142

ABSTRACT Introduction: Children with severe asthma experience significant daytime symptoms that impact academic performance resulting in lowered quality of life and increased hospitalizations. Regular physical activity (PA) participation is an important part of their management yet children with asthma display greater inactivity levels. The aim of this study is to evaluate the frequency and intensity of PA, sleep quality and disturbance, and daytime sleepiness in children with severe asthma compared to healthy controls. Methods: This was a prospective study consisting of two age-sex matched groups: a severe asthma and healthy control group. Subjects were given an ActiGraph wGT3X-BT device to be worn for 7 consecutive days and nights

using a 24 hour-a-day protocol. This device objectively measures wake/sleep cycles and PA measures. The Epworth Sleepiness Scale (ESS) was used as a self-reported measure of daytime sleepiness and the Child Sleep Habits Questionnaire (CSHQ) a self-reported measure of sleep quality and disturbances. Results: A total of 78 children were recruited: 39 children with severe asthma and 39 age-sex matched healthy controls. The mean (±SD) age of those with severe asthma and healthy controls was 8.5±1.2 and 8.5±0.9 years, respectively with 26/39 (66.7%) male participants in both groups. No significant differences were found in total ESS daytime sleepiness scores (p=0.08), total CSHQ sleep disturbance scores (p=0.07), sleep efficiency (p=0.42), time spent in weekly light PA (p=0.67), and time spent in weekly moderate-to-vigorous PA (p=0.42) between groups. However, children with severe asthma were more sedentary compared to controls (482.8±59.3 minutes vs. 441.6±66.1 minutes; p=0.067) over the same 7 day period. Conclusion: Participants with severe asthma maintained PA levels similar to controls although increased sedentary behaviours were observed with no changes in sleep quality. Further research in larger sample sizes is needed to better understand the impact of PA participation in children with severe asthma.

The Impact of Sleep Restriction on Cognition in Healthy Adolescents: Results from A Pilot Crossover Trial

Chan, Amy[1,3], Reyna-Vargas, Myrtha E.[1], Robertson, Amanda[1], Walker, Kirstin[1], Westmacott, Robyn[3,4], Shroff, Manohar[3,5], Dlamini, Nomazulu[1,3,4], Narang, Indra[1,2,3]

[1]Translational Medicine, Research Institute, Hospital for Sick Children; [2]Division of Respiratory Medicine, Hospital for Sick Children, Toronto; [3]University of Toronto, Toronto; [4]Division of Neurology, Hospital for Sick Children, Toronto; [5]Department of Diagnostic Imaging, Hospital for Sick Children, Toronto

Submission ID 125

ABSTRACT Sleep restriction (SR) is defined as a sleep duration below the basal need of an individual. Despite clinical recommendations of 8 to 10 hours of sleep per night, almost 70% of adolescents sleep less than 8 hours per school night. Previous cross-sectional studies in adults have linked SR to impaired attention, executive function, memory and learning that leads to poor academic performance. The purpose of this study was to investigate whether experimental SR, relative to longer sleep (LS), is associated with poorer cognitive outcomes in healthy adolescents. This was a randomized counter-balanced crossover study. Healthy adolescents age 15- to 18-years old underwent a 2-week at-home sleep manipulation protocol, including 2-nights of baseline sleep, 5-nights of LS (9 hours of sleep opportunity), minimum 2-nights of washout period, and 5-nights of experimental SR (maximum 6 hours in bed). Sleep duration was evaluated using a validated accelerometer across multiple nights. Participants were assessed using the NIH-Toolbox, a computerized neuropsychological assessment for fluid cognitive abilities. Twenty-eight adolescents without history of neurological, psychiatric or sleep disorder were included in this study (mean age 16.9+0.71 years, 33% male). The mean sleep duration was 5.38+0.60 hours for the SR condition, and 7.10+0.73 hours for the LS condition in this sample. In the SR state compared to LS state, participants demonstrated lower fluid cognition ($p<0.01$) and total cognition ($p<0.01$). Specifically in the models, participants had significantly poorer cognitive flexibility ($p=0.03$), visual processing speed ($p<0.001$) and attention ($p=0.01$). No significant differences were

seen on assessments of working memory (p=0.14), or episodic memory (p=0.27). Sleeping less than 6 hours per night was associated with poorer cognition, specifically to executive function, processing speed and attention. There is an urgent need for effective interventions to reduce sleep loss in adolescence to minimize long-term impact on cognition and learning in healthy adolescents.

The Impact of Sleep Restriction on Endothelial Function in Healthy Adolescents: Preliminary Results from a Pilot Crossover Trial

Chan, Amy[1]; Reyna-Vargas, Myrtha[1]; Robertson, Amanda[1]; Walker, Kirstin[1]; Westmacott, Robyn[1]; Schroff, Manohar[1]; Dlamini, Nomazulu[1]

[1]The Hospital for Sick Children

Submission ID 124

ABSTRACT Sleep restriction (SR), defined as a sleep duration below the basal need of an individual, adversely impacts cognition and academic performance. Despite clinical recommendations of 8 to 10 hours of sleep each night, almost 70% of adolescents sleep less than 8 hours per school night. Importantly, SR is associated with increased sympathetic activity, oxidative stress and inflammation leading to vascular endothelial dysfunction (VED). Previous research has demonstrated the role of cerebral VED in modulating cognitive deficits. Novel non-invasive measures of cerebrovascular reactivity (CVR), provide an indirect imaging biomarker of endothelial function. The purpose of this study was to investigate whether experimental SR relative to longer sleep (LS) is associated with VED, as measured by CVR in healthy adolescents. This was a randomized counter-balanced crossover study. Adolescents age 15- to 18- years old underwent a 2-week at-home sleep manipulation protocol, including 2-nights of baseline sleep, 5-nights of LS (9 hours of sleep opportunity), minimum 2-nights of washout period, and 5-nights of experimental SR (maximum 6 hours in bed). At the end of each sleep condition, participants had a BOLD MRI study with controlled CO2 challenge to assess mean CVR. Sixteen healthy, neurotypical participants (mean age 16.4+0.8 years, 31% male) were included in this study. The mean sleep duration was 5.33+0.60 hours for the SR condition, and 7.29+0.64 hours for the LS condition. Participants demonstrated reduced CVR in the occipital cortex (p=0.02) with SR compared with LS. The temporal occipital fusiform cortex (p=0.02), inferior lateral occipital cortex (p=0.04), and accumbens (p=0.01) demonstrated reduced CVR with SR compared with LS. SR was associated with reduced regional CVR, and may be the underpinning mechanism for adverse cognitive outcomes in healthy sleep-restricted adolescents. VED is a modifiable risk factor for disease and can be improved with a healthy lifestyle of adequate sleep, exercise and diet.

The long-term impacts of cancer treatment on sleep quality, mental health, and fatigue in breast cancer survivors

**Bradley-Garcia, Meenakshie[1]; Robillard, Rebecca[1,2]; Tanguay, Annick[1]; Archibald, Jane[1]; Sekeres, Melanie[1]

[1]School of Psychology, University of Ottawa, [2]University of Ottawa Institute of Mental Health Research at the Royal

Submission ID 209

ABSTRACT Introduction: Breast cancer is the most prevalent cancer diagnosis worldwide, accounting for 1 in 4 diagnoses in women. Numerous cancer treatments, particularly chemotherapy, have been found to reduce sleep quality in up to 70% of cases and persist for up to 5 years post-treatment. These sleep disturbances are frequently associated with increased fatigue and symptoms of depression. This study examines the long-term impact of chemotherapy and other cancer-related treatments on sleep quality, fatigue, anxiety, depression, and stress in women treated for breast cancer. Few studies have examined the association between sleep quality, fatigue, and several indices of HE, limiting the comprehension of how these factors are inter-related following cancer treatments. Methodology: We recruited women aged 30 to 65 years old with a history of breast cancer that completed chemotherapy (at least 6 months prior to participation) and other cancer-related treatments (n = 22). Participants completed online questionnaires assessing subjective levels of anxiety (State-Trait Anxiety Inventory), depression (Center for Epidemiologic Studies Depression Scale Revised), stress (Perceived Stress Scale), fatigue (Fatigue Severity Scale), and sleep quality (Pittsburgh Sleep Quality Index). Results: Preliminary findings show significant correlations between poorer sleep quality and elevated stress [r(20) = .55, p = .008], state anxiety [r(20) = .45, p = .033], trait anxiety [r(20) = .47, p = .025], depression [r(20) = .61, p = .002], and fatigue [r(20) = .6, p = .003] in breast cancer survivors post-chemotherapy. Conclusion: These findings suggest that breast cancer survivors experience sleep difficulties in conjunction with indices of adverse mental health and fatigue following cancer treatments including chemotherapy. Understanding the relation between sleep quality and anxiety, depression, stress, and fatigue highlights the importance of sleep as a potential therapeutic target to mitigate mental health concerns and fatigue in breast cancer survivors following chemotherapy and cancer-related treatments.

The neurophysiology of closed-loop auditory stimulation in sleep: a MEG study

Jourde, Hugo R.[1]; Merlo, Raphaëlle[1], Brooks, Mary[1]; Rowe, Meredith[2] and Coffey, Emily B. J.[1,2]

[1]Concordia University, Montreal, Quebec; [2]McGill University, Montreal, Quebec

Submission ID 159

ABSTRACT Closed-loop auditory stimulation (CLAS) is a brain modulation technique in which sounds are timed to enhance or disrupt endogenous neurophysiological events. CLAS of slow oscillation up-states in sleep is becoming a popular tool to study and potentially enhance sleep's functions, as it can increase slow oscillations, evoke sleep spindles, and enhance memory consolidation of certain tasks. However, few studies have examined the specific

neurophysiological mechanisms involved in CLAS, in part because of practical limitations to commonly used tools. To evaluate evidence for possible models of how sound stimulation during brain up-states might generate slow oscillations, we simultaneously recorded electro- and magnetoencephalography in six healthy young participants who received auditory stimulation across sleep stages. The results suggest that auditory information reaches ventral frontal lobe areas via non-lemniscal pathways. From there, a slow oscillation is created and propagated. We demonstrate that while the state of excitability of tissue in auditory cortex and frontal ventral regions shows some synchrony with the EEG-recorded up-states that are commonly used for CLAS, it is the state of ventral frontal regions that is most critical for slow oscillation generation. Our findings advance models of how CLAS leads to enhancement of slow oscillations, sleep spindles, and associated cognitive benefits, and offer insight into how the effectiveness of brain stimulation techniques can be improved.

The prevalence and risk factors of sleep disturbances in surgical patients: a systematic review and meta-analysis

**Butris, Nina[1,2]; Tang, Evan [1,2]; Pivetta, Bianca[1,3]; He, David[4]; Saripella, Aparna[1]; Yan, Ellene[1,2]; Englesakis, Marina[5]; Boulos, Mark[6,7]; Nagappa, Mahesh[8]; Chung, Frances[1,2]

[1]Department of Anesthesia and Pain Management, Toronto Western Hospital, University Health Network, University of Toronto, ON, Canada, [2]Temerty Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada, [3]Faculty of Medicine, University of Ottawa, ON, Canada, [4]Department of Anesthesia and Pain Management, Mount Sinai Hospital, University Health Network, University of Toronto, ON, Canada., [5]Library & Information Services, University Health Network, ON, Canada, [6]Division of Neurology, Department of Medicine, University of Toronto, ON, Canada, [7]Hurvitz Brain Sciences Research Program, Sunnybrook Health Sciences Centre, ON, Canada, [8]Department of Anesthesia & Perioperative Medicine, London Health Sciences Centre and St. Joseph Healthcare, Schulich School of Medicine and Dentistry, Western University, London, ON, Canada

Submission ID 182

ABSTRACT Determining the prevalence and risk factors associated with sleep disturbance in surgical patients is beneficial for risk stratification and preventative interventions. This systematic review and meta-analysis aimed to determine the prevalence of preoperative sleep disturbances, risk factors for postoperative sleep disturbance, and its associated postoperative complications. A systematic search of the databases MEDLINE, MEDLINE ePubs Ahead of Print and In-process, Embase Classic+Embase, Cochrane Database of Systematic Reviews, and Cochrane Central Register of Controlled Trials from inception to February 23, 2022 were conducted. The inclusion criteria were: (1) adult patients undergoing a surgical procedure; (2) in-patient population; (3) assessed for preoperative and postoperative sleep disturbances using the Pittsburgh Sleep Quality Index (PSQI) and/or objective sleep assessment tools, and (4) articles written in English. The pooled prevalence of sleep disturbances was calculated using an inverse-variance random-effects model. The 95% confidence interval (CI) was computed using a normal approximation calculation. A sensitivity analysis was performed to determine each study's effect on the meta-analytic estimates. The systematic search resulted in 21,951 articles. Twelve studies involving 1,497 patients were included. The pooled prevalence of sleep disturbances at the preoperative

assessment was 60% (95% CI: 50%, 69%) (Figure). Risk factors for postoperative sleep disturbances were preexisting disturbed sleep and preoperative anxiety. Patients with postoperative delirium were associated with a higher prevalence of preoperative and postoperative sleep disturbances. Patients with postoperative delirium also had a higher wake-after-sleep onset percentage as assessed by actigraphy during the preoperative assessment. The prevalence of preoperative sleep disturbances was high at 60%. In adult surgical patients undergoing inpatient surgery, preoperative sleep disturbance and anxiety were the two main risk factors for postoperative sleep disturbance. Postoperative delirium was associated with a higher prevalence of preoperative and postoperative sleep disturbances. Preventing sleep disturbances in surgical patients may be important for postoperative outcomes.

The Relationship Between Child Sleep Duration and Irritability Among Mothers and Fathers of Young Children

Tam, Andrea[1]; Holtzman, Susan[1]; Keys, Elizabeth[2]; Draper, Zakary[1]

[1]Department of Psychology, The University of British Columbia Okanagan, [2]School of Nursing, The University of British Columbia Okanagan

Submission ID 27

ABSTRACT Child sleep disturbances can contribute to adverse mental health outcomes in parents, such as increased depressive symptoms. However, studies of the link between child sleep duration and parental mood mainly concentrate on depression and anxiety, and often focus only on mothers. It is important to address this gap by investigating other parental mood outcomes, such as irritability. Irritability is an emotional process characterised by proneness to experiencing negative affective states. In adults, irritability has been found to contribute to harsh parenting and is predictive of future mental health problems. The current study aimed to describe how parent-reported child sleep duration correlates with parental irritability in families of children aged 2 to 5 years.

The Relationships Between Birth Order, Breastfeeding, and Sleep-Wake Patterns

**Hershon, Malka[1,2], Laganière, Christine[1,2], Pokhvisneva, Irina[3], Bouvette-Turcot, Andrée-Anne[5], Meaney, Michael[3,4], Gaudreau, Hélène[2], Pennestri, Marie-Hélène[1,2]

[1]Department of Educational and Counselling Psychology, McGill University, Montreal, Québec, Canada; [2]Once Upon a Night Sleep Laboratory, Hôpital en santé mental Rivière-des-Prairies CIUSSS du Nord-de-l'île-de-Montréal, Québec, Canada; [3]Douglas Mental Health University Institute, CIUSSS Quest-de-l'île-de-Montréal, Québec, Canada; [4]Department of Psychiatry, McGill University, Montreal, Québec, Canada; [5]Batshaw Youth and Family Centres, Montreal, Québec, Canada

Submission ID 128

ABSTRACT Introduction: The World Health Organization recommends that mothers exclusively breastfeed for the first 6 month of infancy. Breastfeeding is amongst one of the psychosocial and environmental variables known to influence infant's sleep, but research findings are contradictory. We aimed to 1) investigate the relationship between feeding method, breastfeeding (BF) versus non-breastfeeding (non-BF), and infant sleep at 6 months; 2) explore if this relationship differs for

firstborn and non-firstborn infants. Methods: This study included 412 mother-child dyads from the Maternal Adversity, Vulnerability and Neurodevelopment cohort. Infants were divided into two groups based on if they were the firstborn child (n=381), and then further divided based on feeding method at 6 months. Nocturnal sleep duration, longest period of uninterrupted sleep, and BF status were measured by maternal reports at 6 months. Independent t-test statistics were computed separately in firstborn infants and non-firstborn infants to compare sleep variables between BF and non-BF infants. Results: Within firstborn infants, nocturnal sleep duration was slightly higher in non-BF (10:25±1:27) than BF (10:06±1:38), but this trend was not statistically different t(379)= 1.89, p=.06. Firstborn non-BF infants had significantly longer durations of uninterrupted sleep (8:20±2:52) in comparison to their BF counterparts (6:21±2:43), t(376)=6.63, p=<0.001. For non-firstborn infants, no significant difference was found in nocturnal sleep duration between non-BF (10:05±1:37) and BF infants (10:20±1:44), t(29)=-0.39, p=.70. Similar results were observed for the longest duration of uninterrupted sleep (non-BF: 7:27±3:02; BF: 5:51±3:15), t(29)=1.34, p=0.19. Conclusions: Based on these preliminary results, the longer and more consolidated sleep patterns observed in non-BF seem more pronounced in firstborn than non-firstborn infants. These results would benefit from being replicated in a larger longitudinal sample during infancy, especially for non-firstborn infants, and with objective sleep measures, such as actigraphy. Future research could also consider mother and infants characteristics, and family dynamics.

The temporal dynamics of slow wave activity across the night in adolescents with depression: Assessing the influence of sexual maturity development

**Porteous, Meggan[1,2]; Robilliard, Rebecca[1,2]; Shahsavari, Mohammadreza[3]; Hoffmann, Robert[4]; Arnedt, Todd[4]; Bertram, Holli[4]; Tavakoli, Paniz[2]; Armitage, Roseanne[4]

[1]School of Psychology, University of Ottawa, Ottawa, K1N 6N5, Canada; [2]Sleep Research Unit, University of Ottawa Institute of Mental Health Research at The Royal, Ottawa, K1Z 7K4, Canada
[3]École de Technologie Supérieure, Montréal; [4]University of Michigan

Submission ID 148

ABSTRACT Background: Sleep disturbances impact many adolescents with depression. Research suggests that adolescents with depression may have impaired sleep homeostasis and sleep regulation, leading to lower levels of slow wave activity (SWA) at the beginning of the night and irregular SWA dissipation across the night. How this may relate to sexual maturity stages remains to be investigated. The current study aimed to examine the relationship between SWA changes across the night and depression by comparing adolescents at Tanner stages 4 and 5 with and without a diagnosis of depression. Methods: Participants were divided into two groups according to clinical status: 64 drug-free outpatients with a current diagnosis of non-psychotic major depressive disorder (depression group), and 61 controls without a personal or a first-degree family history of psychopathology (control group). All participants completed a psychological assessment before enrolling in the study and completed level 1 polysomnography. Results: A trend in males at Tanner stage 4 indicated that those with depression had higher levels of SWA at the start of the night than their peers from the control group ($F(1,26) = 4.0$, $p = .055$, $n2p = .14$). An interaction was found between groups and brain topography in the Tanner Stage 4 males showing that the slope of SWA decay was lower in the depression compared to the control group in posterior

electrode sites (F(3,78) = 3.7, p = .016, n2p = .12). Conclusion: Our results suggest that in adolescent males at earlier stages of puberty, depression may be related to elevated levels of sleep pressure at the start of the night and slower decay as reflected by SWA dissipation throughout the night in posterior cortical regions. This highlights the need to assess potential interactions between puberty-driven hormonal changes and sleep alterations in the context of depression.

The ventral midline thalamus consolidates fear memory during sleep by mediating hippocampo-cortical coupling

Timofeev, Igor[1,2]; Basha, Diellor[1,2]

[1]Université Laval; [2]CERVO Brain Research Centre

Submission ID 196

ABSTRACT Sleep is essential for memory consolidation. Consistent with this role, sleep promotes bidirectional communication between the hippocampus, where memories are initially formed and the neocortex, where memories are stored for long-term retention. Precise synchronization between the two structures, a critical step in system consolidation, occurs through the coupling of various field oscillations such as hippocampal sharp-wave ripples (SPW-Rs, 100-300 Hz) and cortical slow oscillations (1-4 Hz). The ventral midline thalamus (VMT), composed of the reuniens and rhomboid nuclei, extends bidirectional connections to the medial prefrontal cortex (mPFC) and hippocampus, giving it an ideal anatomical position for organizing hippocampo-prefrontal coupling. Using closed-loop optogenetic stimulation and in vivo intracellular recording in mice, here we show that phasic inhibition of the VMT during hippocampal SWRs promotes the consolidation of fear memory during NREM sleep. In vivo intracellular recordings demonstrate that hippocampal SWRs inhibit the VMT and trigger thalamic bursting and prefrontal active states. The result describe an inhibition-driven thalamic mechanism that organizes the transfer of hippocampal events to the thalamocortical system.

I don’t think there’s anything typical about it.” Exploring Sleep in Family's with a Child with Autism Spectrum Disorder

Grant, Emma[1]; Mior, Silvano[2]; Cancelliere, Carol[1]; Papaconstantinou, Efrosini[1]

[1]University of Ontario Institute of Technology, [2]Canadian Memorial Chiropractic College

Submission ID 67

ABSTRACT Purpose: Sleep is an important mechanism for everyday functioning as well as childhood development. Children with autism spectrum disorder (ASD) tend to have much higher rates of sleep problems than neuro-typically developing children (NTD). While the sleep of children with ASD has recently become a research and treatment priority, there is a lack of research focus into how this impacts the sleep and daily life of the entire family. Methods: Purposive sampling was used to recruit parents of at least one child with ASD and one other child. Thirteen in-depth, semi-structured interviews were conducted with parents, eleven had at least one child with ASD and one NTD child. Findings: Several critical themes emerged from interviews with parents

including; (1) environmental factors contributing to sleep, (2) individual and family consequences of sleep loss, (3) parental internalization of emotions and conflicts surrounding sleep, (4) mitigation strategies used to improve sleep; and (5) the knowledge and beliefs that parents have about sleep. Discussion: Achieving sufficient sleep is difficult in families with a child with ASD and its impact is often felt by every member of the family. Findings suggest that parents have a great understanding of what it takes to achieve sleep in their homes and carry significant mental and emotional burdens related to sleep, especially ensuring their child(ren) have sufficient sleep. Additional research needs to be conducted to better understand variances in family members experiences of sleep and how that differs among different family members in the same family unit. This work can shape future research directions and inform important programs to support families with a child with ASD as well as to shed light on the importance of understanding sleep from a family-centric perspective.

Theta and beta-band oscillatory activity and functional connectivity specific to REM sleep: a MEG study

Coffey EBJ[1], Provias, Vasiliki[1], Jourde, Hugo R.[1], Schönauer M[2], Gais S[3], and Born J[3,4]; Bergmann TO[3,4,5,6]

[1]Department of Psychology, Concordia University, Montreal, Canada; [2]Institute of Psychology, University of Freiburg, Freiburg, Germany; [3]Institute of Medical Psychology and Behavioral Neurobiology, University of Tübingen, 72076 Tübingen, Germany; [4]Center for Integrative Neuroscience, University of Tübingen, 72076 Tübingen, Germany; [5]Department of Neurology and Stroke, and Hertie Institute for Clinical Brain Research, University of Tübingen, 72076 Tübingen, Germany; [6]Deutsches Resilienz Zentrum DRZ, University of Mainz, 55131 Mainz, Germany

Submission ID 180

ABSTRACT Rapid eye-movement (REM) sleep has been studied for decades, but its precise functions remain unclear. While there is evidence for a role in both memory consolidation and synaptic rescaling (Boyce et al., 2016; Diekelmann and Born, 2010), the mechanisms underlying those functions are largely unknown. REM sleep is characterized by high cholinergic tone and a specific patern of thalamo-cortical and hippocampal oscillatory activity, including ponto-geniculo-occipital (PGO) waves and hippocampal theta oscillations. In humans, the network oscillations of REM sleep appear to involve several frequencies beside the classical 4-8 Hz theta band. To extend our understanding of human REM sleep and the neuronal mechanisms underlying memory processing during sleep, we believe that a spatially resolved, whole-brain characterization of REM oscillatory activity in healthy subjects is essential. Here, we explore human REM sleep using whole-night magnetoencephalography (MEG), characterizing and disentangling the respective involvement of theta (4-8 Hz), alpha (8-14 Hz), and beta (15-30 Hz) oscillations. Our results demonstrate the potential of MEG to characterize network oscillatory activity in the sleeping human brain, contribute information concerning the likely origin of theta, alpha, and beta bands frequently studied with EEG, and offer new candidate oscillations that may contribute to sleep-dependent systems memory consolidation.

Theta and sigma power time-locked to rapid eye movements during REM sleep are implicated in consolidating novel problem-solving skills

van den Berg, N.H.[1], Gibbings, A.[1], Baena-Paez, D.[1], Pozzobon, A.[1], Ray, L.[1,2,3], Fogel, S.[1,2,3]

[1]School of Psychology, University of Ottawa, Ottawa, Ontario, Canada; [2]The Royal's Institute of Mental Health Research, University of Ottawa, Ottawa, Ontario, Canada; [3]University of Ottawa Brain and Mind Institute, University of Ottawa, Ottawa, Ontario, Canada

Submission ID 86

ABSTRACT It is generally accepted that non-rapid eye movement (NREM) sleep supports enhanced procedural memory consolidation for simple motor skills, while rapid eye movement (REM) sleep is implicated in consolidating procedural memories involving novel cognitive strategies used to solve problems. While spindles during NREM sleep have been implicated in enhancing memory for cognitively simple motor procedural skills, the precise role of REM sleep, and the associated neural correlates remain to be elucidated for cognitively complex procedural memory. Here, we assessed event-related spectral perturbation (ERSP) of the electroencephalogram (EEG), time-locked to rapid eye movements (EMs) during REM sleep following the acquisition of a novel cognitive procedural task (i.e., the Tower of Hanoi; ToH) as compared to normal sleep. Participants (n=40) performed the ToH before and after intervals of either overnight sleep (n=20), compared to a daytime 8-hour wake period (n=20). A hidden Markov model approach was used to probabilistically determine bursts of EMs to distinguish between phasic and tonic REM sleep. Improvement the ToH was greater following sleep compared to the wake group. For the sleep group, frontal-central EEG activity in the 12-13 Hz sensorimotor (i.e., sigma), and ~4 Hz theta frequencies, time-locked to EMs were greater on the testing night vs. control night. Overnight improvement on the ToH was associated with decreased eye movement burst activity (i.e., phasic REM), and increased isolated eye movements (i.e., tonic REM) from the control to testing night. These results indicate not only that REM sleep is associated with improved problem-solving skills for procedural strategies, but also that the microarchitecture of REM sleep (i.e., phasic vs. tonic REM) differentially process new information.

Thyrotropin-releasing hormone analog as a stable upper airway-preferring respiratory stimulant with arousal properties

Liu, Wen-Ying[1]; Ladha, Raina A.[1]; Liu, Hattie[2]; Horner, Richard L.[1,2]

[1]Department of Physiology, University of Toronto, Toronto, Ontario, Canada; [2]Department of Medicine, University of Toronto, Toronto, Ontario, Canada

Submission ID 40

ABSTRACT Taltirelin is a stable, brain-penetrating thyrotropin-releasing hormone (TRH) analog with minimal endocrine activity and potential respiratory stimulant properties. Taltirelin's receptor target shows high differential expression at the hypoglossal motor nucleus, and local taltirelin microperfusion into the hypoglossal motor nucleus causes sustained tongue motor activation compared to the transient activating effects of TRH itself. Here we performed a randomized, within-subject, repeated measures design over six separate study days (separated by at least 72

hrs) in chronically instrumented male (n=10) and female (n=9) rats to identify effects on sleep and breathing. Vehicle controls or taltirelin (0.1 and 1 mg/kg), with and without trazodone (30 mg/kg) were administered by intraperitoneal injection. Trazodone was included due to clinical interest in the context of sleep apnea pharmacotherapy as it can suppress arousal without compromising pharyngeal muscle activity. Systemically administered taltirelin (1 but not 0.1 mg/kg) increased tonic and within-breath phasic tonic muscle activity compared to vehicle controls ($P < 0.007$), with little or no changes in diaphragm amplitude or respiratory rate. Taltirelin also suppressed non-rapid eye movement (non-REM) sleep and increased wakefulness ($P < 0.037$). Other indices of taltirelin-induced central nervous system arousal included increased trapezius muscle tone in non-REM sleep and decreased total electroencephalogram power and delta (0.5-4 Hz) power ($P < 0.046$). These effects were especially apparent in non-REM sleep and not prevented by trazodone. These pre-clinical findings identify taltirelin as a stable upper airway-preferring respiratory stimulant with arousal properties, traits that have potential favorable relevance to some respiratory disorders but not others.

Transplanting immortal orexin cells in narcoleptic mice rescues cataplexy.

**Pintwala, Sara[1]; Belsham, Denise[1]; Fraigne, Jimmy[1]; Peever, John[1]

[1]University of Toronto

Submission ID 152

ABSTRACT Narcolepsy is a sleep disorder caused by a loss of orexin neurons in the lateral hypothalamus. This results in symptoms such as excessive sleepiness and cataplexy, a sudden and involuntary loss of muscle tone during wakefulness. Here, we describe the character of a novel immortal orexin cell line and determine the outcome when cells are transplanted into a mouse model of narcolepsy. To do this, we used an immortal cell line from adult (A) transgenic mice (m) expressing green fluorescent protein (GFP) in orexin (ORX) neurons, isolated from hypothalamus (Hypo); the mHypoA-ORX/GFP4 cell line. First, we performed immunocytochemistry and enzyme immunoassay to quantify orexin expression and release. Next, we used the Designer Receptor Exclusively Activated by a Designer Drug (DREADD) hM3Dq to control cultured cells. Next, we transplanted cells to the dorsal raphe in a mouse model of narcolepsy (orexin-knockout, KO) and determined the outcome on cataplexy. Using immunostaining, we found that a majority of GFP-tagged cultured cells co-expressed orexin (97.78±0.22%). When live cells were stimulated under physiological conditions (hypoglycemia) there was significant increase in orexin release by cultured cells (0.337±0.031ng/ml; hyperglycemia; 0.276±0.030ng/ml; t-test; *p<0.01). When cultured cells were exposed to a viral vector carrying hM3Dq (rAAV-hSyn-hM3Dq-mCherry) we found efficient transduction of hM3Dq as 97.47±0.97% of all cells expressed mCherry. The ligand clozapine-N-oxide (CNO) significantly increased c-Fos expression (67.5±13.0%) and orexin release (0.071±0.01ng/mL) by transfected cells (vs. baseline; 36.5±1.9%; 2-way ANOVA, **p<0.01; 0.050±0.01ng/mL; *p<0.05). Transplanting mHypoA-ORX/GFP4 cells to the DR significantly reduced the number of cataplexy episodes (unpaired t-test; ***p=0.0002) and the amount of cataplexy (unpaired t-test; **p=0.0014). In these subjects, 309±159 orexin-expressing cells were present in the dorsal raphe. This project explores the potential of cell replacement therapy as a novel therapeutic strategy for narcolepsy, and using an immortal orexin cell line to this end.

Trends in sleep duration and sleep quality among Canadians aged 15 years and older: results from the Canadian General Social Survey, 1986-2018

**Toigo, Stephanie[1]; Betancourt, Marisol[1]; Chaput, Jean-Philippe[2]; Roberts, Karen C.[1]

[1]Public Health Agency of Canada, Centre for Surveillance and Applied Research, Ottawa, Ontario, Canada; [2]Childrens Hospital of Eastern Ontario (CHEO) Research Institute, Ottawa, Ontario, Canada

Submission ID 15

ABSTRACT Given its importance for overall health, sleep has gained public health attention in recent years. In 2020, 27% of Canadian adults were not getting enough sleep and 37% experienced poor sleep quality. Short sleep duration and poor sleep quality are associated with increased risk of chronic diseases, poor mental health, and lower quality of life. This study examines long-term trends in sleep duration and quality among Canadians to better understand the sleep landscape. Data from the General Social Survey were analyzed over a period of 32 years (1986 to 2018). Time-use diaries, completed by respondents aged 15 and older, captured total time spent sleeping. Poor sleep quality was assessed using questions asking respondents to self-report if they regularly have trouble going to sleep or staying asleep. Mean sleep duration and prevalence of poor sleep quality were calculated for each cycle. Results were stratified by sex, age group, and education. Non-overlapping 95% confidence intervals were used to examine differences between subgroups and years. Between 1986 and 2010, mean sleep duration significantly increased by 4%, from 480 to 498 minutes. Longer mean sleep durations were found among those with less than post-secondary education compared to post-secondary graduates. Conversely, sleep quality declined, with 24% of Canadians reporting trouble going to sleep or staying asleep in 1991 compared to 35% in 2018. The prevalence of poor sleep quality was significantly higher among females compared to males and among those with less than post-secondary education compared to post-secondary graduates. Although the observed increasing/stable trends in sleep duration are positive, the declining trends in sleep quality may place Canadians at increased risk of adverse health outcomes. The results of this study will provide evidence to inform programs and policy recommendations related to sleep health, including the identification of more negatively affected population subgroups.

Use of the ExVent Accessory with the O2Vent Optima Oral Appliance for the Treatment of Obstructive Sleep Apnea – A Clinical Trial

Conflitti, Antonella[5]; Sharma, Sat[1,2,3,4,5]

[1]Centre for Sleep in Toronto and North York; [2]Vaughan Sleep Clinic; [3]York Region Sleep Disorders Centre; [4]Cobourg Sleep Clinic; [5]Windsor Sleep Disorders Clinic

Submission ID 177

ABSTRACT Obstructive sleep apnea (OSA) is a widely prevalent sleep-related breathing disorder, which leads to several life-threatening diseases. There are three main treatment modalities for OSA including Continuous Positive Airway Pressure (CPAP), mandibular advancement devices (MADs) and surgical intervention. The safety and efficacy of MADs and CPAP are well studied.

MADs work by modifying the upper airway by changing the position of the mandible and tongue. Both CPAP and MAD have variable compliance and tolerance and are associated with adverse effects. The ExVent is an optional accessory to the O2Vent Optima MAD and provides oral Expiratory Positive Airway Pressure (EPAP). Oral EPAP with the ExVent is designed to provide upper airway support via similar mechanisms of action of nasal EPAP devices in commercial distribution, e.g., passive dilatation of the airway, which reduces flow limitation. Nasal EPAP devices are in commercial distribution as stand-alone therapies for the treatment of OSA. The oral EPAP provided by the ExVent accessory is designed to augment the OSA therapy provided by the O2Vent Optima. Purpose The purpose of this study was to assess the performance of the O2Vent Optima + ExVent in the treatment of OSA. Results Patients with mild to moderate OSA were treated with Optima MAD and ExVent for 3 months at 3 different sites in North America. Preliminary data analysis demonstrated that treatment with Optima MAD and ExVent reduced AHI from 13.5±6.4/hr to 6.6±4.5/hr ($p<0.05$), average 58% reduction in AHI. The lowest oxygen during sleep increased from 84.6±2.7% to 88.6±2.9% ($p<0.05$). Overall success rate (>50% reduction in AHI) with treatment was 80%. During the trial patients on treatment with Optima MAD and ExVent demonstrated no excessive adverse events or device malfunction. Conclusion The clinical trial confirmed successful treatment with combined use of O2Vent Optima MAD and oral Expiratory Positive Airway Pressure, ExVent in patients with mild to moderate OSA. Treatment was well tolerated with no excessive adverse effects.

Ventilator Data – a web-based survey of practice

Loewen, Andrea[1]; Berlowitz, David[2]; Howard, Mark[2]; Willis, Tsai[1]

[1]Alberta Health Services; [2]Austin Health-Department of Respiratory and Sleep Medicine

Submission ID 130

ABSTRACT Background: Ventilator data can be defined as the signals being measured by a ventilator when in use by the patient, which may be collected and viewed by a third party. Research Question: Health care providers that prescribe, initiate and monitor home non-invasive ventilation (NIV) were surveyed about the use of ventilator data in their program, in order to determine the usage of ventilator data and its impact on patient care. Study Design and Methods: A web-based survey was designed to study the use of ventilator data in initiation and monitoring of NIV Results: A total of 51 respondents from Australia, Canada, USA, Europe and other regions participated. The majority of home ventilation programs reported between 101-500 patients (22/43 reported), and a distribution of neuromuscular (38%), OSA (35%), COPD (9%) and other patients (8%). The median number of ventilators used in each program was 9.31 +/-3.69 (SD). There was no strong preference for location of ventilator initiation. Ventilator data was relatively easy to access (24/100 on a VAS) and 93% of respondents had access. Modalities in monitoring of home ventilatio included: symptoms (88%), ventilator data (71%), SpO2 (67%), ABG (45%), nocturnal oximetry (35%), transcutaneous CO2 (31%), level 3 home oximetry (16%), level 1 polysomnography (10%), nocturnal capnography (10%) . However only 21% of respondents use ventilator data frequently. Ventilator data variables hours of usage and leak were always used. Frequently used variables were high leak (91%), tidal volume (82%), IPAP (100%), EPAP (100%) and AHI (85%). Conclusions: This descriptive study of the use of ventilator data by providers of home ventilation demonstrates access to ventilator data is high (93%), however usage is inconsistent.

The reasons why are unclear. Robust evaluation and research on ventilator data in patient care, and incorporation into guidelines may change the use of remote ventilator monitoring technology.

Video-conference delivery of a sleep optimization program for sub-clinical insomnia: Effects on insomnia, depression, and anxiety symptoms

Stenstrom, Philippe[1]; Sévigny-Dupont, Pénélope[1]; Araújo, Taís[1]; Bouchard, Maude[1]; La Rocque, Cherie[1]; Denesle, Régine[1,2]

[1]HALEO Preventive Health Solutions, Montreal, QC, Canada, [2]Center for Advanced Research in Sleep Medicine, Montreal, QC, Canada

Submission ID 178

ABSTRACT Introduction Cognitive behavioral therapy for insomnia (CBT-I) has been found to be effective in reducing insomnia symptoms and comorbid symptoms of anxiety and depression in individuals with clinical levels of insomnia. We examined if a brief sleep optimization program (SO), based on CBT-I principles but tailored to individuals with sub-clinical insomnia, can reduce insomnia severity as measured by the Insomnia Severity Index (ISI). We also examined the effect of the SO program on anxiety and depression symptoms as measured by the Hospital Anxiety and Depression Scale (HADS). The SO program was comprised of four weekly 25-minute video-conference-enabled sessions with a registered therapist, supported by a digital platform and mobile application. Methods 70 participants (mean age = 36, SD =11.33) with sub-clinical insomnia symptoms, defined as less than 15 on the ISI, completed the SO program. The ISI and HADS were completed at the beginning of the program (baseline) and just before the final session (post-program). Data were analyzed with two-tailed Student paired t-tests. Results ISI scores were significantly lower post-program (M = 5.11, SD = 3.14) compared to baseline [M = 9.46 SD = 3.18; $t(69) = 10.130$, $p < .001$, Cohen's $d = 1.21$]. Similarly, HADS-Depression scores were significantly lower post-program relative to baseline [M = 2.64, SD = 2.32 vs. M = 4.44, SD = 3.51; $t(69) = 5.32$, $p < .001$, $d = 0.63$] as were HADS-Anxiety scores [M = 4.81, SD = 3.1 vs. M = 5.89 SD = 3.79; $t(69) = 3.16$, $p = .002$, $d = 3.78$]. Conclusion The results indicate that a CBT-I-centered program tailored to individuals with sub-clinical insomnia can be effective in reducing symptoms of insomnia, depression, and anxiety in this population.

Vigilance state duration and quality are regulated by the synaptic adhesion molecule Neuroligin-2 under both baseline and sleep deprived conditions

Leduc, Tanya[1,2]; Bougadir, Khadija[3]; El Alami, Hiba[4]; Mongrain, Valérie[1,2]

[1]Department of Neuroscience - Université de Montréal (Montreal - QC - Canada), [2]Center for Advanced Research in Sleep Medicine – Recherche CIUSSS-NIM (Montreal - QC - Canada), Centre de recherche du Centre hospitalier de l'Université de Montréal (Montreal - QC - Canada); [3]Faculté de médecine dentaire - Université de Montréal (Montreal - QC - Canada); [4]Ingram School of Nursing - McGill (Montréal - QC - Canada)

Submission ID 57

ABSTRACT Synaptic adhesion molecules (SAMs) modulate vigilance states, possibly via their involvement in neurodevelopment and/or neuroplasticity. Neuroligin-2 (NLGN2) is a SAM expressed at GABAergic, dopaminergic and cholinergic synapses. These neurotransmission systems are greatly involved in shaping vigilance states. Our group has shown that, under baseline (BL) conditions, the knockout (KO) of Nlgn2 in male mice reduces the overall time spent asleep and increases absolute delta activity (1-4 Hz) during slow-wave sleep (SWS). We here aimed to investigate which slow wave (0.5-4 Hz) properties could explain this increase in delta activity. We also aimed to verify the response of Nlgn2 KO mice to sleep deprivation (SD). Adult male Nlgn2 KO mice and wild-type (WT) littermates underwent surgical implantation of electrodes for electrocorticography (ECoG). The ECoG was recorded during 24h of BL, 6h of SD, and 18h of recovery. Nlgn2 KO mice showed an increased density, amplitude and slope of slow waves during BL and after SD. Furthermore, KO mice had an accelerated PS recovery following SD and showed an impaired response to SD for ECoG activity quantified during wake and PS. Our data support an implication of NLGN2 in shaping slow waves during SWS and the response to sleep loss in male mice. We are now verifying whether a similar function can be observed in females. Preliminary results show that, similarly to males, Nlgn2 KO female mice have increased time spent awake under BL conditions. Yet, their ECoG activity and response to SD remain to be examined. We are also currently investigating whether these phenotypes involve neurodevelopment or plasticity at the adult stage by respectively overexpressing and rescuing Nlgn2 in adult WT and KO mice. Preliminary results suggest that NLGN2 might regulate vigilance states mainly through its function in neurotransmission and plasticity rather than in neurodevelopment.

Wake/Sleep architecture and electrocorticographic activity in two rodent models of Alzheimer's disease

Hector, Audrey[1,2,3]; Provost, Chloé[4]; Fernandes, Karl[5,6]; Brouillette, Jonathan[1,3]; Mongrain, Valérie[7,8]

[1]Département de pharmacologie et physiologie, Faculté de médecine, Université de Montréal, [2]Centre de recherche du CHUM, Montréal, [3]Centre de recherche du CIUSSS-NIM, Montréal, [4]Centre de recherche du CIUSSS-NIM, [5]Département de médecine, Université de Sherbrook, [6]Centre de recherche sur le vieillissement du CIUSSS de l'Estrie – CHUS; [7]Department of Neuroscience - Université de Montréal (Montreal - QC - Canada), [8]Center for Advanced Research in Sleep Medicine – Recherche CIUSSS-NIM (Montreal - QC - Canada), Centre de recherche du Centre hospitalier de l'Université de Montréal (Montreal - QC - Canada);

Submission ID 133

ABSTRACT In Alzheimer's disease (AD), sleep alterations are among the first clinical symptoms observed. It is also well-established that sleep affects the function of the hippocampus, which is implicated in memory consolidation. Moreover, sleep disturbances enhance the risk to develop AD. There is thus a bi-directional link between sleep and AD, however mechanisms underlying this relationship remain to be understood. There is mounting literature that soluble low-molecular-weight amyloid-beta oligomers (Aβo) are the most neurotoxic species in AD patients and in animal models, but their specific contribution to sleep disturbances is unknown. Recently, studies have shown the dysregulation of lipid metabolism in AD and 3xTg-AD mice, but the relation to sleep has not been explored. Therefore, our work has two objectives: understand the effect of Aβo on different sleep variables and verify if 3xTg-AD mice present sleep disturbances. We performed chronic hippocampal injections of soluble Aβo in male rats, and electroencephalographic (EEG) measurements were performed to define wake/sleep alteration. Female 3xTG mice received a 28-day treatment of a SCD (enzyme controlling the unsaturation of fatty acids) inhibitor and EEG recording was performed at days 14 and 28 followed by a sleep deprivation. Results show that the time spent in wakefulness, slow-wave sleep (SWS) and paradoxical sleep was preserved in Aβo-injected rats. However, for the frontal cortex, EEG spectral activity measured during wakefulness was increased by Aβo for slow-wave activity (SWA; 0.5-5 Hz) and low-beta activity (16-20 Hz), whereas it was decreased during SWS for theta (5-9 Hz) and alpha activity (9-12 Hz). Moreover, the theta activity/SWA ratio was decreased during wake and SWS. 3xTg-AD mice spend more time in SWS during their activity period compared to littermates. These preliminary result support the alteration of sleep in AD, and indicate that sleep phenotypes might serve as a non-invasive marker of early AD.

What do people think about their sleep in urban and rural areas in the province of Quebec?

Vallières, Annie[1], Dubois, Fanny[1]; Pappathomas, Alric[1]; Simonelli, Guido[2]; Leanza, Yvan[1]

[1]Université Laval; [2]University of Montreal

Submission ID 63

ABSTRACT Introduction/Objectives Social representations of sleep (SRS) are a set of cognitive elements related to sleep that are determinant in understanding an individual's sleep pattern. This

research investigates the SRS in the adult population of Quebec living in rural or urban settings and migrating from one to the other during the COVID-19 pandemic. Methods 88 participants (m.age=35.2y.o.; SD=13; 79%women) took part in a comparative study with a convergent parallel mixed methodology. Of these, 34 participants were born and live in urban areas and 6 in rural areas. 48 migrated from one to another. Participants completed the Pittsburgh Sleep Quality Index (PSQI) and the Internal Acculturation Index. These scores were analyzed with Student's T tests. 71 participants completed an interview focusing on the meaning of sleep, routine, living environment, internal migration, and the impact of the COVID-19 outbreak on their sleep. Interviews were recorded, transcribed verbatim, and analyzed thematically. Results The urban and rural participants wake up at the same time (7:25 am) but rural participants go to bed earlier (7:50 pm) than urban participants (9:30 pm). There is no significant difference in PSQI scores between them. Among migrants' participants, those who currently live in rural areas tend to have experienced better (p=.076). Participants identify sleep as a means of recharging energy, connecting to their internal world and emotions, and resting the brain and body. The rural environment is considered a quiet place to sleep. A tendency to migrate to a rural area following the COVID-19 outbreak is observed to reconnect with nature. Conclusions The COVID-19 pandemic led to a redefinition of living and sleeping habits favouring rural areas for sleeping and working remotely from home. People have chosen their sleep routines and habits based on the idea that sleep is a way to recharge energy, cope with emotions, and improve well-being.

Wired and Buzzed: The Relationship between Use of Caffeine and Alcohol and Objective Sleep Quality Measured with Odds Ratio Product

**Lambing, Kari[1], Bender, Amy[1,2]

[1] Cerebra, Winnipeg, Canada; [2] University of Calgary, Faculty of Kinesiology, Calgary, Canada

Submission ID 174

ABSTRACT Investigation on how consumption of alcohol and caffeine was related to Odds Ratio Product, an objective marker of sleep quality.

Introduction: There is a lack of research in understanding how different lifestyle factors interact with each other to impact sleep quality on a nightly basis. Caffeine and alcohol are commonly used substances that can negatively impact the quality of an individual's sleep, with greater wake after sleep onset and difficulties falling asleep when consumed. In this study, we investigated how consumption of alcohol and caffeine was related to Odds Ratio Product, an objective marker of sleep quality.

Methods: 19 participants (age 41.1±10.9; 9 females) recorded their sleep with in-home PSG using the Cerebra Sleep System for 18 to 31 nights (21.5±3.4). Sleep quality was measured using odds ratio product (ORP) derived from micro-analyzing frontal EEG channels during wake, NREM and REM sleep. Participants completed a nighttime questionnaire within one hour of bedtime which assessed the time since their last caffeinated or alcoholic beverage, the types of alcoholic or caffeinated beverage consumed, and the number of drinks. A latent class analysis was performed to determine different patterns of substance use in the sample.

Results: Two classes emerged that differed in the time since the last caffeinated or alcoholic beverage, the number of caffeinated drinks, and type of caffeinated beverage (high substance use nights (n = 66), low substance use nights (n = 224)). High substance use nights had more caffeinated beverages ($t(260)=-4.41$, $p<.001$), more recent caffeine usage ($t(259)=4.74$,$p<.001$), higher caffeine content beverages ($t(260)=-49.58$,$p<.001$), and more recent alcohol usage ($t(143)= 2.63$, $p=.009$) than low substance use nights. There was a significant effect of class membership on ORPwake ($t(266)= -2.83$, $p=.005$) and ORP-9 ($t(241)= -3.17$, $p =.015$). For both variables, high substance use nights had higher ORP than low substance use nights, which is indicative of more shallow sleep and worse sleep quality.

Conclusions: Nights with greater use of caffeine and alcohol had more negative associations with sleep quality than nights with less usage of caffeine and alcohol. On those nights, participants had more alert wakefulness, reflected by a higher ORPwake, and had greater difficulty going into deep sleep after an EEG arousal, reflected by a higher ORP-9. This study provided evidence that even casual, recreational usage of caffeine and alcohol can impact objective measures of sleep quality.

AUTHOR INDEX

M

T

U

V