SLEEP Advances

Official Publication of the Sleep Research Society and Australasian Sleep Association

Volume 2, Supplement 1

2021 Australasian Sleep Association Abstracts

This supplement is sponsored by the Australasian Sleep Association.

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ORAL PRESENTATIONS

New Investigator Award

O001

REBOXETINE REDUCES OBSTRUCTIVE SLEEP APNEA SEVERITY: A RANDOMIZED TRIAL

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Introduction: Noradrenergic and muscarinic processes are crucial for pharyngeal muscle control during sleep. Selective norepinephrine reuptake inhibitors (SNRIs) such as reboxetine combined with an antimuscarinic reduce obstructive sleep apnea (OSA) severity. The effects of reboxetine alone on OSA severity are unknown.
Methods: Double-blind, placebo-controlled, three-way crossover trial in 16 people with OSA. Each participant completed three overnight polysomnograms (~1-week washout). Single doses of reboxetine 4mg, placebo, or reboxetine+oxybutynin 5mg were administered before sleep (randomized order). The primary outcome was apnea-hypopnea index (AHI). Secondary outcomes included other polysomnography parameters, next day sleepiness and alertness. Endotyping analysis was performed to determine the medications' effects on OSA pathophysiological mechanisms.
Results: Reboxetine reduced the AHI by 5.4 [95% CI -10.4 to -0.3] events/h, P=0.03 (men: -24±27%; women: -0.7±32%). The addition of oxybutynin did not further reduce AHI. Reboxetine alone and reboxetine+oxybutynin reduced overnight hypoxemia versus placebo (e.g. 4% oxygen desaturation index 10.4±12.8 vs. 10.6±12.8 vs. 15.7±14.7 events/h, P=0.02). Mechanistically, reboxetine and reboxetine+oxybutynin improved pharyngeal collapsibility and respiratory control stability. Men had higher baseline loop gain. Larger reductions in AHI with reboxetine occurred in those with high loop gain. Neither drug intervention changed next day sleepiness or alertness.
Discussion: A single 4mg dose of reboxetine modestly reduces OSA severity without further improvement with the addition of an antimuscarinic. Reboxetine increases breathing stability via improvements in pharyngeal collapsibility and respiratory control. These findings provide new insight into the role of SNRIs on upper airway stability during sleep and have important implications for pharmacotherapy development for OSA.

O002

MEDICAL THERAPY FOR SLEEP DISORDERED BREATHING IN CHILDREN: A RANDOMISED, DOUBLE-BLIND PLACEBO-CONTROLLED TRIAL

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Background: Sleep Disordered Breathing (SDB) in children is characterised by snoring and breathing difficulties during sleep. Small clinical trials suggest intranasal corticosteroids reduce SDB severity as defined by polysomnography. We assessed the efficacy of intranasal corticosteroid for improving symptoms and quality of life (QOL) in children with SDB.
Methods: This is a double-blind, randomised, placebo-controlled trial of healthy children 3-12y referred to a specialist with SDB symptoms. Exclusions were previous adenotonsillectomy, obesity or severe SDB. Participants received daily intranasal mometasone furoate 50micrograms or normal saline for 6 weeks. The primary outcome was resolution of symptoms measured by SDB score. Secondary outcomes were SDB symptom scores, QOL, behaviour, parent and surgeon perceived need for surgery, and parent satisfaction with treatment.
Results: 276 participants were recruited; 138 in each group. 127 and 123 participants had primary outcome data at 6 weeks in the mometasone and saline groups respectively. Baseline age, atopic history, symptom severity and QOL were similar between groups. Resolution of SDB symptoms occurred in 44% [95%CI 35–53] of the mometasone group and 40% [95%CI 32–49] of the saline group; risk difference 4% [95%CI -0.8–16] p=0.511. Secondary outcomes were not different between groups.
Discussion: This large RCT, using clinical rather than polysomnographic outcomes to investigate the efficacy of mometasone on symptoms of SDB, found substantial rates of symptom resolution after 6 weeks in both groups. However, we found no difference in treatment effect between 6 weeks of intranasal mometasone over saline, for management of SDB symptoms in childhood.

O003

THE IMPACT OF WIND FARM NOISE IN A LABORATORY SETTING ON OBJECTIVE AND SUBJECTIVE SLEEP EFFICIENCY

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Introduction: Well-controlled studies of wind farm noise (WFN) on sleep are lacking despite complaints and known effects of other

noise types on sleep. This laboratory-based study investigated the impact of continuous full-night WFN exposure replicated from field recordings on polysomnography-measured (objective) and sleep diary-determined (subjective) sleep efficiency compared to a quiet control night.
Methods: Based on residential location and self-report data, 50 participants were categorised into three groups (14 living <10km from a wind farm and self-reporting sleep disturbance; 19 living <10km from a wind farm and self-reporting no sleep disturbance and 18 controls living in a quiet rural area). Participants underwent full in-laboratory polysomnography during exposure to continuous WFN (25 dB(A)) throughout the night and a quiet control night (background noise 19 dB(A)) in random order. Group and noise condition effects were examined via linear mixed model analysis.
Results: Participants (30 females) were aged (mean±SD) 54.9±17.6 range: 18–80 years. Sleep efficiency in the control condition was (median [interquartile range]) objective: 85.5 [77.4 to 91.2]%; subjective: 85.7 [69.2 to 92.7]%) versus the WFN condition (objective: 86.1 [78.6 to 91.7]% subjective: 85.8 [66.2 to 93.8]%) with no significant main or interaction effects of group or noise condition (all p's >0.05).
Conclusion: These results do not support that WFN at 25 dB(A) significantly impacts objective or subjective sleep efficiency in participants with or without prior WFN exposure or self-reported WFN-related sleep disturbance. Further analyses to investigate potential sleep micro-structural changes remain warranted.

O004

OBSTRUCTIVE SLEEP APNOEA SEVERITY IS ASSOCIATED WITH PARASYMPATHETIC WITHDRAWAL IN CORONARY ARTERY DISEASE

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Introduction: Patients with Coronary Artery Disease (CAD) are exposed to myocardial ischemia and hypoxia, resulting in altered autonomic function. Obstructive sleep apnoea (OSA) is highly prevalent in CAD and is associated with increased sympathetic activity which could further exacerbate cardiovascular risk. We aimed to determine whether OSA severity is associated with altered autonomic function in CAD patients.
Methods: Patients presenting to the coronary care unit with CAD underwent level 2 portable polysomnography to assess the presence and severity of OSA. Autonomic function was calculated from continuous blood pressure and 3-lead ECG 5 minute recordings while awake. Mean spontaneous baroreceptor sensitivity (sBRS msec/mmHg); vagally mediated heart rate variability (HRV) markers (pNN50%, RMSSD, HF-HRV); and, sympathetically mediated vascular autonomic function (LF-BPV) were measured. Autonomic function was assessed in relation to OSA severity (Apnoea Hypopnea Index, AHI; oxygen desaturation index, ODI).
Results: OSA was present in 49/51 (96%) participants with CAD (age 54±9 years; BMI 28.9±5.4 kg/m2; male 41(77%)). No association was found between sBRS and AHI. There was a modest inverse correlation between AHI and vagally mediated HRV (RMSSD, r= -0.28 p=0.04; HF, r= -0.31 p=0.03). AHI positively correlated with LF-SBP (r=0.29, p=0.04) suggesting upregulation of sympathetic modulation. Linear regression analyses, adjusted for age, sex, and BMI, showed AHI was a determinant of parasympathetically modulated HRV measures (pNN50% -0.25(0.12), p=0.05).
Conclusions: In patients with CAD, increased AHI was associated with parasympathetic withdrawal suggesting that OSA could increase poor cardiovascular prognosis in this population.

O005

COGNITIVE BEHAVIOURAL THERAPY AND LIGHT DARK THERAPY FOR POSTPARTUM INSOMNIA SYMPTOMS: A RANDOMISED CONTROLLED TRIAL

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Introduction: Symptoms of postpartum insomnia are common however interventions remain scarce. Cognitive Behavioural Therapy (CBT) and Light Dark Therapy (LDT) target distinct mechanisms to improve sleep. This randomised controlled superiority trial compared CBT and LDT against treatment-as-usual (TAU) in reducing maternal postpartum insomnia symptoms.
Methods: Nulliparous females 4–12 months postpartum with self-reported symptoms of insomnia (Insomnia Severity Index scores >7) were included; excluded were those at risk or with high medical/psychiatric needs. Eligible participants were randomised 1:1:1 to 6 weeks of CBT, LDT (gaining light upon awakening, night-time light avoidance) or TAU. Interventions were therapist-assisted through two telephone calls and included automated self-help emails over six weeks. Symptoms of insomnia (ISI; primary outcome), sleep disturbance, fatigue, sleepiness, depression, and anxiety were assessed at baseline, mid-intervention, post-intervention, and 1-month post-intervention. Latent growth models were used.
Results: 114 participants (mean age=32.2±4.6 years) were randomised. There were significantly greater reductions in insomnia and sleep disturbance in both intervention groups with very large effect sizes (d>1·4, p<0·0001) from baseline to post-intervention compared to TAU; improvements were maintained at one-month follow-up. There were greater reductions in fatigue symptoms in the CBT group (d=0.85, p<.0001) but not LDT (p=0.11) compared to TAU; gains were maintained for CBT at follow-up. Changes in sleepiness, depression and anxiety over time were non-significant compared to TAU (p-values>0.08).
Conclusion: Therapist-assisted CBT and LDT are both efficacious for reducing postpartum insomnia symptoms. Findings were

mixed for fatigue, sleepiness and mood. Future research is needed on predictors of treatment response.

O006

EARLY VASCULAR AGEING IN CHILDREN WITH SLEEP DISORDERED BREATHING: EVIDENCE OF VASCULAR HYPERTROPHY AND HYPERPLASIA

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Children with sleep disordered breathing (SDB) have evidence of increased blood flow velocity and sympathetic overactivity. Sympathetic overactivity leads to peripheral vasoconstriction, increased vascular resistance and consequently, increases blood flow velocity. Early vascular ageing involves premature arterial thickening and stiffening that leads to changes in vascular function. Both increased blood flow velocity and sympathetic overactivity are promoters of arterial remodelling and hence, early vascular ageing. No studies have directly histologically investigated arterial wall structure in children with SDB and how it relates to vascular function. Thirty-six children scheduled for tonsillectomy underwent polysomnography to determine SDB severity and resting brachial artery blood flow velocity (velocity time integral and peak systolic velocity) using Doppler ultrasound. The dorsal lingual artery (tonsil) was stained using hematoxylin and eosin techniques to examine arterial wall structures. Increased velocity time integral correlated with increased arterial medial thickness ($r = 0.50$, $P<0.01$), arterial smooth muscle cells ($r =0.43$, $P<0.05$) and arterial smooth muscle layers ($r=0.45$, $P<0.01$). These relationships remained significant after controlling for body-mass index (BMI). Increased BMI was associated with increased velocity time integral ($r=0.61$, $P<0.01$), arterial medial thickness ($r=0.37$, $P<0.05$) and arterial medial area ($r=0.36$, $P<0.05$). SpO2nadir (TST/REM) was inversely associated with arterial medial area ($r=-0.35$; $r=-0.38$, $P<0.05$). These results demonstrate that increased blood flow velocity is associated with changes in arterial wall composition in children with SDB. This suggests that paediatric SDB, a treatable disorder, is potentially a modifiable risk factor for early vascular ageing and resultant cardiovascular disease in adulthood.

Sleep Health and Other

O007

SLEEP HEALTH PROMOTION IN ABORIGINAL AND TORRES STRAIT ISLANDER COMMUNITIES: UNTAPPED POTENTIAL OF INDIGENOUS YOUTH WORKERS AS SLEEP COACHES

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Purpose: The lack of culturally appropriate sleep health programs and community-led support services are significant barriers to sleep health promotion in Indigenous communities. This project offers Australia's first-ever training and upskilling program for Indigenous youth workers (IYWs) to work as "Sleep Coaches" in Indigenous communities.
Methods: Key stakeholders, i.e., community elders, service providers, Indigenous youth and sleep scientists, were consulted to develop a training program for IYWs. Stakeholder consultations ensured community ownership of the program, facilitated co-design of educational and training activities, and integrated traditional and scientific sleep health knowledge for developing sleep health resources.
Results: Consultations with the advisory group (n=48) identified the need for a multipronged approach for IYWs capacity building. The education and training activities are centred around sleep and include cultural training to cover Indigenous Australians' understanding and interpretation of sleep health, youth mental health first aid training, and participation in youth alcohol and drug education workshops. For sleep education, two blocks of activities, i.e., foundation and advanced level, are offered to cover triaging, sleep education/support and monitoring. An interactive tool for diabetes education in Indigenous communities (FeltMan/FeltMum) has been adapted to offer culturally appropriate sleep education.
Conclusion: IYWs' capacity building as sleep coaches is an innovative way to empower Indigenous communities to embrace sleep health. Going forward, the program will engage with youth mental health services to evaluate the program effectiveness and transferability to other Indigenous communities. There is a need to define the scope of practice and certification to ensure compliance with industry standards.

O008

EMBEDDING DIGITAL SLEEP HEALTH INTO PRIMARY CARE PRACTICE: PERSPECTIVES OF GENERAL PRACTITIONERS, NURSES, AND PHARMACISTS

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Introduction: Digital health interventions (DHI) have the potential to address the unmet sleep health needs of patients in primary care. The current study explored primary care health providers' attitudes and beliefs towards DHIs for sleep health and the implementation into practice.
Methods: A mixed-methods study was conducted in a convenience sample of primary care service providers (GPs, nurses, pharmacists). An online survey captured participants' scope of practice and attitudes towards DHIs. Associations between practice factors and attributes of DHIs were explored. A subset of participants was interviewed to explore perceived barriers/facilitators for implementing DHIs into primary care, which was thematically analysed using the Framework Approach.
Results: 71 surveys were returned (GPs = 26, nurses = 21, pharmacists = 24) and 37 interviews were conducted (GPs = 13, nurses = 12, pharmacists = 12). Self-reported familiarity with DHIs was highest for GPs followed by pharmacists and nurses. Three major themes were identified: 1) Technology in Current Practice 2) Education Gaps and Training Needs and 3) Envisioning a Model of Care. Participants reported the "vague" definition of DHIs and mostly spoke in terms of personal experience and/or the health informatics systems used in practice. Despite recognising knowledge gaps, participants were confident in becoming upskilled and welcomed the idea of expanding digitalisation into sleep health. However, implementation success would depend on a supportive practice culture, patient uptake, and revising reimbursement structures.
Conclusion: With appropriate training and support, service providers highlighted the potential for embedding DHIs into primary care to optimise sleep health.

O009

THE GOOD SLEEPER SCALE-13 ITEMS: A STANDARDISED QUESTIONNAIRE FOR THE ASSESSMENT OF GOOD SLEEPERS

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Introduction: Good sleep is not merely the absence of sleep disorder symptoms, yet this criterion is commonly applied in research studies. We developed the Good Sleeper Scale-13 (GSS-13) to standardise identification of good sleepers.
Methods: We conducted a secondary analysis of the 2019 Sleep Health Foundation online survey of adult Australians (N = 2,044, aged 18–90 years). Possible GSS-13 items were chosen collaboratively with co-authors. Exploratory factor analysis (EFA) was conducted on 10% of the dataset chosen at random (N = 191) for factor identification and item reduction. Confirmatory factor analysis (CFA) on the remaining 90% (N = 1,853) tested model fit. Associations with sleep concerns, health, and daytime functioning tested validity of the final version.
Results: From EFA, six factors were identified: Adequate Sleep; Insomnia; Regularity; Timing; Sleep Duration; Perceived Sleep Problem. On CFA, model fit was comparable to other sleep instruments, X^2 (67) = 387.34, $p < .001$, CFI = .95, TLI = .92, RMSEA = .05. Cronbach's alpha was largely acceptable (≥.7) across subscales. Consistent correlations were found between GSS-13 global scores and outcomes, including "a good night's sleep"

(r = .65, p < .001), feeling un-refreshed (r = -.53, p < .001), and general health rating (r = .44, p < .001). Classification accuracy for insomnia symptoms was also high (AUC = .84).
Conclusions: The GSS-13 is psychometrically sound, correlated well with sleep, health, and daytime functioning, and can be used to identify good sleepers for research. Future work will test relationships with other sleep measures.

O010

THE ROLE OF DYSFUNCTIONAL BELIEFS AND ATTITUDES ABOUT SLEEP IN THE ASSOCIATION BETWEEN DAILY SLEEP AND AFFECT IN ADOLESCENTS AND EMERGING ADULTS

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Introduction: Sleep and affect are closely related. Late adolescence and emerging adulthood are associated with unique sleep patterns and risk for mood disturbances. This daily study examined whether dysfunctional beliefs and attitudes about sleep (DBAS), a modifiable cognitive vulnerability factor, moderated daily sleep-affect associations.
Methods: 421 community adolescents (n=205, 54.1% females, M±SDage=16.9±0.87) and emerging adults (n=216, 73.1% females, M±SDage=21.31±1.73) self-reported sleep and affect (adapted 12-item PANAS) and wore an actigraphy device for 7–28 days, providing >5000 daily observations. Linear mixed models tested whether DBAS moderated daily associations between self-reported and actigraphic sleep duration (total sleep time), sleep efficiency, and next-day affect on between and within-person levels. Both valence (positive/negative) and arousal (high/low) dimensions of affect were examined. Covariates included age, gender, ethnicity, day of week, and previous-day affect.
Results: DBAS significantly moderated associations between average sleep and next-day positive, but not negative, affect. Individuals with higher DBAS had significantly lower high arousal positive affect as average sleep duration (actigraphic: p=.002; self-reported: p=.014) and efficiency (actigraphic: p=.014) decreased. Similar moderation was found for average self-reported sleep duration and low arousal positive affect (p=.032). No significant results emerged on the within-person level. Previous-day affect significantly predicted next-day affect across models and outcomes (all p<.001).
Discussion: Adolescents and emerging adults with more negative views about sleep may experience dampened positive affect in shorter, or poorer, sleep periods. DBAS may constitute a modifiable factor increasing affective vulnerability on a global but not day-to-day level, and a therapeutic target for sleep-related affect disturbances in youths.

O011

ASSOCIATIONS BETWEEN SLEEP AND ALZHEIMER'S DISEASE BIOMARKERS WITHIN THE EPAD COHORT

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Background: Changes in sleep quality are common in Alzheimer's Disease (AD) and may contribute to the onset and accumulation of disease. However, in preclinical stages, it is unclear whether sleep quality or sleep disturbance relate to disease pathology after controlling for known AD risk factors. This study aimed to determine if self-reported sleep quality is associated with AD biomarkers after accounting for such factors.
Method: Data were obtained from the European Prevention of Alzheimer's Disease (EPAD) Longitudinal Cohort Study (LCS; v1500.0). CSF samples were collected for measurement of β-amyloid (Aβ42) and phosphorylated tau (p-tau). Self-reported sleep quality was assessed by the PSQI. Linear regression was used to determine whether p-tau/Aβ42 was associated with PSQI component scores when controlling demographics, ApoE4, depressive symptoms, BMI, vascular risks, smoking status, use of psychotropics, white matter lesions, and hippocampal volume. PSQI component scores of 2 or 3 were combined due to small numbers of component scores of 3.
Results: A total of 1239 participants were included (mean age=65.30 years, SD=7.11; mean PSQI total score=5.31, SD=3.38). After adjustment for all covariates, higher p-tau/Aβ42 was found to be associated with longer sleep latency (component score of 1: β=0.16, p=0.007; component score of 2/3: β=0.12, p=0.134) and better sleep efficiency (component score of 1: β=-0.22, p=0.04; component score of 2/3: β=-0.31, p=0.009)
Conclusion: These findings contribute to growing evidence suggesting sleep is an important early marker of underlying neurodegeneration. Longitudinal assessment of EPAD-LCS participants will allow for evaluation of self-reported sleep as a predictive marker of neurodegeneration.

O012

A PROSPECTIVE EVALUATION OF THE NATURE AND TIME COURSE OF SLEEP DISORDERED BREATHING AND RESPIRATORY FAILURE IN PATIENTS WITH MOTOR NEURONE DISEASE (MND): THE BREATHEMND-1 STUDY

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Introduction: Sleep disordered breathing (SDB) is a well-recognised but heterogeneous complication in MND and may herald the onset of respiratory failure. This study examined the nature and time course of SDB, sleep disruption and respiratory failure in MND patients.
Methods: The BreatheMND-1 study recruited MND patients for prospective evaluation of muscle strength,supine and prone dyspnea, quality of life, pulmonary function, arterial blood gas and polysomnographic sleep measurements at baseline and, where possible, 3, 6 and 12 months for exploratory analyses.
Results: 35 MND patients completed baseline and 25 at least one follow-up visit (median [IQR] follow-up time 8.7 [7.1–10.2] months). At baseline, patients were aged 64 [55–70] years, 16/35 (46%) female, with reduced FVC (77[59–92] %predicted) but relatively normal BMI (26.2[23.7–27.7] kg/m²) and PaCO2 (38.8[37.0–42.1] mmHg). At baseline and last follow-up, the prevalence of respiratory failure (PaCO2>45 mmHg or HCO3>27 mmol/l) was 9/33

(27%) and 12/27 (44%) respectively (p=0.186). Total sleep time and sleep efficiency were poor at baseline (5.2[4.6–5.9] h and 67.6[63.0–78.8]%) and declined at follow-up (by 1[0.3–1.9] h, p=0.020 and 7.9[-2.3–14.2]%, p=0.017 respectively). AHI was 7.2[2.8–14.6] /h and remained unchanged. In regression model,sleep time and efficiency were not predictive of respiratory failure, but the percentage of deep and REM sleep at last follow-up were (ROC area under curve 0.73±0.11, p=0.048 and 0.84±0.09, p=0.001).
Discussion: Sleep quality in MND is remarkably poor, irrespective of SDB, and could reflect and/or impact MND progression. Thus, further strategies to monitor & improve sleep are clearly warranted in patients with MND.

O013

THE PATHOGENESIS OF OBSTRUCTIVE SLEEP APNEA IN INDIVIDUALS WITH COMORBID INSOMNIA AND OBSTRUCTIVE SLEEP APNOEA (COMISA)

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Obstructive sleep apnea (OSA) and Insomnia are prevalent sleep disorders which are highly comorbid. This frequent co-occurrence suggests a shared etiology may exist. OSA is caused by the interaction of four pathophysiological traits: a highly collapsible upper airway, elevated loop gain, a low arousal threshold, and poor muscle compensation. No study has ascertained whether these traits are influenced by insomnia. We aimed to quantify the four traits which contribute to OSA in individuals diagnosed with comorbid insomnia and OSA (COMISA). We non-invasively determined these traits in 52 COMISA patients (Age: 56±14 years) with mild-to-severe OSA (AHI=21.2±10.63 events/h) using polysomnography. Our results indicated that 83% of COMISA patients had a low arousal threshold and only 2% of patients exhibited a highly collapsible airway using previously defined thresholds. Multiple linear regression revealed the arousal threshold (b=0.24, 95%CI[0.11, 0.37], β=0.47, p<0.001) and loop gain (b=23.6, 95%CI[7.02, 40.18], β=0.33, p<0.01) were the strongest predictors of OSA severity in our sample. There was no significant relationship between the arousal threshold and insomnia severity measured by the insomnia severity index (ISI). Further work is being performed to compare these findings with a matched sample of OSA only participants. Our preliminary findings demonstrate OSA in COMISA is characterized by a mildly collapsible airway/low arousal threshold phenotype and is largely driven by non-anatomical factors including a low arousal threshold and high loop gain. OSA treatments which are effective in patients with mild anatomical compromise and raise the arousal threshold may provide therapeutic benefit in COMISA patients.

Paediatric

O014

HEART RATE RESPONSE TO OBSTRUCTIVE RESPIRATORY EVENTS IN CHILDREN BORN PRETERM WITH OSA

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Background: Preterm-born (PT) children have an increased risk for obstructive sleep apnoea (OSA) and adverse cardiovascular outcomes. Respiratory events elicit acute changes in heart rate (HR) in term-born (T) children. Whether this response is augmented in PT children with OSA remains unclear. We aimed to analyse the HR response during obstructive respiratory events in PT children with OSA.
Methods: Nine PT children (3–12 y), were matched for obstructive apnoea hypopnoea index (OAHI), age and gender with T children. Beat-to-beat HR was averaged 10s before, during and the peak after (post) each obstructive event, and peak HR was expressed as percentage change.
Results: 323 obstructive events in PT and 376 in T children were identified, consisting of 681 hypopnoeas (PT 320; T 361) and 18 apnoeas (PT 3; T 15). There were insufficient apnoeas in the PT group for analysis. For hypopnoeas during total sleep, the PT group had significantly lower HR compared to the T group before median 81bpm (IQR 74–87) vs 88 bpm (79–99); p<0.001), during (76 bpm (69–83) vs 82 bpm (74–92; p<0.001) and post (97 bpm (89–103) vs 105 bpm (95–115; p<0.001) events. The post event increase in HR was significantly higher in the PT (26%, (16–39)) compared with the T (23%, (14–36)) group, p=0.008.
Conclusion: Although HR was lower during obstructive hypopnoeas in preterm compared with term-born children, the post event surge was significantly higher. This heightened HR response to respiratory events in children born preterm may underlie the worse cardiovascular outcomes in these children.

O015

UPPER AIRWAY COLLAPSIBILITY MEASUREMENT UNDER ANAESTHESIA IN CHILDREN: FEASIBILITY AND UTILITY IN PREDICTING PERIOPERATIVE RESPIRATORY ADVERSE EVENTS

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Background: Perioperative respiratory adverse events (PRAE) pose significant risk in paediatric anaesthesia, and identifying risk is vital. Perioperative measurement of pharyngeal closing pressure (PCLOSE) is a quick, objective method of assessing upper airway collapsibility that may identify PRAE risk.
Aim: To investigate if PCLOSE measurement is feasible and predictive of PRAE in children.
Method: Fifty-six children (1-8years, 34 male, without significant co-morbidities) underwent PCLOSE measurements immediately preceding (pre-PCLOSE) and following (post-PCLOSE) adenotonsillectomy. Measurement was performed under anaesthesia while breathing spontaneously in supine posture with head/jaw neutral.
After application of a face mask, inspiratory flow was occluded with an associated decrease in mask/nasal pressure seen with each inspiratory effort. With airway collapse, a plateau developed in minimum pressure observed (= PCLOSE): less collapsible airways occluded at more negative pressures. PCLOSE was averaged over 5–6 sequential efforts, at least 3 times on each occasion.
Results: Both pre-and post-PCLOSE were successfully measured in 94.6% children without affecting procedure. Pre-PCLOSE and change in PCLOSE from pre- to post- were associated with an increased incidence of PRAE (Poisson regression coefficient 0.083(0.03) (mean, SE); p=0.0054 and 0.03(0.01); p=0.018, respectively). There was no significant association between post-PCLOSE and PRAE. The odd of PRAE occurrence during recovery was 1.5 times higher than in other phases.
Conclusion: This study demonstrated the feasibility of obtaining PCLOSE. A more collapsible airway before surgery and an increase in collapsibility with surgery were both associated with increased PRAE. PCLOSE measurement could be a valuable risk assessment tool for PRAE in children undergoing surgery.

O016

EXPLORING THE DRIVERS OF GEOGRAPHIC VARIATION FOR PAEDIATRIC TONSILLECTOMY AND ADENOIDECTOMY

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Introduction: Tonsillectomy and/or adenoidectomy (A/T) is first-line treatment for paediatric obstructive sleep apnoea. Provision of A/T is of critical interest to sleep medicine practitioners. Geographic variation of A/T has been described since the 1930s, but no studies have investigated the reasons behind it. This study aimed to describe the geographical distribution of paediatric A/T and investigate area-level factors associated with this variation.
Methods: Linked administrative datasets captured a complete state-wide population of paediatric A/T performed between 2010

and 2015. Surgery data were collapsed by patient residence to the level of Local Government Area. Regression models were used to investigate the association between likelihood of surgery and area-level factors.
Results: There was a 10.2-fold difference in A/T rates across the state, with higher rates more common in regional than metropolitan areas. Area-level factors associated with geographic variation that increased the likelihood of A/T were a higher proportion of children aged 5–9 years (IRR 1.07, 95%CI 1.01–1.14, P=0.03), while a higher proportion with low English-language proficiency (IRR 0.95, 95%CI 0.90–0.99, P=0.03) decreased the likelihood of A/T. In a sub-population of public sector surgeries, low maternal educational attainment increased the likelihood of A/T (IRR 1.09, 95%CI 1.02–1.16, P<0.001) and longer surgical waiting time reduced it (IRR 0.996, 95%CI 0.99273–0.99997, P=0.048).
Discussion: Significant variation in surgery rates exist by geographical area state-wide, with factors analysed having significant impacts. These findings suggest that improved surgical access and better community understanding of the indications for A/T could decrease geographic variation.

O017
PARENTS' EXPERIENCES OF HAVING A CHILD WITH DOWN SYNDROME AND SLEEP DIFFICULTIES

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Introduction: This qualitative study that investigates parents' experiences of having a child with Down Syndrome (DS) and sleep difficulties is a part of a broader mixed-method study entitled Sleep Difficulties in Children with Down Syndrome: An Evaluation of Parent/Carer and Family Quality of Life.
Methods: We conducted semi-structured interviews with 26 parents (fathers n = 4 and mothers n = 22), and reflexive Thematic Analysis (TA) was operationalised for data analysis. The interviews covered the following key topics: DS diagnosis; timeline of their child's sleep patterns and difficulties; implications for parental sleep, day-time function, and well-being; family dynamics; and access to supports.
Results: Most participants described negative experiences at time of diagnosis, including not feeling listened to, and receiving inconsistent, insensitive and inadequate information and/or treatment. Most strikingly, no parents recall receiving sleep specific information. Most participants described their child's sleep difficulties affecting their own sleep, day-time function and family dynamics, yet they commonly normalised these experiences. Such normalisation was a recurring theme across their experiences of having a child with DS and is contextualised by their accounts of resisting prejudiced attitudes towards their child since diagnosis.
Discussion: This is the first qualitative study to investigate parents' experiences of having a child with DS and sleep difficulties. Implications include professional development for health care workers focusing on sleep as a significant comorbidity for these children, and awareness of families' tendencies to normalise their experiences when delivering care.

O018
CHANGES IN SLEEP PARAMETERS IN CHILDREN WITH DOWN SYNDROME FOLLOWING TREATMENT

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Introduction: There is limited evidence about how sleep changes in children with Down syndrome (DS) following sleep interventions. This study evaluated changes in sleep over time in children receiving treatment comparing to a control group who did not.
Methods: Children with DS, 3-16yrs, attending the sleep clinic were followed for 24-months. Sleep parameters including parent completed child sleep habits questionnaire (CSHQ), PSG and home sleep diary were obtained pre and post sleep interventions for children undergoing treatment. Data was obtained at similar intervals for the control group who were followed over the same time period.
Results: Data was obtained for 41 participants, 16 children received an intervention and 25 did not. Interventions included ENT surgery (7), CPAP (4), melatonin (3) or a combination (2). The intervention group had a significantly higher average total CSHQ score overall than those in the control group (0.01). Scores decreased over time but remained higher than in controls throughout, and were clinically significant in both groups (>41). Sleep diary estimated average total sleep duration did not differ between groups and was 10hrs/night. PSG showed improvement in OAHI in those children undergoing pre and post intervention studies.
Discussion: Evaluation of sleep parameters in this referred cohort of children with Down syndrome demonstrates total sleep duration in keeping with national recommendations and improvement in obstruction with treatment. However, CSHQ results indicate ongoing sleep difficulties reported by parents, despite standard sleep interventions. This may reflect persisting non-respiratory sleep disorders, which are not being adequately addressed at present.

O019
MOBILE PHONE USE AT NIGHT, CYBER-BULLYING, SLEEP, AND MENTAL WELLBEING IN YOUNG PEOPLE AGED 7 TO 19 YEARS

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Introduction: Children commonly have access to mobile devices that allow them to send and receive texts at night when they should be sleeping. This may contribute to an increase in cyber-bullying and sleep problems, with negative effects on mental wellbeing.
Methods: Young children (7-11y, n = 22,597), early adolescents (12-14y, n = 19,470) and late adolescents (15-19y, n = 14,156) completed a survey examining mental wellbeing and the frequency of obtaining 8h sleep, texting at night and cyber-bullying.. Generalised structural equation modelling was used to investigate the effects of texting at night on mental wellbeing, directly, and indirectly via effects on sleep. Cyber-bullying was also specified as a moderator of the effect of texting at night on sleep.
Results: Text messaging at night in the last week was reported by 51% and cyber-bullied in the last school term by 15% of children. For all children, obtaining at least 8h of sleep increased the odds of better mental wellbeing, Conversely, texting messaging and cyber-bullied reduced the odds of obtaining 8h sleep in both male and

female young children and female early and late adolescents. In all cohorts except late adolescent males, obtaining less than 8h sleep and cyber-bullied accounted for a large proportion of the effects of text messaging on mental wellbeing.
Conclusion: Mobile phone use at night impairs sleep which contributes to poor mental wellbeing. The effect on sleep is exacerbated by cyber-bullying. Strategies to discourage small screen use at night, promote adequate sleep and reduce cyber-bullying are needed.

O020

WHAT HELPED YOU AND WHAT PREVENTED YOU FROM GETTING GOOD SLEEP? CONTRIBUTION OF DAILY FACILITATORS AND BARRIERS TO ADOLESCENT SLEEP

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Introduction: This intense longitudinal study examined factors that facilitate and hinder sufficient and good quality sleep in adolescents' everyday life.
Methods: 205 (54.2% female, 64.4% non-white) Year 10–12 adolescents (Mage = 16.9 ± 0.9) completed daily morning surveys and wore actigraphy over 2 school-weeks and 2 subsequent vacation-weeks. Morning surveys assessed self-reported sleep and the usage of 8 facilitators and 6 barriers of sleep from the previous night. Linear mixed-effects models examined contribution of facilitators/barriers to actigraphy and self-reported total sleep time (TST) and sleep onset latency (SOL), controlled for age, sex, race, place of birth, and study day. Schooldays/non-schooldays was included as a moderator.
Results: Seven facilitators and two barriers were endorsed by high proportions (>30%) of adolescents as frequently (≥50% days) helping/preventing them from achieving good sleep.
Facilitators predicting longer TST and shorter SOL, were: "follow body cues", "manage thoughts and emotions", "create good sleep environment", "avoid activities interfering with sleep" and "plan bedtime and go to bed as planned" (only TST on schooldays). Barriers predicting shorter TST and longer SOL, were: "pre-bedtime thoughts and emotions", "unconducive sleep environment", "activities interfering with sleep", "inconsistent routines" and "other household members' activities". Overall, facilitators or barriers explained an additional 1–5% (p-values < .001) of variance beyond the covariates.
Discussion: Adolescents perceive a range of factors as facilitating and as preventing sufficient and good quality sleep in everyday life. These factors are predictive of their sleep duration and onset latency, and need further research to understand their functions and clinical implications.

Sleep and breathing - clinical and epidemiology

O021

PREFERRED ATTRIBUTES OF CARE PATHWAYS FOR OBSTRUCTIVE SLEEP APNOEA FROM THE PERSPECTIVE OF DIAGNOSED PATIENTS AND HIGH-RISK INDIVIDUALS: A DISCRETE CHOICE EXPERIMENT

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Background: The current health care system is challenged with a large and rising demand for obstructive sleep apnoea (OSA) services. A paradigm shift in OSA management is required to incorporate the preferences of diagnosed patients and individuals at high-risk of OSA. This study aimed to provide empirical evidence of the values and preferences of individuals diagnosed with OSA and high-risk populations regarding distinct OSA care pathway features.

Methods: A discrete choice experiment (DCE) was undertaken in two groups: those with a formal diagnosis of OSA (n=421) and those undiagnosed but at high-risk of having OSA (n=1033). The DCE approach used mixed logit regression models to determine preferences relating to eight salient features of OSA management pathway, i.e. initial assessment, setting and diagnosis costs, waiting times, results interpretation, treatment options, provider of ongoing care and frequency of follow up visits.

Results: The findings indicate that all eight attributes investigated were statistically significant factors for respondents. Generally, both groups preferred low diagnostic costs, fewer follow-up visits, minimum waiting time for sleep study results, and sleep specialists to recommend treatment and as ongoing care providers. Management of OSA in primary care was acceptable to both groups and was the most preferred option by the high-risk group for sleep study testing and ongoing care provision.

Discussion: The DCE results offer a promising approach for systematic incorporation of patient and high-risk groups preferences into the future design and delivery of care pathways for OSA management.

O022

LONG-TERM CARDIOVASCULAR RISK IN OBSTRUCTIVE SLEEP APNOEA: A SLEEP CLINIC COHORT STUDY

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The relationship between obstructive sleep apnoea (OSA) and the development of long-term cardiovascular disease (CVD) is incompletely understood. We therefore investigated the impact of OSA severity, assessed by polysomnographic (PSG) metrics, on the development of long-term CVD in a sleep clinic cohort.

Participants in the Western Australian Sleep Health Study, who attended a sleep clinic at a tertiary hospital between 2006 and 2010, were linked to state health administrative data from 1969 to 2016. Cox regression was used to investigate associations between standard PSG metrics of OSA severity (including the apnoea-hypopnoea index [AHI], time with oxygen saturation <90% [T90], and arousal index) and a CVD composite outcome (hospitalisation due to coronary heart disease, heart failure, stroke, or atrial fibrillation), controlling for baseline CVD risk factors such as age, sex, and body mass index (BMI).

A total of 4067 participants were included: mean (SD) age of 50.6 (14.0) years, with 60.8% men. The mean BMI was 32.7 (7.7) kg/m². Over a median follow-up of 7.3 years, 584 (14.4%) participants developed the composite CVD outcome. Following adjustment for risk factors, independent predictors of incident CVD were an AHI ≥30 events/hour (hazard ratio [HR], 1.21; 95% CI, 1.02–1.45), log (T90 + 1) (HR, 1.16; 95% CI, 1.03–1.31), and the periodic limb movements of sleep index (PLMSI) (HR, 1.01; 95% CI, 1.00–1.01).

We demonstrated independent effects of AHI, hypoxaemia, and PLMSI on incident CVD in this large sleep clinic cohort, suggesting multi-faceted aspects of disrupted sleep influence cardiovascular risk in OSA.

O023

IMPACT OF WEIGHT LOSS OF OSA PATHOPHYSIOLOGY

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Introduction: Obesity is a major risk factor for developing obstructive sleep apnoea (OSA), however, the underlying mechanisms are not fully understood. We aimed to assess the impact of weight loss on all OSA endotypes (i.e. upper airway collapsibility, muscle compensation, respiratory arousal threshold, and loop gain).

Methods: We analysed data from 40 OSA patients (collated from 3 centres) who underwent bariatric surgery. Demographics and clinical polysomnograms (PSG) were performed at baseline and at between 6–18 months post-surgery. OSA endotypes were measured during sleep using non-invasive endotyping methods (derived from clinical PSG).

Results: Participants lost 28±14 kg and had a post-surgery reduction in the AHI of 19.6 (Interquartile range[IQR] -9.8

to -35.4) events/hr [from baseline 39.9 (24.3 to 65.6) events/hr to 17.0 (9.9 to 33.3) events/hr]. Following surgical weight loss, there was significant improvement in collapsibility (Δ6.2 [IQR -1.4 to 13]%Veupnoea, p<0.0001), as well as significant reduction in loop gain and arousal threshold (Δ-0.06 [-0.17 to 0.009], p<0.001 and Δ-13.7 [-24.8 to -1.8]%Veupnoea, p<0.001 respectively). There was no significant change in muscle compensation.
Conclusion: Our findings suggest that weight loss improves upper airway collapsibility and reduces loop gain and the arousal threshold, providing novel insights about the mechanisms by which obesity causes OSA. Further analysis is underway to determine whether knowledge of the baseline OSA endotypes (in isolation and/or in combination) can predict which individuals will have a response to weight loss alone.

O024

WEIGHT LOSS SURGERY IN OBESE PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA IS ASSOCIATED WITH INCREASED INTER-HEMISPHERIC ELECTROENCEPHALOGRAPHIC COHERENCE

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Introduction: Electroencephalogram (EEG) analysis of obstructive sleep apnoea (OSA) patients has shown reductions in both delta band frequency power and interhemispheric coherence. Weight loss surgery is increasing in popularity and is often effective in reducing the symptoms and severity of OSA. No study has examined the effects of weight loss surgery on the sleep EEG of OSA patients.
Methods: Twenty patients underwent diagnostic polysomnography (PSG) prior to- and twelve months after weight loss surgery. Quantitative EEG analysis was conducted to calculate spectral power (fast fourier transform with four second overlapping windows) as well as amplitude and phase coherence between the two hemispheres (C3/C4 electrodes).
Results: Weight loss surgery was successful in reducing weight (137±17 kg vs 102±17kg P<0.001 for pre- and post-surgery, respectively), and OSA severity (Apnoea-Hypopnoea Index: 26±15 events/hour vs 10±12 events/hour P<0.001 for pre- and post-surgery, respectively). Stage N1 proportions were slightly decreased (12±7% vs 9±8%; P=0.039 for pre- and post-surgery, respectively) but all other stages were unchanged. Increases in interhemispheric phase coherence was observed following weight loss surgery, with significant changes observed in theta (-0.07±0.09 degrees vs -0.03±0.03 degrees P=0.035), alpha (-0.12±0.13 degrees vs -0.03±0.06 degrees P=0.008), sigma (-0.19±0.18 degrees vs -0.07±0.07 degrees P=0.011) and beta (-0.29±0.25 degrees vs -0.11±0.09 degrees P=0.004) band frequencies. There were no differences in EEG spectral power or interhemispheric amplitude coherence.
Discussion: Sleep EEG coherence, a putative marker of neurocognitive susceptibility in OSA, improves following weight loss surgery. Further studies are needed to determine the functional consequences of these EEG changes.

O025

SMART POLYMER IMPLANTS AS AN EMERGING TECHNOLOGY FOR TREATING AIRWAY COLLAPSE IN OBSTRUCTIVE SLEEP APNEA: PROOF OF CONCEPT

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Study objectives: To assess the use of a novel magnetic polymer implant in reversing airway collapse and identify potential anatomical targets for airway implant surgery in an in vivo porcine model.
Methods: Target sites of airway collapse were genioglossus muscle, hyoid bone, and middle constrictor muscle. Magnetic polymer implants were sutured to these sites, and external magnetic forces, through magnets with pull forces rated at 102 kg and 294 kg, were applied at the skin. The resultant airway movement was assessed via nasendoscopy. Pharyngeal plexus branches to the middle constrictor muscle were stimulated at 0.5 mA, 1.0 mA, and 2.0 mA and airway movement assessed via nasendoscopy.
Results: At the genioglossus muscles, large magnetic forces were required to produce airway movement. At the hyoid bone, anterior movement of the airway was noted when using a 294 kg rated magnet. At the middle constrictor muscle, an anterolateral (or rotatory) pattern of airway movement was noted when using the same magnet. Stimulation of pharyngeal plexus branches to the middle constrictor revealed contraction and increasing rigidity of the lateral walls of the airway as stimulation amplitude increased. The resultant effect was prevention of collapse as opposed to typical airway dilation, a previously unidentified pattern of airway movement.
Conclusions: Surgically implanted smart polymers are an emerging technology showing promise in the treatment of airway collapse in obstructive sleep apnea. Future research should investigate their biomechanical role as an adjunct to treatment of airway collapse through nerve stimulation.

O026

Pharyngeal enlargement via tongue advancement differs with mandibular advancement therapy response and improves treatment prediction

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Introduction: Mandibular advancement splint (MAS) treatment outcome prediction for obstructive sleep apnoea (OSA) is currently unreliable. Lower baseline AHI has been associated with better MAS response but is a poor predictor on its own. Imaging markers may enhance prediction. We investigate how the upper airway enlarges via posterior tongue advancement, using tagged MRI during mandibular advancement, as a potential predictor of MAS treatment response.

Methods: 101 untreated OSA participants (AHI 10–102 events/hr) underwent an MRI scan wearing a MAS. Mid-sagittal tagged MRI images were collected to quantify tongue movement during passive jaw advancement. Upper airway cross-sectional areas were measured with the mandible in a neutral position and advanced to 70% of the maximum protrusion. Treatment outcome was determined after a minimum of 9 weeks of therapy.
Results: 71 participants completed the study: 33 were responders (AHI<5 or AHI≤10 events/hr with >50% AHI reduction), 11 were partial responders (>50% AHI reduction but AHI>10 events/hr), and 27 non-responders (AHI reduction<50% and AHI≥10 events/hr). Responders had the greatest naso- and oropharyngeal tongue advancement (0.40±0.08 and 0.47±0.13mm, respectively) and oropharynx enlargement (6.41±2.12%) per millimetre of mandibular advancement. The inclusion of these imaging markers along with baseline AHI in a multivariate model classified more patients in the right MAS response group (69.2%) than a model based only on baseline AHI (50.0%) when the mandible was advanced by at least 4 mm.
Conclusions: Tongue advancement and upper airway enlargement with mandibular advancement in conjunction with baseline AHI improves MAS treatment response categorisation to a satisfactory level.

O027

THE COMBINATION OF MANDIBULAR ADVANCEMENT DEVICES (MAD) AND SUPPLEMENTAL OXYGEN DRAMATICALLY IMPROVES OSA SEVERITY: PRELIMINARY RESULTS FROM THE MADOX TRIAL.

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Introduction: Patients with obstructive sleep apnoea (OSA) considered 'non-responders' to mandibular advancement device (MAD) therapy, typically have a high loop gain contributing to their OSA physiology. While MAD does not improve loop gain, other treatments such as supplemental oxygen can have a strong effect on this pathogenic trait. Therefore, we conducted a randomised controlled trial (RCT) to determine whether the administration of supplemental oxygen in combination with a MAD, was associated with greater improvements in OSA severity compared to MAD therapy alone.
Methods: Patients recently diagnosed with OSA underwent an initial screening sleep study to confirm the presence of moderate-severe OSA (Apnoea-hypopnoea index [AHI]>20events/hr). Eligible patients were then enrolled in a randomised single-blind cross-over trial involving 4 sleep studies with the following treatments; MAD, oxygen (4L/min), MAD+oxygen and room-air/sham (control). The primary outcome was the reduction in AHI (%baseline).
Results: Of the 57 participants screened, 35 met the eligibility criteria (Baseline/Screening AHI = 52±22 events/hr). Compared to the sham night, all treatments significantly reduced the AHI; a 35% [CI: 18–48] was seen with oxygen (p<0.0002), a 53% [CI: 40–64] was seen with MAD (p<0.0001) and a 67% [CI: 56–76] was seen with MAD+oxygen (p<0.0001). Importantly, the combination of MAD+oxygen was associated with a significant reduction in AHI relative to MAD alone (15% [CI:4–24] p=0.01).
Discussion: In a population with moderate-severe OSA, preliminary analyses from this trial suggests that the addition of supplemental oxygen in combination with MAD therapy provided greater reductions in OSA severity than either treatment alone.

Chronobiology, insomnia and sleep health

O028

EFFECTIVENESS OF DIGITAL BRIEF BEHAVIOURAL THERAPY FOR INSOMNIA WITH WEARABLE TECHNOLOGY: PILOT RANDOMIZED CONTROLLED TRIAL

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Objective: This pilot trial aimed to test the effectiveness of integration of a wearable device with digital brief behavioural therapy for insomnia (dBBTi) on insomnia symptom severity, sleep metrics and therapy engagement.

Participants and Methods: One hundred and twenty-eight participants with insomnia symptoms were randomised to a 3-week dBBTi program with a wearable device enabling sleep data synchronization (dBBTi+wearable group; n = 62) or dBBTi alone (n = 66). We assessed the Insomnia Severity Index (ISI) and modified Pittsburgh Sleep Quality Index (PSQI; wake-after-sleep-onset (WASO), sleep-onset-latency (SOL), and total sleep time (TST)) at baseline and weeks 1, 2, 3, 6 and 12. Engagement was measured by the number of daily sleep diaries.

Results: There was no significant difference in ISI scores between the groups (d = 0.7, p = 0.061). The dBBTi+wearable group showed greater improvements in WASO (d = 0.8, p = 0.005) and TST (d = 0.3, p = 0.049) compared to the dBBTi group after 6 weeks. There was significantly greater engagement in the dBBTi+wearable group compared to the dBTi group (d =0.7, p = 0.010).

Conclusions: This pilot trial found that wearable device integration with a digital insomnia therapy led to improvements in WASO and TST and enhanced user engagement. We suggest that incorporation of adjunctive wearable technologies may improve digital insomnia therapy.

O029

PREDICTORS OF ACUTE INSOMNIA DURING THE COVID-19 PANDEMIC BEYOND PERCEIVED STRESS

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Introduction: Stress is a common precipitant of acute insomnia and likely contributed to increased reports of sleep disturbances during the COVID-19 pandemic. However, many other sleep and lifestyle changes may have also precipitated acute insomnia. This study aimed to clarify which factors, beyond perceived stress, contributed to the development of acute insomnia during the COVID-19 pandemic.

Methods: The study consisted of 578 participants with acute insomnia and 741 good sleepers. Participants completed an online survey assessing insomnia symptoms, sleep, lifestyle changes and mental health during the COVID-19 pandemic. Logistic regression analyses were conducted to identify contributing factors to acute insomnia when controlling for demographic differences between groups.

Results: Perceived stress was a significant predictor of acute insomnia during the pandemic (p<.001). However, after adjusting for stress, individuals who altered their sleep timing (p<.001) or increased their use of technology before bed (p=.037) during the pandemic were at a 3-fold increased risk of acute insomnia. Other sleep factors associated with acute insomnia included dream changes (p=.001), sleep effort (p<.001), and cognitive pre-sleep arousal (p<.001). For pandemic factors, being very worried about contracting COVID-19 (p<.002) and more stringent COVID-19 government restrictions (p<.001) increased the risk. Anxiety (p<.001) and depressive (p<.001) symptoms, as well as the personality trait of agreeableness (p=.010), also contributed to acute insomnia.

Discussion: To reduce acute insomnia during the COVID-19 pandemic, public health messaging should promote stress reduction and mental health care, but also modifiable behaviours such as keeping consistent sleep patterns and reducing technology use before bed.

O030

CHANGES IN SLEEP-WAKE PATTERNS, CIRCADIAN TIMING, AND MOOD IN AUSTRALIAN TEENS DURING THE COVID-19 PANDEMIC

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During the COVID-19 pandemic, schools rapidly transitioned from in-person to remote learning. We examined sleep- and mood-related changes in early adolescents, before and after this transition to assess the impact of in-person vs. remote learning. Sleep-wake timing was measured using wrist-actigraphy and sleep diaries over 1–2 weeks in Year 7 students (age M±SD =12.79±0.42 years) during in-person learning (n=28) and remote learning (n=58; n=27 were studied in both conditions). Circadian timing was measured under a single condition in each individual using salivary melatonin (Dim Light Melatonin Onset; DLMO). Online surveys assessed mood (PROMIS Pediatric Anxiety and Depressive Symptoms) and sleepiness (Epworth Sleepiness Scale – Child and Adolescent) in each condition. During remote vs. in-person learning: (i) on school days, students went to sleep 26 min later and woke 49 min later, resulting in 22 min longer sleep duration (all p<0.0001); (ii) DLMO time did not differ significantly between conditions, although participants woke at a later relative circadian phase (43 minutes, p=0.03) during remote learning; (iii) participants reported significantly lower sleepiness (p=0.048) and lower anxiety symptoms (p=0.006). Depressive symptoms did not differ between conditions. Changes in mood symptoms were not mediated by changes in sleep timing. Although remote learning had the same school start times as in-person learning, removing morning commutes likely enabled adolescents to sleep longer, wake later, and to wake at a later circadian phase. These results indicate that remote learning, or later school start times, may extend sleep duration and improve some subjective symptoms in adolescents.

O031

NOCTURNAL MELATONIN SECRETION IN POST-TREATMENT BREAST CANCER PATIENTS: A PRELIMINARY STUDY

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Purpose: Breast-cancer patients frequently report of poor sleep-quality. Although the pathophysiology is unclear, circadian-sleep misalignment is a plausible mechanism. We compared nocturnal melatonin-secretion, a circadian rhythm marker, in post-menopausal, post-treatment (≥12-months) female breast-cancer patients (BCG), with post-menopausal female controls with no history of cancer (CG)

Methods: We recruited 6 BCG and 10 CG from Westmead Hospital breast-cancer outpatient clinic or hospital-staff community, respectively. Participants completed the Pittsburgh Sleep Quality Index (PSQI; >5 PSQI-score=poor sleep-quality) and ~7 days of home-actigraphy (Philips Actiwatch-2, Philips Respironics, USA) to ascertain habitual bed-time (HBT). Later, participants completed an overnight, in-laboratory study, with saliva sampled (n=13) at regular intervals under strict dim-light conditions (<1 lux). Salivary-melatonin concentrations were quantified via radio-immunoassay (University of Adelaide). We measured 1) clock-time when salivary-melatonin concentrations reached 4pg/mL (melatonin onset-[DLMO-4pg/ml]) and 2) time-interval between HBT and DLMO-4pg/ml (indicates circadian-sleep misalignment-[PAR-DLMO]). Data were expressed as median [interquartile range], and compared using 2-sided Mann Whitney U-tests. $p<0.05$ was considered significant.

Results: BCG and CG had similar ages (62.5 [59.5–67.3] vs. 58.5 [54.0–66.3] yrs, respectively; p=0.23). Compared with CG, BCG had higher PSQI-scores (8.50 [5.25–10.75] vs. 4.00 [3.75–5.50] a.u.; p=0.07), but similar HBT (22:49 [21:46-23:38] vs. 22:17 [21:59-22:21] h:min; p=0.26). BCG had later DLMO-4pg/ml (20:46 [20:01-22:03] vs. 18:23 [17:55-20:07] h:min; p=0.03) and shorter PAR-DLMO (1.43 [0.96–2.38] vs. 3.63 [2.18–3.90] hrs; p=0.09), than CG.

Conclusion: Preliminary data indicate BCG had poorer sleep-quality, delayed melatonin onset, and altered circadian-sleep alignment; compared with CG. We speculate disrupted nocturnal melatonin-secretion potentially influences poor sleep-quality reported by breast-cancer patients.

O032

THE INFLUENCE OF TRAVEL AND RECOVERY INEQUALITY ON GAME OUTCOME IN THE NATIONAL BASKETBALL ASSOCIATION

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Introduction: Elite athletes are often required to travel for National and International competitions. However, the direction (westwards or eastwards), time zones crossed, and recovery days relative to their opponents may influence team success. The aim of this study was to determine whether differences in jetlag-induced circadian misalignment and number of recovery days between National Basketball Association (NBA) teams influenced the subsequent game result.

Methods: A total of 11,598 games from the 2011/2012 to the 2020/2021 seasons were analysed using mixed models with two fixed effects (travel, recovery) and three random effects (team, opponent, game time). Mediation modelling was also performed to determine if any influence of the fixed effects were mediated by another variable. The data is presented from the home team's perspective.

Results: Teams with more recovery days between games, won by larger margins ($F = 5.0$, $p < 0.001$). Compared to one fewer recovery day (1.45 ± 13.92), one more recovery day (3.53 ± 13.51) advantaged the home team by 2.08 points ($d = 0.15$). The effect of travel on greater home team margins was completely mediated via recovery day differences (95% CI -0.11 to -0.03, p = 0.002).

Discussion: Using 10 seasons of data, our findings show that regardless of travel, recovery days between games significantly impact game margins. An advantage in recovery days should be considered for teams who travel more time zones westwards relative to their opponent. This suggests inequalities of the NBA schedule may be minimised for future seasons.

O033

PREDICTING SUBJECTIVE SLEEP QUALITY USING MULTI-DAY ACTIGRAPHY DATA: A MACHINE LEARNING APPROACH

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Objectives: Insomnia is diagnosed using clinical interview but actigraphy is often used as a consecutive multi-day measurement of activity-rest cycles to quantify sleep-wake periods. However, discrepancies between subjective complaints of insomnia and objective actigraphy measurement exist. The aims of the current study were to (i) predict subjective sleep quality using actigraphic data and, (ii) identify features of actigraphy that are associated with poor subjective sleep quality.

Methods: Actigraphy data were collected for 14-consecutive days with corresponding subjective sleep quality ratings from participants with Insomnia Disorder and healthy controls. We fitted multiple machine learning algorithms to determine the best performing method with the highest accuracy of predicting subjective quality rating using actigraphic data.

Results: We analysed a total of 1278 days of actigraphy and corresponding subjective sleep quality ratings from 86 insomnia disorder patients and 20 healthy controls. The k-neighbors classifier provided the best performance in predicting subjective sleep quality with an overall accuracy, sensitivity and specificity of 83%, 74% and 87% respectively, and an average AUC-ROC of 0.88. We also found that activity recorded in the early morning (04:00-08:00) and overnight periods (00:00-04:00) had the greatest influence on sleep quality scores, with poor sleep quality related to these periods..

Conclusions: A machine learning model based on actigraphy time-series data successfully predicted self-reported sleep quality. This approach could facilitate clinician's diagnostic capabilities and provide an objective marker of subjective sleep disturbance.

O034

ROCKABYE SAILOR: INVESTIGATING THE IMPACT OF SIMULATED MOTION ON SLEEP AND COGNITIVE PERFORMANCE

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Background: Many naval vessels are designed with sleeping berths orientated in a fore/aft direction. Reorientating the berths changes the rocking from side-to-side to head-to-foot. It is unknown what effect rocking orientation may have on sleep.
Aim: This study aimed to investigate the impact of a simulated fore/aft orientation (side-to-side motion) with a simulated athwartships berth orientation (head-to-foot motion), on sleep quality and quantity, and cognitive performance.
Method: 21 participants (13M/8F; 24.0±4.8 years; BMI 21.1±2.5) slept in berths on a motion platform replicating vessel motion. In a repeated measures design, each participant slept under three conditions in randomised order: 1) no motion, 2) fore/aft orientation (side-to-side motion), and 3) athwartships orientation (head-to-foot motion). Measurements of sleep (ambulatory polysomnography), sleepiness (Karolinska Sleepiness Scale: KSS), and vigilance (Psychomotor Vigilance Test: PVT) were analysed using Mixed Effects ANOVA.
Results: Participants' total sleep time was shorter ($p<0.001$), sleep efficiency was reduced ($p<0.001$), they woke more frequently ($p<0.001$), and their sleep contained less REM ($p<0.001$) in the athwartships orientation (head-to-foot motion) compared to the no motion, and fore/aft orientation (side-to-side motion) conditions. Participants' also reported significantly higher sleepiness on KSS ($p=0.006$), poorer subjective sleep quality ($p<0.001$), and displayed worse vigilant attention on PVT ($p=0.03$) following the athwartships orientation compared to the two other conditions.
Discussion: The simulated athwartships bunk orientation (head-to-foot motion) negatively impacted sleep and cognitive performance. These results may have implications for crew wellbeing. The data also gives unique theoretical insight into the effects of different types of rhythmic movement on sleep.
Funding: DSTG

Sleep and breathing measurement and sleep and neurosciences

O035

AUTOMATED VS. EXPERT MANUAL ANALYSIS OF THE MULTIPLE SLEEP LATENCY TEST

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Purpose: To compare Compumedics Profusion PSG™ automated sleep analysis of Multiple Sleep Latency Tests (MSLTs) with expert consensus manual analysis.
Methods: Consecutive PSG with MSLTs were analysed using automated software (Compumedics Ltd (Abbottsford, Victoria, Australia) Profusion PSG™ V4.5 Build 531) ('Auto') and by two of nine experienced scientists. Discrepancies between scientists were discussed to establish expert consensus ('Final').
Results: Fifty consecutive patients referred for investigation of Narcolepsy were included. Two were excluded due to poor signal quality (1) and early test termination (1). The remaining 48 (37 M, 10 F, 1) had a median (range) age of 37 (17–63) years, BMI 28.0 (19.9–66.1) kg/m2, and mean sleep latency (MSL) 14.0 (1.5–20.0) minutes. Of five MSLTs with MSL <=8 min, Auto-MSL was also <=8 min. Of 43 MSLTs with MSL >=8 min, Auto-MSL was <=8 min in 12. MSL sensitivity was 100% and specificity 72%. For the one MSLT with >=2 SOREMs, Auto identified 1 SOREM. Nap-wise, Auto-SOREM sensitivity was 17% and specificity 98%; one of six REM-positive naps was detected by auto-analysis and there were seven false positive and five false negative SOREM results.
Conclusions: (1) Automated analysis poorly detected short MSL and SOREM occurrence but was able to rule out all true-negative MSLT results, in this MSLT dataset. (2) This comparison methodology and dataset facilitates robust prospective testing of other current and future algorithms.

O036

RESPIRATORY EVENT RELATED OXYGEN DESATURATION IS PREDICTIVE OF CARDIOVASCULAR MORTALITY IN SLEEP APNOEA PATIENTS

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Introduction: Cardiovascular disease (CVD) is the leading cause of death globally. The mechanisms underpinning the development of CVD in OSA are multifaceted and include sympathetic overactivity, endothelial dysfunction, inflammation, and oxidative stress. Nocturnal hypoxaemic burden—the cumulative exposure to hypoxaemia experienced overnight—may contribute to the pathophysiology of CVD. We investigated if polysomnogram SpO2 parameters can predict CVD outcomes in OSA patients.
Methods: Data from the SpO2 signals from 4689 polysomnograms (PSGs) of the Sleep Heart Health Study with CVD mortality outcome and complete covariate information was used. Analysis of the average SpO2 responses to respiratory events revealed a transient response from the event start that extended for four event lengths. Based on the response we developed a respiratory event related oxygen desaturation (REROD) parameter for quantifying the desaturation associated with respiratory events that is readily calculated. The performance of the parameter in predicting CVD death was assessed using an adjusted Cox proportional hazard ratio (HR) analysis and compared to other methods including hypoxic burden, T90 and ODI3.
Results: The COX analysis was adjusted for known covariates of CVD. The HR results indicate a dose-response relationship with the highest quintile providing a HR=2.0(95% C.I. 1.3–3.2).
Discussion: Our REROD metric predicts CVD mortality independent of confounding covariates and provides prediction performance superior to other hypoxemia metrics. A big advantage of our metric is its computational simplicity and reproducibility. We believe the metric is an important enabling step towards clinical methods that provide CVD risk stratification from the PSG.

O037

GENIOGLOSSUS MOTOR CONTROL FOLLOWING THE RETURN TO SLEEP AFTER BRIEF AROUSAL

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Rationale: Arousal from sleep has been shown to elicit a prolonged increase in genioglossus muscle activity that persists following the return to sleep and may protect against airway collapse. We hypothesised that this increased genioglossal activity following return to sleep after an arousal is due to persistent firing of inspiratory single motor units (SMUs) recruited during the arousal.
Methods: 34 healthy participants were studied overnight while wearing a nasal mask/pneumotachograph to measure ventilation and with 4 intramuscular genioglossus SMU electrodes. During stable N2 and N3 sleep, auditory tones were played to induce brief (3-15s) AASM arousals. Ventilation and genioglossus SMUs were quantified for 5 breaths before the tone, during the arousal and for 10 breaths after the return to sleep.
Results: A total of 1089 tones were played and gave rise to 236 SMUs recorded across arousal and the return to sleep in 20 participants (age 23±4.2 years and BMI 22.5±2.2kg/m2). Ventilation was elevated above baseline during arousal and the first post-arousal breath ($p<0.001$). The peak firing frequency of expiratory and tonic SMUs was unchanged during arousal and return to sleep, whereas inspiratory modulated SMUs were increased during the arousal and for 4 breaths following the return to sleep ($p<0.001$).
Conclusions: The prolonged increase in genioglossus activity that occurs on return to sleep after arousal is a result of persistent activity of inspiratory SMUs. Strategies to elevate inspiratory genioglossus SMU activity may be beneficial in preventing/treating obstructive sleep apnea.

O038

LOWER MEAN OXYGEN SATURATION IN SLEEP IS ASSOCIATED WITH WORSE COGNITIVE PERFORMANCE IN SUBJECTS WITH OBSTRUCTIVE SLEEP APNOEA

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Introduction: Obstructive sleep apnoea (OSA) is a risk factor for cognitive impairment and has been associated with deficits in executive function, attention, and memory. Potential mechanisms of harm include sleep disruption and intermittent hypoxaemia. Our aim was

to investigate whether the apnoea-hypopnoea index (AHI), arousal index (AI) and mean oxyhemoglobin saturation in sleep (mean SpO_2) - conventional polysomnography (PSG) measures of respiratory disturbance, sleep fragmentation and nocturnal hypoxaemia respectively - were associated with worse cognitive performance in OSA subjects.
Methods: In this cross-sectional analysis, 75 subjects with PSG-confirmed OSA (age: 66.1yrs ± 7.1yrs, male: 51%) were recruited from a hospital sleep clinic and had their cognitive profile screened via the Addenbrooke's Cognitive Examination – Revised (ACE-R). Linear regression was used to determine whether AHI, AI and mean SpO_2 were associated with total ACE-R scores. Binary logistic regressions were then performed to determine whether increased severity of OSA (AHI ≥ 30 events/hour), sleep fragmentation (AI ≥ 30 events/hour), and hypoxaemia (mean SpO_2 ≤ 92%) increased the likelihood that participants would have worse cognition (ACE-R score ≤ 88).
Results: There was a modest positive association with mean SpO_2 and ACE-R score (r^2 = 10.4%, $p < 0.01$). Similarly, logistic regression found only increased hypoxaemia (mean SpO_2 ≤ 92%) to be associated with increased odds of worsened cognition (OR 3.00, 95% CI (1.090–8.254), $p < 0.05$).
Discussion: OSA-induced hypoxaemia, and not sleep fragmentation or respiratory disturbance, was found to be most strongly associated with deficits in cognitive performance.

O039

DIFFERENTIAL EFFECTS OF SLEEP DEPRIVATION AND SLEEP RESTRICTION ON ERROR AWARENESS

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Introduction: The ability to detect and subsequently correct errors is important in preventing the detrimental consequences of sleep loss. We report the first study to compare the effects of total sleep deprivation (TSD) and sleep restriction (SR) on error awareness.
Methods: Thirteen healthy adults (11F, age=26.8±3.4y) underwent a 34h TSD protocol, completing the Error Awareness Task (EAT: a combined Stroop/1-back/GoNogo task) at 4h and 27h post-wake. Twenty healthy adults (11F, age=27.4±5.3y) were studied both well-rested (WR: 9h sleep) and following SR (3 nights of 3h sleep), completing the EAT once/day (8-9h post-habitual wake). The EAT required participants to withhold responding to "nogo" stimuli and signal, via a button press, whenever they realised they made an error on these nogo trials.
Results: TSD did not significantly affect error rate (p=.712) or error awareness rate (p=.517), however, participants were slower to recognise errors after TSD (p=.004). In contrast, SR increased error rate (p<.001), decreased error awareness (p<.001), and slowed recognition of errors (p<.01).
Discussion: Three nights SR impaired the ability to recognise errors in real-time, despite a greater number of errors being made. Thus, impaired error awareness may be one mechanism underlying increased sleep loss-related accidents and errors in occupational settings, as well as at home. Interestingly, 1-night TSD did not lead to more, or impaired recognition of errors. TSD participants were slower to recognise errors, which may be problematic in safety critical settings. Technological and/or operational solutions may be needed to reduce the risk of errors going unrecognised.

O040

SLEEP RESTRICTION IMPAIRS THE ABILITY TO INTEGRATE MULTIPLE PIECES OF INFORMATION INTO A DECISION

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Introduction: Sleep deprivation impacts overall decision-making, though the impact on specific components of decision-making are less well studied, especially outside of total sleep deprivation. Here, we examine the effects of sleep restriction on the ability to integrate multiple pieces of information into a decision.
Methods: Healthy adults (n=41; age=27.9±6.0 years, 20F) lived in the sleep lab for 2 counterbalanced conditions: well-rested (WR: 9-hour sleep opportunity for 4 nights) and sleep restriction (SR: one 9-hour night, followed by three 3-hour nights). Following the last night of each condition, participants performed the decision task. Across 48 trials, participants first saw two containers, with different numbers of black and white balls. Eight balls were randomly drawn, with replacement, from one unknown container. Participants decided which container was used, based on the "odds" each container was used and draw results ("evidence"). Mathematical modelling determined the amount of weight given to odds/evidence. The "best" decisions integrate both pieces of information.
Results: When WR, participants utilised both pieces of information to make their decisions, though odds were given slightly more weight. During SR, the amount of weight given to the odds did not change, and the weight given to the evidence decreased significantly.
Conclusion: SR impaired the ability to integrate multiple pieces of information into a decision. Instead, participants focused on a single piece of easy-to-understand information and did not fully utilise a harder-to-understand piece of information. This has implications for complex applied environments where individuals have large amounts of information with which to make decisions.

O041

THE IMPACT OF INCLUDING OXYGEN DESATURATIONS OCCURRING DURING AWAKE EPOCHS ON THE OXYGEN DESATURATION INDEX

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Introduction: The oxygen desaturation index (ODI) is an important measure of sleep disordered breathing during polysomnography (PSG) however there is no accepted standard for its calculation. The AASM Manual for the Scoring of Sleep and Associated events (V2.6) does not specify whether oxygen desaturations occurring during awake epochs should be included. More generally, epoch-based scoring is potentially problematic for accurate ODI calculation. This study aims to compare the calculation of ODI including and excluding oxygen desaturations occurring during awake epochs and to determine the impact of sleep efficiency (SE) on any discrepancy.
Methods: Using twenty-one consecutive unattended PSG's for investigation of OSA, two oxygen desaturation indices were calculated from each PSG; one excluding (ODIsleep) and one including (ODIall) oxygen desaturations marked in awake epochs.

Results: The median (IQR) ODIall was 19.3/h (10.3, 27.0) and ODIsleep was 13.0/h (6.6, 16.7). The median (IQR) difference (ODIall - ODIsleep) was 5.2/h (2.7, 10.4). This difference was greater with decreasing SE ($r = -.63$, $p = .002$). Patients with SE ≤ 75% (n=10) had a median ODI difference of 11.5/h (4.0, 17.6), and those with SE > 75% (n=11) had a difference of 2.8/h (2.0, 5.5) ($p = .02$).

Discussion: ODI was greater when including oxygen desaturations during awake epochs, with this discrepancy being greatest when SE is ≤ 75%. We plan to confirm these findings in a larger sample. This investigation informs clinical practice, highlights the difficulties of epoch scoring, and informs future standards for the scoring of sleep and associated events.

Advanced Trainee Presentations

O042

IMPACT OF SUPINE REM AHI ON DIAGNOSTIC SLEEP STUDIES FOR OSA

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Introduction: A conventional belief is that REM exacerbates positional OSA (POSA). Subsequently, PSGs often report on presence of supine REM with the presumption that without supine REM, the AHI may be underestimated. This study explores the impact of REM upon obstructive respiratory events in sleep when supine.
Methods: From 1/1/2019 through 31/12/2020 PSGs for OSA diagnosis performed using Sleepware G3 were reviewed. A subgroup analysis was conducted within POSA patients defined as 1) total AHI>10/hour and non-supine AHI<10/hr, 2) supine AHI>2x non-supine AHI and 3) at least 15min of supine and non-supine sleep. Data was analysed with Pearson's Chi Squared Test using Stata 16.1.
Results: Supine REM occurred in 97% of the 467 PSG's. The supine REM AHI was 32.1(95%CI 29.1–35.2), compared to supine NREM AHI of 36.6(33.5–39.6), non-supine REM AHI of 21.3(18.8–23.9) and non-supine NREM AHI of 19.9(17.3–22.5).
Among 109 POSA patients the supine REM AHI was 31.7(26.1–37.4) compared to 28.9(24.8–32.9) in supine NREM, 9.5(6.1–12.9) in non-supine REM and 3.5(3.0–4.0) in non-supine NREM.
The average duration of obstructive respiratory events was 27.3 seconds (26.2–28.5) in REM compared to 23.5 seconds (22.8–24.2) in NREM. This statistically significant difference did not persist in POSA patients.
Discussion: The results do not support an additive effect of REM beyond supine positioning among patients with POSA, however there is evidence that REM lengthens respiratory events, which may reduce AHI. In the POSA subgroup analysis, there was an increased AHI in REM compared to NREM only in the non-supine position.

O043

"MY FITBIT TELLS ME I DON'T SLEEP" – VALIDATION OF A CONSUMER-WEARABLE DEVICE (FITBIT CHARGE 3TM) USING GOLD STANDARD IN-LABORATORY POLYSOMNOGRAPHY TO ASSESS SLEEP IN ADULTS PRESENTING FOR MEDICAL EVALUATION IN A SLEEP LABORATORY

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Background: There has been a rapid growth in wearable devices marketed for sleep. Trackers such as the Fitbit collect data through an accelerometer and use heart rate variability to estimate the sleep-wake state. Currently, Fitbit validation studies have only been with "healthy" adults and Insomnia Disorder.
Aims: The purpose of this study is to evaluate the accuracy of Fitbit Charge3TM compared to in-lab polysomnography (PSG) in patients with sleep disorders. Our hypothesis is that Fitbit Charge 3TM will perform with less sensitivity and specificity relative to PSG in the presence of sleep disorders.
Methods: A prospective study of patients attending a PSG through Epworth Camberwell Sleep Lab between 2019–2021 will be conducted. Fitbit Charge3TM will be worn on the wrist with concurrent PSG monitoring.
Parameters measured with both PSG and Fitbit Charge3TM will include total sleep time, Sleep onset latency, wake after sleep onset and time spent in N1, N2, N3 and REM sleep (min). Standard PSG data will be evaluated to diagnose sleep-disordered breathing.
Progress to date:Ethics approval has been obtained, and 110 participants have been recruited. 30-second epoch-by-epoch analysis will now be conducted. Bland-Altman analyses will be performed to assess agreement between the Fitbit and PSG.
Intended outcome and impact: Our novel study findings will provide evidence to address queries regarding the accuracy of the Fitbit trackers to evaluate sleep and may support the use of Fitbit Charge3TM as an initial screening device to assess sleep duration and sleep architecture in select patients.

O044

PROMISING QUESTIONNAIRES TO MEASURE SLEEP DISTURBANCE AND IMPAIRMENT

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Background: Obstructive sleep apnoea (OSA) is highly prevalent in Australia with significant health and economic impacts. OSA severity as measured by Apnoea Hypopnoea Index (AHI) does not reliably predict symptom burden as measured by questionnaires such as the Epworth Sleepiness Scale (ESS) or Functional Outcomes of Sleep Questionnaire (FOSQ). Our hypothesis is that utilising the standardised, scenario-agnostic, evidence-based Patient-Reported Outcomes Information System (PROMIS) questionnaires would yield better clinical utility. The primary aim was to validate PROMIS questionnaires in detecting symptom burden of OSA and its relationship to AHI. Secondary outcomes were to investigate the relationship between PROMIS questionnaires and other commonly used measures of sleep impairment and disturbance, and the relationship between PROMIS questionnaires and surrogate markers of sleep impairment on a Polysomnogram.
Methods: Analysis of prospectively collected data from 122 adult patients referred to an Australian University and Tertiary Hospital associated sleep apnoea clinic. All adult patients who completed extensive pre-assessment questionnaires and subsequently underwent polysomnography following clinician review were included in this study. Questionnaires included: PROMIS Sleep Disturbance, Sleep Related Impairment and Cognitive Function-Abilities questionnaires, FOSQ, ESS, Insomnia Severity Index (ISI) and Hospital Anxiety and Depression Scale (HADS).
Progress to date: Data collected for all 122 participants. Preliminary analysis currently underway. Intended outcome and impact: Examine utility of the novel PROMIS scales in measuring symptom burden in patients referred for suspected OSA and its relationship to AHI. Investigate the relationship between PROMIS scales, surrogate markers of sleep impairment and other validated sleep disorder questionnaires.

O045

ANXIETY AND DAYTIME SLEEPINESS SCORES HAVE A WEAK BUT STATISTICALLY SIGNIFICANT CORRELATION WITH APNOEA-HYPOPNOEA INDEX.

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Background: Previous datasets demonstrate inconsistent relationships between apnoea-hypopnoea index (AHI) and questionnaire measures of daytime sleepiness, anxiety and depression.
Methods: 1149 consecutive diagnostic polysomnograms at a quaternary hospital were retrospectively analysed (2020–2021). Relationships between age, sex, AHI, Epworth Sleepiness Scale (ESS) and Hospital Anxiety and Depression Scales (HADS-A and HADS-D) were reviewed.
Progress to date:Mean age was 47.8+/-15.7 years, with male gender bias (59%). 49.9% had elevated HADS-A (>7; mean 8.1+/-4.5). 33.7% had elevated HADS-D (>7; mean 6.2+/-4.0). 29.6% had sleepiness (ESS >10; mean 7.9+/-5.0). Mean AHI was 23.5+/-27.9 events/hour. 69.7% had obstructive sleep apnoea (OSA); 45.0% were moderate-severe (AHI >14/h).
HADS-A (9.1 versus 7.3; P<0.001; 95% CI [-2.32, -1.25]), HADS-D (6.9 versus 5.8; P<0.001; 95% CI [-1.62, -0.67]) and ESS (8.2 versus 7.7; P=0.039; 95% CI [-1.21, -0.03]) were higher in females. Males had greater OSA severity (AHI 27.0/h versus 18.6/h; p<0.001; 95% CI [5.15, 11.67]).
Pearson's tests demonstrated a statistically significant but weak positive correlation between AHI and HADS-A (P=0.021, R=0.07, N=1096), and AHI and ESS (P=0.042, R=0.06, N=1135). AHI and HADS-D showed no correlation. ESS weakly correlated with HADS-A (P<0.001, R=0.237, N=1104).
Intended outcome and impact:Severity of sleep apnoea as defined by AHI only explains a small proportion of the variance in daytime sleepiness and anxiety as measured by the ESS and HADS-A, respectively, with weak linear relationships demonstrated. Neither ESS nor HADS-A were helpful in predicting the presence of OSA. Further study is required to determine optimal polysomnographic correlates of sleep apnoea symptoms.

O046

ASSOCIATION OF SLEEP CHARACTERISTICS WITH LOW MUSCLE STRENGTH: THE HYPNOLAUS COHORT STUDY

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Background: Muscle deterioration is a hallmark of aging and sleep may play a role in the development of sarcopenia. Population-based studies including objective evaluation of sleep characteristics and disorders may provide evidence of how sleep affects muscle function across adulthood. We aimed to evaluate associations of sleep characteristics with handgrip strength in a population-based cohort study.
Methods: Participants of the HypnoLaus study (Lausanne, Switzerland) aged >40 years were cross-sectionally evaluated through questionnaires and PSG. Muscle strength was assessed by hand dynamometer and low muscle strength (LMS) was defined according to the criteria for sarcopenia (<27 kg for men, <16 kg for women). Multivariate logistic regression analysis controlling for potential confounders were applied.
Results: 1902 participants (mean [SD] age, 57.4 [10.5] years; 968 [50.9%] female) were enrolled. LMS was detected in 95 (5.0%) participants. After controlling for sociodemographic characteristics, lifestyle factors, and comorbidities, objectively measured long sleep duration (>8h) was independently associated with LMS (OR=2.41, 95%CI=1.36–4.27). Subjective measures of sleep duration and quality, excessive daytime sleepiness, and other sleep characteristics obtained by PSG were not associated with LMS.
Conclusions: Objectively measured long sleep duration rather than short sleep duration was associated with LMS in a population-based study including participants aged >40 years. Self-reported sleep duration was not associated with LMS. The findings suggest long sleep duration measured by PSG is a potential risk factor for sarcopenia and should be considered as a target in preventive and therapeutic strategies against the development of muscle health decline observed with aging.

O047

SLEEP QUALITY AND FATIGUE IN CHILDREN AND ADOLESCENTS WITH MULTIPLE SCLEROSIS

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Background: Fatigue is common in children and adolescents with multiple sclerosis (MS) and its aetiology is assumed to be multifactorial, however, its relationship to sleep quality in this population remains unknown. This study aims to examine the prevalence of fatigue and sleep disturbance in this population and their relationship to mood, quality of life, physical activity, and MS disease characteristics.
Methods: Children with pediatric onset multiple sclerosis (POMS) aged 0–18 were recruited. Subjective sleep quality was assessed by the Pediatric Daytime Sleepiness Scale (PDSS), Sleep Disturbance Scale for Children (SDSC) and OSA-18. All children were referred for polysomnography (PSG) including transcutaneous CO2 and video monitoring. Fatigue was assessed using the PedsQL Multidimensional Fatigue Scale (PedsQL-MFS).
Progress to date: Fifteen children with relapsing remitting MS (mean age 15.73±1.44, mean EDSS score 1.11±1.12) have been enrolled to date. 73% of children were fatigued according to the PedsQL-MFS (mean transformed score 52.04). 67% and 60% of children scored higher than the clinical cutoff for the PDSS (17.87) and SDSC (42.73) respectively. However, all children scored within the normal range for the OSA-18 (34.00). To date, eleven children have completed PSG.
Intended outcome and impact: This is the first study utilising PSG to objectively assess sleep quality in children with POMS. Findings from this study will document the magnitude of sleep disturbance in this population and have implications for the management of fatigue and other related impairments observed in paediatric MS.

O048

THE CF ELEPHANT IN THE ADOLESCENT ROOM: A CROSS SECTIONAL STUDY OF SLEEP AND MOOD IN ADOLESCENTS WITH CYSTIC FIBROSIS

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Background: Mental health issues are of increasing burden within the adolescent CF population, with known impacts from sleep disturbance. There are limited studies examining mediators of this relationship. We aimed to investigate the relationship between sleep quality and mood in adolescents with CF alongside a range potential mediating factors including socioeconomic and family influences in adolescents.
Study Design: Adolescents with CF aged 10–18 and their parents at a Victorian tertiary paediatric CF centre were eligible. Adolescents-parent pairs cross sectionally completed age appropriate online questionnaires assessing sleep (Pediatric Daytime Sleepiness Scale, Sleep Disturbance Scale for Children), mood (Global Anxiety Disorder-7, Patient Health Questionnaire-9, Beck's Depression Inventory, Brigid Jordan CF screen), health-related quality of life (CF Questionnaire-Revised), family dynamics (Family Assessment Device, Family Management Measure), CF respiratory symptoms (CF Respiratory Symptom Score), and treatment adherence. Socioeconomic status and impacts from pandemic lockdowns were also surveyed.
Progress to date: 45 CF adolescents-parent pairs have been recruited. Questionnaires have been distributed and awaiting return of results for analysis.
Intended outcome and impact: We anticipate demonstrating the known association between impaired sleep quality and elevated mood scores. We will also make commentary on associations with a range of social factors (family dynamics, socioeconomic status) as well as parental mental health. Discussion will also include impacts on treatment adherence, HRQOL and respiratory symptom scores. Results from this pilot will inform the upcoming AREST CF prospective longitudinal study where the bidirectional relationships between factors studied can be further explored.

O049

SLEEP QUALITY AND ITS IMPACT ON CHILDREN WITH PRIMARY CILIARY DYSKINESIA

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Background: PCD is a rare, progressive disease resulting in upper respiratory manifestations and abnormal lung mechanics that increase one's risk of obstructive sleep apnoea. This study aims to characterise the sleep quality of children with PCD and its impacts on mood and HRQOL.
Methods: Children with PCD aged 0–19 years with stable respiratory symptoms were recruited. Subjective sleep quality was assessed by the Sleep Disturbance Scale for Children (SDSC), OSA-18, and Paediatric Daytime Sleepiness Scale (PDSS). Mood and depressive symptoms were assessed via QOL-PCD and Children's Depressive Inventory (CDI) as age-appropriate. Pulmonary function testing was performed via spirometry and Multiple Breath Washout. Patients underwent an ENT assessment. All children completed one night of polysomnography including transcutaneous CO2 and video monitoring.
Progress to date: Twenty participants (45% female) have been recruited with a mean age of 8.5 years. Mean (±SD) FEV1 is 76.5±22.9%. 73% of children assessed have chronic rhinosinusitis. Clinically significant scores for SDSC were observed in 79% of patients and in 30% of patients for OSA-18. 38% of children reported clinically significant scores for PDSS. To date, 7 children have completed polysomnography.
Intended outcome and impact: This is the first study to characterise sleep quality and the impact of sleep disturbance in Australian children with PCD. We aim to identify clinical markers of poor sleep quality to better inform the development of a sleep screening program for use in paediatric PCD clinics.

O050

HYPERSOMNOLENCE IN CHILDREN: THE DIAGNOSTIC DILEMMA

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Background: Excessive daytime sleepiness (EDS) is reported to affect up to 20% of pre-pubertal children and 50% of adolescents. EDS can be due narcolepsy and idiopathic hypersomnolence (IH). Currently diagnosis is by a multiple sleep latency test (MSLT) with protocols adapted from adults. The aim of this study was to describe the results of MSLTs in a paediatric population and assess whether a 5th nap altered diagnosis.
Methods: Retrospective analysis of 253 MSLTs at a single tertiary paediatric centre from May 2004 – Jan 2021 with consent obtained in 214 patients. Narcolepsy defined as a mean sleep latency (MSL) <8min with ≥2 sleep onset REM (SOREM). IH defined as a MSL < 8 minutes with <2 SOREMs. Results outside these parameters were grouped as hypersomnolence not otherwise specified (HNOS), with ambiguous HNOS defined as MSL 8–12 minutes or ≥2 SOREM.
Progress to date: There were 108 (50%) females, 132 (62%) >12 years old (range 3.3–19.4 years) and 17 patients had repeat studies. Narcolepsy was diagnosed in 48 (22%) and IH in 22 (10%). Criteria for ambiguous HNOS were met by 43 (20%) patients including 11 (5%) with MSL >12 minutes with ≥2 SOREMs. A 5th nap was performed in 58 (27%) MSLTs which did not change the diagnosis. Obstructive sleep apnoea was diagnosed in 48 (22%) patients and 27 (13%) had elevated periodic limb movement index.
Intended outcome and impact: Applying current MLST criteria in children may significantly under-estimate diagnostic categories for paediatric EDS as evidenced by the ambiguous HNOS.

POSTER PRESENTATIONS

P001

SAFETY, TOLERABILITY, AND EFFICACY OF 1 MONTH OF ATOMOXETINE PLUS OXYBUTYNIN IN OBSTRUCTIVE SLEEP APNOEA

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Introduction: Single-night studies with noradrenergic and anti-muscarinics have recently been shown to improve upper-airway function and reduce obstructive sleep apnoea (OSA) severity. This study aimed to determine the safety, tolerability, and efficacy profile of longer-term use of different doses of the noradrenergic agent atomoxetine combined with the anti-muscarinic oxybutynin (ato-oxy) in people with OSA.
Methods: Thirty-nine people with predominantly severe OSA received either 80/5mg ato-oxy, 40/5mg ato-oxy, 40/2.5mg ato-oxy or placebo nightly for 30 days according to a double-blind, randomised, parallel design. Safety and tolerability were assessed via weekly phone calls for adverse events, vital signs and objective measures of alertness and memory. Participants completed 3 in-laboratory sleep studies (baseline, night 1 and night 30) to assess efficacy.
Results: Side effects were generally mild and consistent with the known side-effect profile of each drug alone (e.g. dose-dependent increases in dry mouth with oxybutynin). Heart rate increased by night 30 in two of the drug arms versus placebo (e.g. 80/5mg ~9 beats/min, p=0.01). Blood pressure and measures of alertness and memory did not change between conditions. AHI_4 and hypoxic burden decreased by ~50% in the 80/5mg arm on night 1 with similar magnitude reductions at night 30. ~50% of participants indicated willingness to continue taking the medication post-study.
Discussion: 1 month of nightly noradrenergic and anti-muscarinic combination therapy is generally well-tolerated with a side effect profile consistent with each agent alone. These findings also further highlight the potential to target noradrenergic and anti-muscarinic mechanisms for OSA pharmacotherapy development.

P002

TARGETED NON-CPAP COMBINATION THERAPY RESOLVES OBSTRUCTIVE SLEEP APNOEA

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Introduction: Mandibular advancement splint (MAS) therapy is an effective alternative to CPAP for many people with obstructive sleep apnoea (OSA) but ~50% have residual OSA. This study aimed to resolve OSA in these individuals by combining MAS with other targeted therapies based on OSA endotype characterisation.
Methods: Eleven people with OSA (apnoea-hypopnoea index (AHI): 35±13 events/h), not fully resolved with MAS alone (AHI>10 events/h) were recruited. Initially, OSA endotypes were assessed via a detailed physiology night. Step one of combination therapy focused on anatomical interventions including MAS plus an oral expiratory positive airway pressure valve (EPAP) and a supine-avoidance device. Participants with residual OSA (AHI>10 events/h) following the anatomical combination therapy night, were then given one or more targeted non-anatomical therapies according to endotype characterisation. This included oxygen (4L/min) to reduce unstable respiratory control (high loop gain), 10mg zolpidem to increase arousal threshold, or 80/5mg atomoxetine-oxybutynin (ato-oxy) for poor pharyngeal muscle responsiveness.
Results: OSA was successfully treated (AHI<10 events/h) in all participants with combination therapy. MAS combined with EPAP and supine-avoidance therapy resolved OSA in ~65% of participants (MAS alone vs. combination therapy: 17±4 vs. 5±3, events/h, n=7). For the remaining participants, OSA resolved with the addition of oxygen (n=2), one with 80/5mg ato-oxy and another required both oxygen and 80/5mg ato-oxy.
Discussion: Targeted combination therapy may be a viable treatment alternative for people with OSA who cannot tolerate CPAP or for those who have an incomplete therapeutic response with monotherapy.

P003

THE IMPACT OF FORCED WAKE FROM OVERNIGHT POLYSOMNOGRAPHY ON MULTIPLE SLEEP LATENCY TEST RESULTS

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Introduction: The multiple sleep latency test (MSLT) is used to diagnose disorders of hypersomnolence. Although internationally-recognised protocols do not stipulate whether patients should be woken from the preceding overnight polysomnography (PSG), many labs wake their patients for logistic reasons. This study analyses the impact on PSG and MSLT parameters of forced wake (FW) from the overnight PSG compared with unrestricted sleep (US).
Methods: 400 consecutive patients (FW=200; US=200) undergoing PSG/MSLT were included and the following parameters were compared: Epworth Sleepiness Scale (ESS), Morningness-Eveningness Questionnaire score (MEQ), PSG total sleep time (TST), wake-up time from the PSG, overall MSLT sleep latency (MSL), individual nap latencies (SLNap 1–4), number of MSLT naps with sleep-onset REM periods (#SOREMP), and percentage of MSLTs with overall MSL<8 minutes (%MSLT<8).
Results: The 2 groups were well-matched for ESS and MEQ. The FW group had more males (49% vs 39%). When compared to FW, patients with US had longer TST (+38 minutes; p=<0.0001), later wake-up time (+52 minutes; p<0.0001), longer MSL (+1.9 minutes; p=0.0049), 50% fewer #SOREMP (p=0.0224), and 16% fewer %MSLT<8 (p=0.0018). SLNap1 increased by 1.5 minutes (p=0.0623), SLNap2 increased by 2.0 minutes (p=0.0067), SLNap3 increased by 0.75minutes (p=0.0533) and SLNap4 increased by 2.5 minutes (p=0.0059).
Discussion: Allowing patients to have unrestricted sleep on the night prior to the MSLT resulted in significantly longer TST, longer sleep latencies during the MSLT, fewer SOREMP and fewer

tests with MSL<8 minutes. International protocols should stipulate unrestricted sleep on the PSG prior to the MSLT to improve diagnostic accuracy.

P004

NON-INVASIVE VENTILATION - PARTNERING WITH PAEDIATRIC NDIS PARTICIPANTS AND THEIR FAMILIES

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To discuss a new funding pathway for Non-Invasive ventilation (NIV) in Paediatrics.

Since October 2019, the National Disability Insurance Scheme (NDIS) introduced funding for NDIS participants in the category 'Disability-related Health Supports - Respiratory Support'.

From August 2020, a nursing project was funded by the Hospital Executive to facilitate the transfer of NIV consumable costs to the NDIS. A retrospective review of 256 NIV patients (Bi-Level Positive Airway Pressure (BiPAP) and Continuous Positive Airway Pressure (CPAP)) and the patients NDIS eligibility status.

110 patients were identified as potential NDIS eligible patients by Primary diagnosis and their families contacted and supported to access NDIS funding for NIV device and consumables. By May 2021, 163 patients were NDIS participants on NIV therapy.

Formal Assistive Technology (Respiratory ventilation) requests were developed with Key stakeholder input and supplier quotes obtained for machines and consumables.

Nursing support, whilst labour intensive has shown to benefit Paediatric patients and their families accessing NDIS funding for NIV therapy in the future. Furthermore, the purchasing of disability-related health supports through NDIS funding is an alternative funding model for NIV in Paediatrics.

P005

THE EFFECT OF ALCOHOL ON THE MOTOR CONTROL OF THE GENIOGLOSSUS MUSCLE

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Rationale: Alcohol is recognised to worsen snoring and obstructive sleep apnea (OSA). This effect is thought to be due to alcohol's depressant effect on upper airway dilator muscles such as the genioglossus, but how alcohol reduces genioglossus activity is unknown. The aim of this study was to investigate alcohol's effect on genioglossus single motor units (SMUs).

Methods: Healthy individuals visited the lab on two days (Alcohol: breath alcohol concentration ~0.08% or Placebo). They were instrumented with a nasal mask, 4 intramuscular genioglossus SMU EMG wires and an ear oximeter. They were exposed to 8–12 hypoxia trials (45-60s of 10%O2 followed by one breath of 100%O2) while awake. The SMUs were sorted according to their firing patterns with respect to respiration and were quantified during baseline, hypoxia, hyperoxia and recovery.

Results: The total number of SMUs recorded at baseline (68 and 67 respectively) and their distribution (ET: 29 vs 22, IP: 5 vs 10, IT: 8 vs 20 and TT: 26 vs 15 respectively) was similar between conditions. The discharge frequency did not differ between conditions (21Hz vs 22.4Hz, $p>0.08$). There was no difference between placebo and alcohol in the number (101 vs 88 respectively) and distribution (ET: 35 vs 32, IP: 22 vs 16, IT: 14 vs 22 and TT: 30 vs 17 respectively, $p<0.05$) of SMUs during hypoxia. Afterdischarge following hypoxia was also not different between conditions.

Conclusion: Alcohol has little effect on genioglossus SMUs and afterdischarge. OSA following alcohol may be related to increased upper airway resistance/nasal congestion.

P006

INITIATION OF CONTINUOUS POSITIVE AIRWAY PRESSURE AS AN INPATIENT IN PATIENTS WITH OBESITY HYPOVENTILATION SYNDROME ADMITTED TO GENERAL MEDICAL UNIT.

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Background: With higher rates of obesity in regional and rural Australian population, there will be higher rates of Obesity Hypoventilation Syndrome (OHS). The cornerstone of the treatment of OHS is Positive Airways Pressure. We studied the initiation of Continuous Positive Airways Pressure (CPAP) in an inpatient setting in patients with OHS in the regional population of Ballarat and subsequent impact on their hospital stay/readmission.

Methods: We performed a retrospective study of 22 patients with OHS during the 6-month study period (01/07/2021–31/12/2021) admitted into General Medical Unit at Ballarat Base Hospital.

Progress: Complete

Outcome/Impact: The mean age in the cohort was 60 with average weight of 139.5 kg. The mean pCO2 and pH were 68.1 and 7.33 respectively. CPAP was initiated in 9 of 22 patients (40.1%) with mean of 7.3 days. Mean days of oxygen use was 4.7 days with mean length of hospital stay 10 days. We did not find any statistical difference in length of hospital stay, ICU stay, supplemental oxygen use or readmission rates between CPAP and non-CPAP group. Subgroup analysis showed that CPAP group had higher rates of COPD (44.4% vs 30.8%) and diabetes (44.4% vs 30.8%) with trend to lower FEV1 (mean FEV1 47.6% vs 57.2%). There were 4 deaths (16.7%), 3 of them did not have CPAP initiated.

The longer duration to CPAP initiation is likely to explain the non-significant difference between the groups. Proactive measures to increase initiation of CPAP is likely to improve patient outcome in terms of their morbidity and mortality.

P007

EATING IN ALIGNMENT WITH THE CIRCADIAN CLOCK: A STRATEGY TO REDUCE THE METABOLIC IMPACT OF NIGHTWORK

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Nightwork disrupts circadian rhythms and impairs glucose metabolism, increasing the risk for type 2 diabetes. We investigated eliminating or reducing the amount of food consumed during simulated nightwork as a countermeasure to reduce the impact of circadian disruption on glucose metabolism. N=52 healthy, non-shiftworking participants (24.4±4.9 years; 26 Females; BMI 23.8±2.5kg/m2) underwent a 7-day laboratory protocol with an 8h TIB baseline sleep, followed by 4 simulated nightshifts with 7h TIB daytime sleep and an 8h TIB recovery sleep in groups

of 4 participants. Each group was randomly assigned to a meal-at-midnight (n=17, 30% energy requirements), snack-at-midnight (n=16, 10% energy requirements) or no-eating-at-midnight (n=19) condition. Total 24h energy and macronutrient intake were constant across conditions. Standard oral glucose tolerance tests (OGTT) were conducted on day2 (baseline), and day7 (recovery). Plasma was sampled at -15, 0, 15, 30, 60, 90, 120, 150 mins, assayed for glucose and insulin. Area under the curve (AUC) was the calculated. Mixed model analyses of glucose AUC found a condition-by-day interaction ($p<0.001$). Glucose responses to OGTT did not change with nightwork in the no-eating-at-midnight condition ($p=0.219$) but worsened in the meal-at-midnight ($p<0.001$) and snack-at-midnight ($p=0.022$) conditions. Insulin AUC was different by condition ($p=0.047$). Insulin was highest after nightwork in the no-eating-at-midnight compared to meal-at-midnight ($p=0.014$) but not snack-at-midnight ($p=0.345$). Glucose tolerance was impaired by eating-at-midnight, associated with a lower than expected insulin response. Further work is required to determine the effect of meal or snack composition as a strategy to mitigate adverse metabolic effects of nightwork.

P008

A SYSTEMATIC REVIEW AND META-ANALYSIS OF INFLAMMATORY BOWEL DISEASE ACTIVITY AND SLEEP QUALITY

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Background: Poor sleep quality has been associated with active inflammatory bowel disease (IBD) in several studies. This review examines sleep quality in people with active IBD and in those in remission, with meta-analyses performed, considering subjective and objective sleep quality and IBD activity.
Methods: Electronic databases were searched from inception to December 1st 2020. A random effects model was used with separate meta-analyses performed for objective and subjective sleep and IBD activity, considering sleep quality in active and inactive IBD.
Results: 19 studies were included in the qualitative review representing 4972 IBD patients. Subjective IBD activity (11 studies) was associated with subjective sleep quality with pooled odds ratio (OR) for subjective poor sleep in active IBD compared to remission of 3.04 (95% CI 2.41–3.83). Including only studies with objective sleep measures (5 studies), sleep efficiency was lower in those self-reporting active IBD and time awake post sleep onset was higher in those with active IBD. Objective IBD activity was associated with subjective poor sleep (4 studies), with pooled OR of 6.64 95% CI (3.02 – 14.59). Insufficient data was available to consider objective IBD activity and objective sleep quality.
Conclusion: IBD activity is associated with poor sleep using subjective and objective measures of sleep quality. This poor sleep manifests as decreased sleep efficiency and increased number of waking episodes post sleep onset. The relationship between objective IBD activity and sleep requires further investigation.

P009

AUSTRALIAN CONSULTANT PHARMACISTS' POTENTIAL ROLES IN SLEEP HEALTH CARE - EXPLORING A NEW AVENUE FOR IMPROVING THE MANAGEMENT OF INSOMNIA

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Background: Insomnia is a highly prevalent sleep disorder and the first-line recommended treatment is cognitive behavioural therapy. However, there is persistent use of pharmacotherapy, mainly, sedative-hypnotics. Consultant pharmacists can provide medication review services for patients on polypharmacy, and are therefore well placed to educate patients and provide sleep health/insomnia care with regards to pharmacotherapy and behavioural therapy use.
Objectives: To explore consultant pharmacists' current sleep health-related practice and what their perspectives are around developing/implementing a consultant pharmacist-led behavioural service for insomnia.
Methods: Qualitative semi-structured interviews were conducted with a convenience-based sample of consultant pharmacists. Interviews were audio-recorded, transcribed and thematically analysed.
Results: Twenty-four consultant pharmacists were interviewed. Three themes were gauged: 1) Trivializing insomnia and sleep health, 2) Patients – an integral piece of the treatment puzzle, 3) Making it work. Participants commonly dealt with older patients and frequently encountered patients with sleep complaints/consuming sleep aids. Generally, it was believed that sleep health was considered a 'non-priority', with other comorbidities taking precedence in health provisions. While interested in expanding their sleep health/insomnia practice, participants expressed the need for appropriate education/training, funding and collaborative treatment configurations. Further, patients' attitudes towards treatment approaches were regarded critical to future service developments.
Conclusion: Insomnia/sleep health concerns are growing. Primary health professionals need to scale up their sleep health care provisions to accommodate for this health demand. Consultant pharmacists are interested/willing to expand their sleep-related practice and provide evidence-based insomnia therapies, however factors such as education/training, service configuration support and patient attitudes should be addressed.

P010

Abstract Withdrawn

P011

EFFECT SIZE OF VITAMIN-C ON INDICES OF SLEEP-QUALITY, FATIGUE, ENDOTHELIAL-FUNCTION, CIRCULATING HIF-1ALPHA AND PATIENT MORTALITY: A SYSTEMATIC REVIEW

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Background-Patients-with-untreated-or-undiagnosed-disordered-breathing have increased-risk-of-perioperative-complications. Increased-vitamin-C was-associated with-improved-quality-of-sleep. Furthermore, supplemental-vitamin-C has been associated with-reduced-fatigue, improved-endothelial-function, and regulation-of-HIF-1α-expression-and-reactive-oxygen-species(ROS). Administration of supplemental-vitamin-C-to-patients-treated-for-life-threatening-disease-states-with-excessive-ROS was associated-with-lowered-mortality. Since patients scheduled for elective-surgery have-a-risk of untreated-or-undiagnosed-sleep-disorder such as OSA; the hypothesis emerged that administering-supplemental-vitamin-C during the pre-operative period to people with high-STOP-BANG-scores maybe associated with lower-levels of perioperative-adverse-events. The objective of this study was to quantify the effect-sizes of vitamin-C for promoting sleep-quality, reducing-fatigue, regulating endothelial-function and circulating HIF-1α-expression, lowering mortality amongst people treated for life-threatening conditions associated with high-levels of ROS; and the impact of untreated-or-undiagnosed-OSA on peri-operative adverse-events.

Methods-A Prospero-registered(ID 262766) systematic-review in accordance with the PRISMA-2020-statement was undertaken using Comprehensive-Meta-Analysis-software to quantify effect-sizes of vitamin-C and OSA on-patient-outcomes.

Progress to date-Four-studies were identified examining-the-impact-of-higher-levels-of-vitamin-C on sleep-quality, Hedges' g=0.384(95%CI-0.180-to-0.588),p<0.001. Eleven-studies were identified examining the impact-of-supplemental-vitamin-C on fatigue. Hedges' g=0.484(95%CI-0.314-to-0.653), p<0.001. Five-studies explored the impact of supplemental-vitamin-C on improved-endothelial-function. Hedges' g = 0.988(95%CI -0.516-to-1.461), p<0.001. Five-studies examined the-impact-of-supplemental-vitamin-C on reducing-HIF-1α-expresion. Hedges'g=4.282(95%CI-2.482-to-6.066), p<0.001. Sixty-seven studies comparing-the-impact of supplemental-vitamin-C on mortality, OR=0.706(95%CI-0.615-to-0.810), p<0.001. Fourteen-studies-compared the odds of perioperative-adverse-events amongst patients at high-risk-of-OSA with controls; OR = 2.687(95%CI-1.705-to-4.233), p<0.001).

Intended Outcome and Impact-Statistically-and-clinically-significant-evidence was-observed-supporting the hypothesis that-the-biology-of-abnormal-sleep-states could be regulate-by supplemental-vitamin-C; and untreated-or-undiagnosed-OSA was associated with increased-perioperative-adverse events. Due to the-lack-of-clinical-equipoise regarding supplemental-vitamin-C promoting-healthy-sleep, regulate-the-pathological-impacts of intermittent-hypoxaemia and oxidative-stress, future-ethical-research will require all-eligible-subjects to-be-offered vitamin-C. Prospective-supplemental-vitamin-C-treated-groups could be compared with historic-controls; or standard pre-operative-care and standard pre-operative-care-plus supplemental-vitamin-C could be randomised according to surgical-centre to promote ethical-clinical-investigation. These experimental-design-considerations also have implications for improving-clinical-governance in the current-era-of-fiscal-restraint.

P012

MATERNAL AND INFANT STRESS DURING A BEDTIME SEPARATION: A PILOT RCT

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Background: Behavioural sleep interventions to improve infant sleep disturbance commonly include extinction where an unwanted behaviour (night time crying) is periodically ignored. There have been conflicting findings regarding the impact of extinction methods on infant stress levels as measured with cortisol and as perceived by mothers and only one that measured cortisol at the time of the separation. This study aimed to compare a responsive method to extinction (controlled crying) and a control group evaluating subjective and objective stress for mother/infant dyads at the time of bedtime separation.

Methods: Mother/infant dyads were randomly allocated to behavioural sleep interventions (Responsive - n= 7, Controlled Crying - n=6 or Controls - n=4). Cortisol (two oral swabs on two nights at T2), maternal self-reported stress (Subjective Units of Distress - SUDS), and perceived infant distress (PIS) were compared over eight weeks. Correlations tested relationships between PIS, SUDS and infant cortisol levels. Mixed models analysis were used for cortisol analyses.

Results: There were no significant differences in cortisol levels between groups across time points but significant inter and intra-individual variability. Maternal stress was positively correlated with infant cortisol and PIS ($p<0.05$) and mothers in the Responsive group were significantly less stressed ($p=0.02$).

Conclusion: In this small sample, infant cortisol during bedtime separation was variable, elevated in all sleep interventions and not significantly different. Mothers were less stressed in the Responsive group. Findings indicate responsive methods are comparable to extinction and less stressful for mothers offering a possible gentler choice at bedtime separation.

P013

A PILOT STUDY FOR ULTRASOUND EXAMINATION OF THE PTERYGOMANDIBULAR RAPHE TO PREDICT EFFICACY OF MANDIBULAR ADVANCEMENT SPLINT THERAPY IN OBSTRUCTIVE SLEEP APNOEA

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Background: A lack of predictive indicators for mandibular advancement splint (MAS) efficacy limits their use in the treatment of obstructive sleep apnoea (OSA). The absence of a tendinous pterygomandibular raphe (PMR) in the lateral nasopharynx on MRI may predict MAS efficacy, however MRI is time and resource intensive. We aimed to assess the feasibility of ultrasound in determining PMR absence compared to MRI.

Methods: 10 healthy participants were recruited to undergo both MRI and ultrasound of the lateral airway. Surrounding anatomical landmarks were examined to establish the presence or absence of the PMR. These results will be compared to MRI to determine parameters on ultrasound which correlate to an absent PMR.
Progress to date: 8 of the 10 participants have undergone both MRI and ultrasound, of which half were women, mean age 53 years, mean BMI 28 and mean AHI 3. In all 8 participants so far parameters for assessment of the PMR were identified and described, including presence of anatomical landmarks, localisation and width of the PMR space, and presence of a hyperechoic structure within the space. Comparison of these parameters with MRI to determine predictors of PMR presence or absence is currently underway.
Intended outcome and impact: Validation of ultrasound in the assessment for presence or absence of a tendinous PMR will enable further study of this structure as a predictive marker for MAS efficacy in OSA. This could assist clinicians in identifying suitable patients for MAS therapy.

P014

SHIFT WORK DISORDER AND THE PREVALENCE OF HELP SEEKING BEHAVIOURS FOR SLEEP CONCERNS IN AUSTRALIA

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Introduction: Shift work disorder is a circadian rhythm sleep-wake disorder, defined by symptoms of insomnia and excessive levels of sleepiness resulting from work that occurs during non-standard hours. Sleep problems are common in shift workers, yet our understanding of help-seeking behaviours for sleep in shift workers is limited.
Methods: As a part of a national sleep health survey, data were collected on the help-seeking behaviours for sleep problems in an online sample of Australian individuals on non-standard work schedules (n=448). Of the sample of non-standard workers, 10.5% (n=41) met the criteria for probable shift work disorder (pSWD).
Results: Non-standard workers with pSWD did not seek help for sleep problems at higher rates than workers without SWD (p = .979). General practitioners were the most reported healthcare professional sought out for sleep problems of individuals with pSWD. Self-management was common in workers with pSWD, with a high self-reported prevalence of alcohol use (31.7%) as a sleep management strategy, and caffeine consumption (76.9%) as a sleepiness management strategy. The majority of individuals with pSWD reported the mentality of 'accept it and keep going' as a sleepiness management strategy, highlighting a potential barrier to help-seeking behaviour in workers with pSWD.
Discussion: These findings provide novel insight into the help-seeking behaviours of individuals with pSWD. There is a need for further research to understand why individuals at risk for shift work disorder are not actively seeking help, and to develop health promotion and intervention strategies to improve engagement with healthcare professionals.

P015

HOME (LEVEL 2) SLEEP STUDIES ARE FEASIBLE IN CHILDREN

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Introduction: In-hospital polysomnography (PSG or Level 1 study) is the "gold-standard" for investigating sleep disorders in children. There are long waiting lists for sleep studies in Australian tertiary centres. Level 2 home-PSG has been proposed as an alternate option. However, there are limited data regarding the feasibility in a clinical population. The aim of this study is to assess the feasibility and patient experience of home-PSG in a clinical cohort.
Methods: The signal quality and outcomes of a home-PSG in young people undergoing sleep investigation in a single centre were reviewed. A successful home-PSG was defined as a study with ≥ 6hrs of sleep and all channels present for ≥90% of sleep time. Feedback from the guardian/young person was collected using a questionnaire.
Results: Fifty-five patients (4m-18yrs) were included. Successful home-PSG, on the first attempt, was achieved for 48/55 (87%) patients. There were no differences in success when accounting for neurodevelopmental conditions, OSA severity or age. A clinical diagnosis was confidently made in 53 (96%) patients. The majority (76%) rated their sleep as the same or better than normal and only 12% found having the study conducted at home difficult. Following the study, only 8% would have preferred a hospital sleep study.
Discussion: Home-PSG produced technically adequate recordings for most subjects and families found the experience of having a home sleep study to be positive. These data support, in appropriate circumstances, home-PSG as a viable alternative to an in-patient sleep study.

P016

DAYTIME LIGHT EXPOSURE PREDICTS BETTER MOOD-, SLEEP- AND CIRCADIAN-RELATED OUTCOMES IN >8,000 UK BIOBANK PARTICIPANTS

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Introduction: Light has powerful effects on mood, sleep, and the circadian system. Humans evolved in an environment with a clear distinction between day and night, but our modern lighting environments have blurred this distinction. While the disruptive effects of night time light exposure are well described, the potential positive effects of daytime light exposure on these systems are less well studied.
Method: Participants were a subset of the UK Biobank cohort who were invited to complete a seven day wrist-worn actimetry and light sensor study (n = 8,372, 61% female, age range: 39–70). Hierarchical linear models assessed the association between average daytime light exposure and mood-, sleep- and circadian-related outcomes, adjusted for age, sex, and season of assessment.
Results: Greater daytime light exposure was associated with earlier chronotype (p < .001), greater ease of getting up in the morning (p < .001), lower odds of using antidepressant medication (p < .001), less frequent low-mood (p = .002), less frequent anhedonia (p < .001), greater happiness (p < .001), less frequent insomnia symptoms (p = .01) and less frequent tiredness (p < .001).

Conclusions: In the largest study to-date, we observe that greater daytime light predicts better outcomes across a range of mood-, sleep- and circadian-related measures. Our findings are consistent with the known effects of light on the circadian system, whereby greater daytime light enhances the strength of the rhythm allowing for greater distinction between sleep and wake states. These findings

P017

AM I SLEEPY? – SUBJECTIVE SLEEPINESS AND DROWSY DRIVING: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Driving impairment due to sleep loss is a major contributor to motor vehicle crashes resulting in severe injury or fatalities. Ideally, drivers should be aware of their sleepiness and cease driving to reduce risk of a crash. However, there is little consensus on how accurately drivers can identify sleepiness, and how this relates to subsequent driving impairment. To examine whether drivers are aware of their sleepiness, we systematically reviewed the literature.
Methods: The research question for this review was "are drivers aware of sleepiness while driving, and to what extent does subjective sleepiness accurately reflect driving impairment?". Our search strategy led to thirty-four simulated/naturalistic driving studies for review. We then extracted the relevant data. Correlational data were examined using meta-analysis, while predictive data were assessed via narrative review.
Results: Results showed that drivers were aware of sleepiness, and this was associated with both driving impairment and physiological drowsiness. Overall, subjective sleepiness was more strongly correlated (a) with ocular and EEG-based outcomes (rweighted = .70 and .73, respectively, p<.001), rather than lane position and speed outcomes (rweighted = .46 and .49, respectively, p<.001); (b) under simulated driving conditions compared to naturalistic drives; and (c) when the Karolinska Sleepiness Scale was used to measure subjective sleepiness. Lastly, high levels of sleepiness significantly predicted crash events and lane deviations.
Discussion: This review presents evidence that drivers are aware of sleepiness when driving, and suggests that interventions such as stopping driving when feeling 'sleepy' may significantly reduce crash risk.

P018

THE EFFECTS OF ZOPICLONE ON SLEEP SPINDLES IN OBSTRUCTIVE SLEEP APNEA: A RANDOMIZED PLACEBO-CONTROLLED TRIAL

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Purpose: This study aimed to determine the effects of a standard dose of zopiclone (7.5mg) on sleep spindle activity and to assess if potential changes in sleep spindles correlate with improvements in next-day measures of sleepiness and simulated driving performance in people with obstructive sleep apnoea (OSA).
Methods: Thirty-one people with OSA completed polysomnography (PSG) at baseline followed by 1-month nightly treatment with 7.5mg zopiclone or placebo according to a double-blind, parallel design (ANZCTRN12613001106729). Participants completed two further PSGs on the first (night1) and final (night30) night of treatment. A 30-min AusEd driving simulator task and a subjective sleepiness questionnaire (Karolinska sleepiness scale, KSS) on each visit were also performed in the morning. Sleep spindle events and spindle frequency activity (SFA, sigma EEG power) were quantified during N2 sleep from all-night EEG recordings.
Results: Sleep spindle events were consistently higher in both frontal and central EEG sites on night1 and night30 treatment nights in the zopiclone group compared to placebo (e.g. F4 night30 = 346[SEM±28] vs. 239[SEM±27] total # of sleep spindles respectively, p=0.009). Additionally, greater sleep spindle density in the zopiclone group correlated with better next-day simulated driving performance on night1 and night30. No correlations were observed between sleep spindle activity and the KSS.
Conclusions: Zopiclone is associated with greater sleep spindle activity in OSA compared to placebo, and sleep spindle increases are associated with better driving simulator performance. Thus, hypnotic-induced increases in sleep spindles may help alleviate certain cognitive performance decrements in people with OSA.

P019

OBSTRUCTIVE SLEEP APNOEA ENDOTYPES IN PEOPLE WITH MULTIPLE SCLEROSIS

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Purpose: Obstructive sleep apnoea (OSA) is common in people with multiple sclerosis (MS) despite a lack of typical risk factors for OSA in people with MS such as obesity and male predominance. Therefore, underlying factors other than sex and obesity may be particularly important in the pathogenesis of OSA in people with MS. Thus, the primary aim of this study was to determine the relative contributions of OSA endotypes in people with MS and compare this to matched controls with OSA only.
Methods: Eleven people with MS and OSA (MS-OSA group) (apnoea-hypopnoea index [AHI]>5events/h) and eleven controls matched for OSA severity, age and sex without MS (OSA group) were studied. Participants underwent a detailed overnight polysomnography with an epiglottic pressure catheter and genioglossus intramuscular electrodes to allow for quantification of pathophysiological contributors to OSA. This included the respiratory arousal threshold, genioglossus muscle responsiveness, respiratory loop gain and upper airway collapsibility.
Results: Measures of the four primary OSA endotypes were not different between the MS-OSA and OSA groups (e.g. NREM respiratory arousal threshold -27±15 vs. -23±8 cmH_2O respectively, p=0.24). Within group analysis indicated higher loop gain in non-obese MS-OSA participants compared to obese MS-OSA participants (0.53±0.11 vs. 0.37±0.11, p=0.04).
Conclusions: Overall, OSA endotypes are similar between MS-OSA participants and matched OSA controls. However, within the MS-OSA group, non-obese participants have higher loop gain (unstable respiratory control) compared to obese participants. Thus, unstable respiratory control may play an important role in OSA pathogenesis in many people with MS.

P020

REDUCED DURATION AND CONTINUITY OF N3 SLEEP IS ASSOCIATED WITH EXCESSIVE DAYTIME SLEEPINESS IN SUSPECTED OBSTRUCTIVE SLEEP APNEA PATIENTS

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Introduction: Excessive daytime sleepiness (EDS) is a common but not universal-accompanying symptom of obstructive sleep apnea (OSA). The mechanisms explaining the presence of EDS in OSA subjects are not fully understood. We hypothesised that characteristic differences in sleep architecture can be quantified with more comprehensive descriptors of sleep continuity in those with and without severe-EDS according to the Multiple Sleep Latency Test (MSLT).
Methods: 2111 participants with suspected OSA and complaints of daytime sleepiness underwent in-lab diagnostic polysomnography (PSG) and next-day MSLT. Sleep continuity was quantified by calculating the cumulative-frequency relationship of continuous sleep-state duration against proportion of sleep time; and continuous sleep-state duration against absolute sleep time.
Results: Study contained 368 severe-EDS participants (MSLT≤5min) and 385 non-EDS participants (MSLT>15min). Severe-EDS participants had less Wake After Sleep Onset (48.1±37.7 vs. 68.1±44.2-minutes, $p<0.05$ [mean±SD]), and greater Total Sleep Time (366.5±50.3 vs. 336.2±58.2-minutes, $p<0.05$). While total NREM sleep time was similar between groups, severe-EDS participants had less N3 sleep (67.7±38.0 vs. 78.6±32.0-minutes, $p<0.05$) and more N2 sleep (230.7±59.3 vs. 178.4±45.9-minutes, $p<0.05$). Moreover, severe-EDS participants had both less cumulative N3 sleep (36.9±2.9 vs. 60.0±3.3-minutes, $p<0.05$) and a lower proportion of N3 sleep (66.8±5.3% vs. 77.2±4.2%, $p<0.05$) occurring in periods ≥10mins duration.
Discussion: Whilst OSA participants with severe EDS have similar NREM sleep time to non-EDS participants; they have less N3 sleep, and N3 sleep periods are less consolidated. These preliminary results suggest that individuals with OSA which disturbs both the quantity and consolidation of N3 sleep are at greater risk of severe EDS.

P021

DOES OBSTRUCTIVE SLEEP APNEA (OSA) LEAD TO IMPAIRMENT WITHIN THE COCHLEA?

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Introduction: The cessation of breathing with OSA is linked to the continuous decrease in oxygen saturation throughout the night which could impact the inner ear as it is sensitive to hypoxic changes. Inner ear hair cells response from the cochlea is measured through Transient Otoacoustic Emission (TEOAEs). This study aimed to evaluate TEOAEs in suspected OSA patients and its correlation with oxygen saturation.
Methods: TEOAEs were measured before sleep and in the morning in suspected OSA patients and healthy participants. The following frequencies were measured: 1000Hz, 1500Hz, 2000Hz, 3000Hz and 4000Hz. Polysomnography with oxygen saturation was completed overnight. Preliminary analysis was completed on 11 no OSA, 22 mild OSA, 13 moderate OSA and 27 severe OSA patients.
Results: One-way ANOVA with Tukey post-hoc analysis revealed a difference between severe vs mild with average TEOAE only ($p = 0.04$). A moderate correlation was found between average TEOAE and minimum O2 saturation, $rs (72) = 0.444$, $p< 0.0001$) through Spearman's rank-order correlation. As middle ear function can impact TEOAE results, regression analysis revealed an association between a decrease in TEOAE and lowered minimum O2 saturation ($F (1,63) = 8.951$, $p = 0.004$, partial $n2 = 0.124$) when middle ear pressure was controlled.
Discussion: Oxygen desaturation with OSA is associated with a decrease in inner ear hair cells response, which was independent from middle ear function. Despite this association, a difference in TEOAE was only found between severe vs mild, which could be due to the current sample size of the preliminary data.

P022

UNATTENDED HOME SLEEP STUDIES HAVE A HIGH RECORDING FAILURE RATE IN A PREOPERATIVE ANAESTHETIC CLINIC COHORT WHEN DONE AS A ROUTINE SCREENING PROCEDURE FOR OBSTRUCTIVE SLEEP APNOEA (OSA)

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Introduction Preoperative screening for OSA is strongly advised but attended laboratory sleep studies have limited availability. Portable unattended sleep monitors, such as ApneaLink, may provide a practical solution for large scale preoperative OSA screening. However, these unattended monitors may be prone to data recording failure.
Methods: We performed a prospective, uncontrolled, before-after study from March 2017 to December 2018 where patients from a pre-operative anaesthetic clinic were screened for OSA with an ApneaLink home sleep study (AHSS). 24 initial patients were provided with version 1 (v.1) recording instructions, while the next 24 patients received version 2 (v.2) which included colour, more detail and larger pictures compared to v.1. Recording failure was defined as an absence of recorded ApneaLink data. We analysed predictors of recording failure including instruction version and patient factors using logistic regression.
Results: Thirty-three of 48 (69%) patients successfully completed an AHSS. Failure rate was 31%. Median duration of recorded data was 480 minutes. The successful recording group was more likely to have used v.2 instructions than the failure group (61% vs. 27%; p=0.029). The odds ratio for successful recording using v.2 was 4.2 (95% CI: 1.1–16.2). Age, gender, country of birth, and number of days prior to surgery were not associated with recording failure.
Discussion: There was a high failure rate of AHSS for OSA screening from a preoperative anaesthetic clinic. Clear written

instructions with greater use of colours and pictures may improve the recording success rate in this cohort.

P023

QUANTITATIVE EEG ANALYSIS OF POLYSOMNOGRAPHY IN A CASE OF FATAL FAMILIAL INSOMNIA

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Purpose . To report on quantitative electroencephalograph (EEG) activity during polysomnography (PSG) in a rare case of confirmed Fatal Familial Insomnia (FFI).

Methods. Sleep/wake characteristics of a 32-year-old male patient were quantitatively analysed using central EEG recordings during two PSGs (FFI-1 and FFI-2) first, for investigation of insomnia and PLMS but with no suspicion of FFI and second, 120 days later with suspected but unconfirmed FFI at the time; 89 days prior to death. PSG metrics; absolute EEG power in specified frequency bands; EEG slowing ratio of slow-to-fast frequencies ((delta + theta)/ (alpha + sigma + beta)); and sleep spindle density were calculated. Results were compared with gender and age-matched insomnia and healthy controls (two of each).

Results: FFI-1 and FFI-2 PSGs revealed total time in bed of 413.5 and 392 minutes, total sleep times of 208.5 and 7.5 minute, including NREM 153.0 and 2.5 minutes, and REM 55.5 and 5.0 minutes, respectively. FFI-1 had approximately 1.5 times lower slow wave activity (SWA, 0.5–4.5Hz) during N3 than insomnia and controls. FFI-1 had 2 times and 1.8 times higher slowing ratio during REM than insomnia and controls, respectively. Spindle density (per minute of NREM sleep) for FFI-1 was 0.9, compared to pair-averages of 1.2 for insomnia disorder and 4.7 for healthy controls.

Conclusions: PSG in FFI revealed poor sleep efficiency that severely deteriorated with disease progression. Quantitative analysis of EEG revealed lower spindle density, lower SWA in N3, and higher slowing ratio in REM, when compared to insomnia patients and healthy sleepers.

P024

CHILDREN'S SLEEP AND FATHERS' HEALTH AND WELLBEING: A SYSTEMATIC REVIEW

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Introduction: Night-waking is typical across infancy and early childhood. Although mothers are traditionally primary carers for children overnight, child sleep may impact others in the household, such as co-dwelling fathers. Despite expectations of more 'hands on' fathering, the relationship between children's sleep and fathers' health and wellbeing has not been previously synthesised.

Methods: This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement and registered with the Prospective Register of Systematic Reviews (PROSPERO). Focusing on fathers, this review synthesised evidence pertaining to effects of children's sleep (from birth to 12 years) on fathers' health and wellbeing.

Results: From 4,421 records, 29 studies met inclusion criteria. Findings showed: (1) child sleep was associated with father's sleep when child sleep was measured through father-report or objective measurement; (2) poorer child sleep was associated with poorer general health and wellbeing among fathers, however, associations of poor child sleep with depression were fewer; and (3) poor child sleep was negatively associated with quality of within-couple and parent-child relationships.

Discussion: Results suggested two principal issues: (1) Systematic variation in measures and findings underscores importance of objective measurement. Yoked actigraphy techniques are vital for understanding inter-relationships of family sleep and attendant outcomes. (2) Different patterns of child sleep and parent outcomes suggest direct and indirect pathways of effect. Understanding patterns of overnight caregiving, and factors underpinning parent decisions, are important for understanding mechanisms linking child sleep to fathers' outcomes and for designing effective interventions to support parents.

P025

EXPERT OPINIONS TO DEVELOP A SLEEP INTERVENTION FOR PATIENTS WITH LOW BACK PAIN: A NOMINAL GROUP STUDY

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Introduction: Insomnia is a common comorbidity of low back pain. Research has investigated the use of cognitive behavioural therapy interventions for insomnia (CBT-I) to treat these conditions but show little effect on improving pain outcomes. This study sought the opinion of experts to explore how existing online CBT-I interventions could be optimised to improve sleep and pain outcomes in patients with comorbid insomnia and LBP.

Methods: This study was conducted using the nominal group technique, a structured meeting to generate ideas and rank priorities amongst a panel of experts. Musculoskeletal researchers (n=7) and clinicians (n=1), sleep researchers (n=2), and a consumer advocate (n=1) were purposively sampled to participate in a 2-hour online nominal group workshop. A quantitative analysis was conducted to rank ideas by their relative importance. A qualitative analysis was used to provide context on the highest ranked ideas.

Results: A total of 58 ideas were generated and subdivided into 11 primary categories, each of which contained a varying number of sub-ideas. The primary categories, personalisation of care, assessment guided management, understanding the user experience, personalised advice on physical and environmental factors, and continual re-assessment to guide management, were ranked one to five respectively and accounted for 73% of all votes from the panel.

Discussion: An intervention framework consisting of three interacting domains, personalisation of the intervention, assessment guided management, and user experience was proposed. This framework outlines recommendations that should be considered to improve online CBT-I interventions to treat patients with comorbid insomnia and low back pain.

P026

SLEEP DURING THE TRANSITION TO SHIFT WORK: PRELIMINARY FINDINGS OF A LONGITUDINAL FIELD STUDY OF COMMENCING PARAMEDICS

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Paramedics are at increased risk of occupational injuries, mental illness and poor health outcomes. Little is known however about the role of poor sleep in such outcomes and the way in which sleep may change as an individual commences work as a paramedic. The aim of the present study is to investigate changes in sleep as paramedics commence work.

As part of an ongoing, longitudinal study of Australian paramedics, participants undertake a baseline assessment prior to commencing work and a follow up every three months for a year. At each time point paramedics wear an actigraph (GENEActiv) for seven days, and complete an online survey including the Pittsburgh Sleep Quality Index (PSQI). The present preliminary analysis utilised linear mixed models to test the effect of commencing work as a paramedic on participants' sleep quality.

Preliminary results from the first cohort of recruits are reported (n=9 commencing paramedics, mean age (+SD) = 25.2±4.4, 56% female). There was a significant increase in PSQI scores from baseline (T0: 2.4±1.4) to three months (T1: 5.2±3.9) ($F(1, 8) = 5.47$, $p = 0.05$). The percentage of individuals with clinically poor sleep (PSQI ≥5) increased from 0% (n=0) at T0 to 56% (n=5) at T1.

Commencing paramedics report significantly poorer sleep quality compared to their pre-commencement levels. Interestingly, baseline PSQI scores indicate no participants were experiencing clinically defined poor sleep. However, at follow-up over half the sample reported clinically defined poor sleep. Findings of objective sleep and wake outcomes are anticipated for the meeting in October.

P027

THE CLINICAL ROLE AND OUTCOMES OF NON-INVASIVE VENTILATION IN MOTOR NEURON DISEASE: AN AUSTRALIAN TERTIARY HOSPITAL EXPERIENCE

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Introduction: In motor neuron disease (MND), non-invasive ventilation (NIV) in patients who develop respiratory muscle weakness improves both quality of life and survival. This study aimed to evaluate the current practice and outcomes of NIV use in MND patients in an Australian tertiary hospital.

Methods: The medical records of all MND patients who attended a specialist multidisciplinary clinic requiring NIV treatment between January 2015 and January 2020 were retrospectively analysed.

Progress to date: Forty-five patients have been analysed with a mean age at time of NIV commencement of 61±10(SD) years, 67% were male, 33% were current or past smokers and 7% had OSA with previous CPAP use. MND onset was limb in 58%, bulbar in 36% and respiratory muscle in 7%. Riluzole was prescribed in 47% and PEG/RIG insertion performed in 47%.

At time of NIV commencement, 82% were symptomatic and 47% hypercapnic. No patient was commenced based on functional testing alone.

NIV adherence (usage ≥4hours/night) was observed in 80%. NIV non-adherence was associated with bulbar subtype ($p=0.02$) and empirical NIV initiation ($p<0.01$) on univariate analysis.

Average survival from NIV commencement was 17±22(SD)months. Average survival on NIV in adherent patients was 19±24(SD) months and non-adherent patients was 2±2(SD)months, although this did not reach statistical significance ($p=0.1$).

Intended outcome & impact: Overall clinical practice and outcomes of NIV use in this study is comparable to literature. The factors influencing NIV tolerance and adherence require further study to optimise outcomes in MND patients with respiratory muscle weakness.

P028

THE NOX A1 AMBULATORY SYSTEM IS RELIABLE WHEN SELF-APPLIED

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Background: Home Sleep Apnea Tests (HSAT) increases access to SDB diagnostic testing (Safadi, 2014). A previous study defined a reliable HSAT if: ≥4hours total recording time, an intelligible position signal and respiratory effort, airflow and oximetry for at least 80% of the night were recorded, however, admits no standardized criteria in the literature (Domingo, 2010).

Aim: To test the reliability of a self-applied HSAT using the Nox-A1 ambulatory system (NOX Medical, Iceland).

Method: Patients self-applied the HSAT guided by industry produced video and written instructions. Signals for the HSAT included; two electro-occulagrams (EOG), two sub-mental electromyograms (EMG), a single modified frontal encephalogram (EEG), a lead I ECG, single leg anterior tibialis EMG, chest and abdominal inductance respiratory effort, nasal pressure airflow, WristOx 2 3150 SpO2 (Nonin Medical, Inc., USA) and 3-D accelerometer and body position sensor. Analysed with ProFusion PSG 4 (Compumedics Limited, Australia) after importing data into Nexus. 33 consecutive studies were recorded during lock-down. Recording satisfactory if SpO2 signal and EEG present >80% of study, it was considered a failure if doctor requested test repeat.

Results: 33 subjects, age 43.1 ± 13.7 years, BMI 27.4 ± 6.0 kg/m2, 66.6% male. 81.8% of studies satisfactory. 6% of studies needed a repeat in-lab PSG due to 1) loss of oximetry & EEG and 2) loss of EEG

Discussion: 6% doctor request repeat in-lab PSG is comparable to a study (Lloberes, 2001) of partially self-applied HSAT. Demonstrated good reliability with this self-applied COVID-safe method of HSAT.

P029

HOME VIDEO SLEEP RECORDING AS A SCREENING TOOL FOR PAEDIATRIC OBSTRUCTIVE SLEEP APNOEA

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Introduction: Polysomnography (PSG) remains gold standard for assessment of paediatric OSA, despite limitations. Home-based video sleep recordings offer a promising screening tool that would be relatively simple and inexpensive but have been minimally

investigated. This study aims to assess the ability of short home-based video sleep recordings to predict PSG-diagnosed OSA in a population of healthy children.
Methods: Healthy children aged 1–18 years undergoing PSG to assess for OSA were recruited. Those with comorbidities likely to cause/exacerbate OSA, aside from adenotonsillar hypertrophy and obesity, were excluded. Thirty-minute video recordings of sleep shortly after sleep onset capturing the face and exposed torso were obtained. A previously validated scoring system was modified to include six parameters: snore, inspiratory noise, respiratory events, respiratory effort, mouth breathing and neck extension.
Results: We report interim results of this ongoing study. Of the 51 children meeting inclusion criteria, videos for 44 (28M, mean (SD) age 8.58 (2.96) years) were deemed satisfactory and analysed. Four (9%) children had OAHI >5 episodes/h on PSG and median Total Video Score (TVS) was 0 (IQR 0–1). TVS and OAHI >5 episodes/h on PSG showed a statistically significant association (OR 2.782, p=0.006) with area under the curve of 0.847. TVS ≥4 showed sensitivity of 75% and specificity of 100% for OAHI >5 episodes/h.
Discussion: This video scoring system, when applied to short home-based video sleep recordings, showed acceptable diagnostic accuracy for PSG-diagnosed OSA. Full data analysis will further clarify the role of this modality as a screening tool for paediatric OSA.

P030

THE EFFECTS OF CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) THERAPY IN MODERATE TO SEVERE OBSTRUCTIVE SLEEP APNEA (OSA): A HIGH-DENSITY ELECTROENCEPHALOGRAPHY (EEG) STUDY

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Introduction: A previous high-density EEG investigation in OSA showed regional sleep EEG deficits particularly slow wave activity (SWA) in the parietal region. It is unclear whether CPAP treatment can reverse local sleep EEG abnormalities, and whether any recovery is related to improved cognitive function.
Methods: Fifteen males with moderate-severe OSA (age 50.4±6.5yrs, AHI 51.7±23.5/h) underwent polysomnography with 256-channel high-density EEG at baseline and following 3 months of CPAP. Tasks assessing cognitive performance and sleep-dependent memory were administered. Topographical spectral power maps were calculated for standard frequency ranges for sleep stages. Differences in normalized power between baseline and treatment were determined by statistical nonparametric mapping.
Results: In 11 CPAP compliant patients (data loss: intolerant of CPAP[n=3]/high-density EEG [n=1]), total sleep time did not change after CPAP but N1 (baseline vs. treatment: 66.9 vs. 39.5 mins, p=0.008) and N2 (195.0 vs. 150.6 mins, p=0.002) sleep was lower and N3 (89.8 vs. 128.7 mins, p=0.003) was higher. Topographic high-density EEG analysis revealed a regional increase in SWA (1–4.5Hz) during N3 sleep in a cluster of 22 electrodes overlying the parietal cortex (paired t-test, t(10)=-3.9, p=0.0029). The change in N3 SWA in the parietal cluster after CPAP was correlated with improved overnight procedural memory on the motor sequence task (rho=0.79, p=0.03) and better executive functioning (Stroop accuracy, rho=0.73, p=0.01).
Conclusion: CPAP treatment reduces localised deficits in sleep EEG, and specific regional recovery relates to short-term improvements in memory and executive function. These data also highlight the potential for long-term therapeutic effects on cognitive outcomes.

P031

ASSOCIATIONS BETWEEN SOUND PRESSURE LEVELS AND AMPLITUDE MODULATION FROM WIND FARM NOISE AND AMBULATORY RECORDED OBJECTIVE MACRO-SLEEP PARAMETERS

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Introduction: This study used ambulatory sleep studies to examine potential relationships between wind farm sound pressure level ([SPL] in dBA) and amplitude modulation (AM) on conventional measures of sleep quality in individuals residing within 10 km of a wind turbine in Australia.
Methods: Twenty six individuals (42:58%, females:males) aged (mean ± standard deviation) 53.2±12.2 years and residing 2.9±1.7 km from the nearest wind turbine underwent two consecutive ambulatory sleep studies and detailed indoor time-synchronised acoustic recordings inside their home. Associations between averaged whole night SPL and AM prevalence versus sleep onset latency, wake after sleep onset (WASO), percentage of sleep in each stage, sleep efficiency and total sleep time on each recording night were explored using bivariate and multiple regression analyses, using log-normalised data where required.
Results: Forty-five technically successful sleep studies (24 night 1, 21 night 2) were available for analysis. On night 2, AM prevalence explained 18.9% of the variance in sleep efficiency (R=.434, F(1,19)=4.421, p=0.049) and SPL explained 23.5% of the variance in WASO (R=.484, F(1,19)=5.821, p=0.026) in multiple regression analyses adjusting for age. No other sleep macrostructure variables were associated with AM prevalence or SPL on either night.
Conclusion: Weak relationships between SPL and AM prevalence and sleep outcomes in a real-world wind farm noise exposure setting support the need for more detailed investigations of potential wind farm noise effects on sleep quality.

P032

ADEQUATE HEALTH LITERACY PREDICTS ADHERENCE TO CONTINUOUS POSITIVE AIRWAY PRESSURE IN ADULTS WITH OBSTRUCTIVE SLEEP APNOEA

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Study Objectives: Obstructive sleep apnoea (OSA) is a chronic disease with significant health implications and adequate adherence to continuous positive airway pressure (CPAP) is essential for effective treatment. In many chronic diseases, health literacy has

been found to predict treatment adherence and outcomes. In this study, the aim was to determine the health literacy of a sleep clinic population and evaluate the association between health literacy and CPAP adherence.
Methods: A prospective cohort study was undertaken, recruiting 104 consecutive patients with a variety of sleep diagnoses attending the clinic. The Short Form Rapid Estimate of Adult Literacy in Medicine (REALM-SF), a validated questionnaire was administered to measure health literacy. In a sub-group of 91 patients prescribed CPAP for OSA, CPAP usage was measured, with adequate usage defined as greater than 4hrs/night CPAP therapy.
Results: 71% of the sleep clinic cohort was found to have adequate health literacy as measured by the REALM-SF. In those prescribed CPAP for OSA, inadequate health literacy was associated with a two fold increase risk for inadequate CPAP usage (adjusted odds ratio 2.75, 95% CI: 1.00 - 7.6, p = 0.05). There was a 1.7hr/night difference in median CPAP usage comparing those with adequate to inadequate health literacy (4.6hrs versus 6.3hrs/night).
Conclusions: The majority of this sleep disorders cohort had adequate health literacy as measured by the REALM-SF questionnaire. However inadequate health literacy appears to be an independent predictor of treatment adherence, and may represent a potentially modifiable risk factor of poor treatment outcomes in OSA.

P033

RANDOMISED CONTROLLED TRIAL ON THE EFFICACY OF AUDIO-VISUAL HEALTH EDUCATIONAL MATERIALS ON CPAP ADHERENCE: THE AHEAD TRIAL

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OSA is a prevalent chronic disease with significant health implications, for which achieving >4 hours/night on continuous positive airway pressure (CPAP) is essential for effective treatment. Educational videos to improve CPAP adherence are of interest as a low-cost intervention, however trials have shown mixed results. This study aimed to compare CPAP usage following standard of care education (SOCE), with the usage following the addition of educational videos, customised to incorporate low health literacy communication, motivational and self-efficacy techniques.
Methods: Adults with OSA recommended treatment with CPAP, were recruited and randomised in a single blinded method, to watch short educational videos following their in laboratory CPAP study or SOCE. The primary outcome was CPAP usage at 2mths and secondary outcomes were usage at 12mth and proportion of patients with adequate usage >4hrs/night.
Results: 195 patients met the eligibility criteria and were randomised to video education (n = 96) or to SOCE (n = 99). There was no significant difference in compliance at 2mths (median usage 1.7hrs IQR 0–6.2 SOCE, 4.4hrs IQR 0–6.7 video education p = 0.1), however at 12mths there was increased usage in the video education arm (median 0hrs IQR 0–5.4 standard of care, 3.8hrs IQR 0–6.87 p = 0.05). The proportion with adequate CPAP usage >4hrs/night at 12mths was higher in the video education group (33, 33% versus 48, 50% p = 0.01).
Conclusions: Long-term adherence to CPAP is enhanced by the addition of educational videos that incorporate low health literacy communication and motivational techniques, compared to SOCE.

P034

INTER-SCORER CONCORDANCE IMPACTS MSLT RESULTS

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Title: Inter-scorer concordance impacts MSLT results
Introduction: A retrospective study on the effect of inter-scorer concordance and impact of analysing polysomnography (PSG) data prior to the Multiple Sleep Latency Test (MSLT) on clinical interpretation of Narcolepsy (N) and Idiopathic Hypersomnolence (IH).
Methods: Data of four individuals was randomly selected from a cohort of patients that participated in MSLT studies. De-identified MSLT fragments from four nap periods (n=16) were scored in two groups: analysis of PSG conducted prior to the respective MSLT fragments, and analysis without access to prior PSG. Individual scorers were compared to a master score set, by consensus from two experienced sleep scientists.
Spearman correlation and percentage agreement statistics were applied to calculate the inter-scorer concordance in sleep latency and REM latency. Mann-Whitney test was utilised to assess differences between the two groups. A positive result was assigned as: mean (n=4) sleep latency of <10min (IH), and mean (n=4) sleep latency of <8min including (n=2) SOREMs (N).
Results: From 16 sets of data, four false positive results were identified when PSG was not analysed prior to scoring the MSLT fragments. Additionally, statistically significant differences were present when PSG analysis was conducted prior to scoring MSLT sleep latency and REM latency data.
Discussion: These results support a recommendation that PSG analysis (sleep and REM latency) should be encouraged prior to MSLT studies and performed by the same sleep scientist. Furthermore, including MSLT data in intra-lab concordance activities is important, particularly in relation to medical interpretation and practice.

P035

IS THE GRAEL OXIMETRY AVERAGING TIME INTERCHANGEABLE WITH A MASIMO PULSE OXIMETER ALGORITHM IN POLYSOMNOGRAPHY?

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Compumedics recording software (Grael V2) for polysomnography (PSG) calculates SpO2 values using a 3-heartbeat long averaging window. This is derived from the ECG and thus introduces variability in the averaging time that is dependent on the heart rate. Little is known about the effect this has on the common oximetry metrics used in PSG interpretation. This study explorer the interchangeability of the Grael V2 inbuilt 3-beat averaging algorithm with a short averaging window of 2 - 4 seconds using a Masimo Radical 7 pulse oximeter during a PSG.
SpO2 data were collected from 2 oximeter probes (Grael and Radical 7) both attached to a patient's fingers. After SpO2 artifacts were removed, the following SpO2 parameters from each oximeter were generated: mean sleep SpO2, oxygen desaturation index (ODI) using 2%, 3% and 4% drop in SpO2 in sleep, total sleep time (TST) with SpO2 < 90% and < 80% as well as time spent < SpO2 88% in minutes. 88 sleep studies were included in the data collection.

For ODI2%, 3% and 4%, bias (95% limits of agreement) values were -0.75 events/hr (9.99 to -11.49 events/hr), -0.74 events/hr (10.00 - -11.49 events/hr) and -0.20 events/hr (8.45 - -8.86 events/hr) respectively. There was no significant difference between measurements except for the mean sleep SpO2 values, $p < .001$.
Although no bias found between measurements, there was poor agreement between the algorithms as demonstrated by the wide 95% limits of agreement suggesting that the two oximeter devices are not interchangeable.

P036

TRAJECTORIES OF EMOTIONAL AND BEHAVIOURAL PROBLEMS IN ABORIGINAL AND TORRES STRAIT ISLANDER CHILDREN: ROLE OF SLEEP AND CULTURAL ATTACHMENT

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Purpose: This study explored the link between sleep and emotional and behavioural problems and assessed whether cultural attachment reduces the risk of emotional and behavioural problems in Aboriginal and Torres Strait Islander (Indigenous) children.
Methods: The data from wave 5 to wave 10 of the Footprints in Time cohort were used. Multi-trajectory modelling was used to identify sleep trajectories using weekday sleep duration, weekday bedtimes, wake times, and sleep problems (waves 5, 7 & 10). Trajectories of emotional and behavioural problems were derived from the Strengths and Difficulties Questionnaire (SDQ) data (waves 6, 8 & 10). Cultural attachment assessment included the knowledge of Indigenous language, clan, people, family stories/history and other cultural practice. Multivariable logistic regression models were used to assess the link between sleep and emotional and behavioural problems.
Results: Analysis of sleep data from 1270 Indigenous children (50.6% females, mean age 6.3 years (±1.5)) identified four distinct trajectories: early sleepers/early risers (19.3%); early/long sleepers (22.1%), normative sleepers (47.8%), and late sleepers (10.8%). Three emotional and behavioural problem trajectories emerged: low stable (49.1%), high decreasing (40.5%), and high stable (10.4%). Early sleepers//early risers (OR: 0.48, 95% CI: 0.28–0.82) and children with strong cultural attachment (OR: 0.47, 95% CI: 0.27–0.82) had lower odds of being in the high emotional and behavioural problem trajectory group.
Conclusions: Early bedtime in children may reduce the risk of future emotional and behavioural problems. The protective effect of cultural attachment further highlights the need for strengths-based approaches to reduce mental health issues in Indigenous children.

P037

INDIGENOUS AUSTRALIANS' CONCEPTUALISATION OF SLEEP HEALTH DIFFERS FROM WESTERN INTERPRETATIONS

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Purpose: Despite a significant burden of poor sleep, Aboriginal and Torres Strait Islander peoples' (Indigenous Australians) conceptualisation of sleep health is poorly understood. This research explored Indigenous Australians' understanding and interpretation of sleep health and how that affects their health.
Methods: Indigenous people from remote Queensland were invited to participate in focus group discussions exploring their understanding of sleep health, the link between dreaming and sleep, and perceived implications of poor sleep. Participants were also asked to complete an adapted pictorial Epworth Sleepiness Scale (ESS). Descriptive statistics were used to summarise ESS data and participants' demographic data. Thematic analysis was used to analyse focus group data.
Results: A total of 29 Indigenous Australians (82% females), median age 39 years (Interquartile range 26–51 years) from various geographical areas within North West Queensland participated in focus group discussions (n=6). The following themes emerged from the data: interconnection among sleep, emotional and physical health; challenges and successes in obtaining healthy sleep; the impact of dreams on waking life; and lack of support from health services in managing sleep issues. Scores from the modified pictorial scale indicate 24% of the participants had excessive daytime sleepiness (ESS score>10 points).
Conclusion: Indigenous Australians' conceptualisation of sleep health is different from the western interpretation of sleep health. In particular, the connection between dreams and sleep is not adequately captured in current tools and resources to promote sleep health. This will limit effective prevention and management of sleep issues in Indigenous communities.

P038

INSOMNIA - GOING BACKWARD TO GO FORWARD

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Background: Although there are common features in people with insomnia, for each individual there are possible different contributing factors and pathophysiological processes; each needing specific tailoring of treatment. We aim to understand treatments undertaken prior to specialist referral, common features on presentation and contributing factors in individual cases identified as part of their assessment.
Methods: We will undertake a retrospective audit of consecutive patients presenting with insomnia to a single private practice with a high insomnia case-load. We are collecting demographic data, details of prior and current treatments, clinical characteristics at presentation, outcomes of investigations and classification insomnia sub-type using the International Classification of Sleep Disorders-2 (ICSD-2). Data will be descriptive to allow understanding of the type and nature of patients presenting with

insomnia and a deconstruction of contributing factors to the presenting problem of insomnia.
Progress to date
Low-risk ethics approval submitted via St Vincent's Human Research Ethics Committee.
Literature review in progress.
Intended outcome and impact
The umbrella term "insomnia" belies its heterogeneity. Although there are common factors in most insomnia presentations, recognised in the simplification of diagnostic criteria in ICSD-3 and DSM 5, in managing individual patients it is also important to understand characteristics that are particular to the person. Whilst generic cognitive behavioural therapy for insomnia (CBTi) has been proven to be effective, in expert hands the response rate is still in the region of 60%, potentially reflecting a role for more tailored treatments for individuals to complement CBTi.

P039

INTERVENTIONS USED TO INCREASE SLEEP DURATION IN YOUNG PEOPLE: A SYSTEMATIC REVIEW

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Introduction: Habitual short sleep duration affects a substantial proportion of young people, which is problematic due to its association with various adverse consequences. The aim of this systematic review was to identify the effectiveness of current interventions to increase sleep duration in healthy young people (14–25 years).
Methods: A systematic literature search, following PRISMA guidelines was conducted across multiple databases including PubMed, Ovid MEDLINE, CENTRAL, Embase, CINAHL (via EBSCOhost), PsycINFO, Scopus, Web of Science, ProQuest Dissertations and Theses, and Trove. Eligible studies were required to report sleep duration before and after exposure to the intervention, published from 2005 onwards, and participants 14–25 years of age. The Newcastle-Ottawa scale and Cochrane Risk of Bias were used to evaluate quality of studies.
Results: 2695 citation were screened, and 29 studies met the eligibility criteria for this review. The included studies implemented differing methodologies, including behavioural (48.3%), educational (24.1%), and combination (24.1%) of behavioural, educational and other methods, such as mindfulness, light therapy, and naturalistic observation (3.4%). Initial findings indicate that educational interventions on their own are not effective at increasing sleep duration as behavioural or combination of both.
Discussion: These results indicate that behavioural interventions which prescribe new sleep schedules show positive treatment effects on sleep duration. Hence, provide promise for mitigating sleep difficulties and improving health in young people aged 14–25 years.

P040

NIGHT SHIFT WORK AND DISEASE: A SYSTEMATIC REVIEW OF THE ROLE OF OXIDATIVE STRESS

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Night shift workers make up an essential part of the modern workforce. However, night shift workers have higher incidences of late in life diseases and earlier mortality. Night shift workers are exposed to constant light and experience circadian rhythm disruption. Sleep disruption is thought to increase oxidative stress, defined as an imbalance of excess pro-oxidative factors and reactive oxygen species over anti-oxidative activity. Oxidative stress can damage cells, proteins and DNA and can eventually lead to varied chronic diseases such as cancer, diabetes, cardiovascular disease, Alzheimer's and dementia. This review aimed to understand whether night shift workers were at greater risk of oxidative stress and to contribute to a consensus on this relationship. Twelve studies published in 2001–2019 examining 2,081 workers were included in the review. Studies compared both the impact of working a single shift and in comparisons between those who regularly work night shifts and only day shifts. All studies had evidence to support this relationship across a range of oxidative stress indicators, including: increased DNA damage, reduced DNA repair capacity, increased lipid peroxidation, higher levels of reactive oxygen species, and to a lesser extent, a reduction in antioxidant defence. This research supports the theory that melatonin and the sleep wake cycle mediate the relationship between shift work and oxidative stress. It is concluded that night shift work increases the risk for oxidative stress and therefore future disease. Recommendations are made to promote the long-term health of shift workers considering these findings.

P041

THE IMPACT OF SIMULATED NIGHT SHIFTS ON EXECUTIVE FUNCTIONING

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Nightwork is associated with fatigue, decreased sleep quality, and impairments in cognitive function. While attentional tasks have been widely investigated, there are limited data on more complex tasks, such as executive functioning during nightwork. Workers often need to rapidly shift between tasks, adapting to new and complex situations. The aim of this study was to investigate the impact of nightwork on executive functioning.
Healthy, non-shift working individuals (N=8; 5F, 24.8±5.0y) participated in a 7-day live-in laboratory study. Participants underwent an 8h TIB baseline sleep, followed by 4 consecutive simulated nightshifts with 7h TIB sleep during the day and an 8h TIB recovery sleep. Participants were assessed for executive function at 2000h, 2200h, 0100h and 0400h. Executive functioning was assessed with a mental flexibility switching task where a 3D rotation and math task were displayed simultaneously with an arrow indicating which task to complete in a random order. Resulting throughput data were analysed using linear mixed models.
There was a main effect of time of night ($F(3,77)=4.81, p=.004$) on throughput such that there was a speed accuracy trade off over the night shift with slower switching ability later in the shift. There was also a main effect of nightshift ($F(2,77)=54.33, p<.001$) where participants' performance improved on the task with each nightshift.
This study suggests executive functioning is impaired on nightshift with worse performance at 0400h. Task improvements over consecutive nightshifts may have been due to learning or acclimation to nightwork. Understanding complex task performance on nightshift is important for tailoring countermeasures.

P042

FIVE-YEAR REVIEW OF A TERTIARY PAEDIATRIC SLEEP SERVICE FOR COMPLEX PATIENTS

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Introduction: Our paediatric sleep unit commenced service for children with complex medical problems in July 2015. Service capacity includes 12 inpatient level 1 studies (two neonates) and one home study per week. FTE includes senior scientists 2.6, sleep technologists 1.7, administration 1.0, nursing 0.7 and medical 1.2. The primary aim of this study was to evaluate activity during the first 5-years. The secondary aim was to document the impact of the COVID-19 pandemic.
Methods: Sleep unit operational & diagnostic data were collected from sleep booking sheets, sleep study reports, electronic medical records. Descriptive statistics are presented.
Results: A total of 2186 sleep studies were performed (July 2015 to June 2020) with a range of 368–472 studies per annum. Overall, 61.7% were diagnostic studies, 20.8% titration studies (CPAP, oxygen, bi-level or invasive ventilation), 10% neonatal and 7.5% home studies. Between 2016–2020, the average waiting time (days) for a neonatal study was 16, a titration study was 106, a diagnostic study was 110 and a home study was 76. Further delays were caused by the COVID19 pandemic. Mean waiting time rose 229% from 108 days (Feb 2020) to 355 days (Feb 2021). Referrals for sleep studies have exceeded bed capacity since the beginning of the pandemic.
Discussion: This audit describes activity in a tertiary complex paediatric sleep service during the first 5 years. The service has struggled on current FTE and bed capacity to manage waiting times, exacerbated further by the COVID-19 pandemic. A new business and clinical model are warranted.

P043

TELEHEALTH-SUPPORTED LEVEL 2 PAEDIATRIC HOME POLYSOMNOGRAPHY

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Introduction: The gold standard for diagnosis of paediatric obstructive sleep apnoea (OSA) is attended in-laboratory level 1 polysomnography (PSG). In our service, we select some children for unattended home level 2 PSG (HPSG) with telehealth support. We audited our HPSG service from 2013 to 2020.
Methods: We retrospectively audited level 2 home PSG reports in children aged 5–18 years referred for suspected OSA between 2013 and 2020. Tests were performed with the Compumedics Somte PSG acquisition device. The primary outcome was % of studies achieving a technically adequate diagnosis. Secondary outcomes included sleep duration, sleep efficiency and parental acceptance by non-validated service-specific questionnaire. Data was analysed using descriptive & inferential statistics. χ^2 tests were used for categorical variables.
Results: There were 235 (140 male, 59.6%) patients studied between 2013 and 2020 (7 years). The mean age was 10.8 (SD 3.6) years. 69 patients (29.4%) had co-morbidities. Repeat studies were indicated in 10.2% (24/235) due to technical failure. There was no significant difference between failed studies set up by HITH nurses compared with Sleep scientists (p=0.1). A technically acceptable diagnosis was made in 87% (205/235) patients, with no reason for under-estimation in 74.9%, and potential under-estimation in 17.9%. No diagnosis was achieved in 7.2%. 6 hrs or more sleep was obtained in 83%. Parental questionnaires revealed 89% perceived high-level care, 91% perceived increased convenience and 76% good/excellent telehealth support.
Discussion: Telehealth-supported paediatric HPSG achieves a technically adequate diagnosis in 87%, with 83% achieving ≥6 hrs sleep duration, and excellent family acceptability.

P044

PRIMARY CARE MANAGEMENT OF CHRONIC INSOMNIA BY GENERAL PRACTITIONERS: AN AUSTRALIAN PERSPECTIVE

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Introduction: Chronic insomnia is a common sleep disorder, with an estimated 15% of Australian adults reporting symptoms of insomnia. Australian general practitioner (GP) guidelines recommend cognitive behavioural therapy for insomnia (CBTi) as first-line treatment for insomnia however research suggests that GPs instead rely heavily on sleep hygiene and pharmacotherapy. GPs commonly provide treatment for insomnia; however, little is known about the experiences of Australian GPs and their interest when managing patients with insomnia. This study was conducted to explore the perspectives of GPs towards insomnia management and to identify factors that could influence the implementation of new models of insomnia care within general practice.
Methods: A pragmatic, inductive qualitative study. Purposive sampling was used to recruit 28 Australian GPs varying in age, experience, and distance from specialist sleep services. Semi-structured interviews were conducted, and data were analysed using thematic analysis.
Results: Three themes were identified: 1) Responsibility for insomnia care; 2) Complexities in managing insomnia; and 3) Navigating treatment pathways. Whilst GPs accepted insomnia care as part of their role, they often found it difficult to provide evidence-based care within the time and funding limitations of general practice. Co-morbidity of mental health conditions and insomnia, and long-term use of benzodiazepines presented challenges for GPs. GPs' knowledge and experience of CBTi and access to specialised referral pathways for insomnia was limited.
Discussion: Insomnia presents complexities for GPs. Education about insomnia treatments, funding that enables recommended treatment, and pathways to specialist services would support insomnia management within general practice.

P045

A PROSPECTIVE REVIEW OF SLEEP QUALITY IN HOSPITALISED RESPIRATORY INPATIENTS

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Background and Aim: Sleep is an active and restorative state that is vital for maintaining optimal physical and mental health. Hospitalised patients are particularly at risk of poor sleep. We aim to review the sleep quality of respiratory inpatients at a tertiary hospital and to identify modifiable barriers to sleeping well in hospital environments.

Methods: Prospective data were collected from respiratory ward patients at time of discharge by completion of a medical records review and a Sleep Questionnaire created by Working Group Sleep Health Foundation, including patient rating of sleep quality (very poor, poor, fair, good, very good) and sleep disrupting factors. These data were stratified by pertinent environmental, patient and clinical care factors.

Results: Data from 6 patients were analysed; median age was 65 years, 3 (50%) were male and median length of hospital stay was 5 days. Four (67%) patients used sedating medications, 1 (17%) used this for treatment of insomnia. Two (33%) of patients characterised their sleep quality as poor or very poor and 3 (50%) patients described their sleep in hospital as slightly worse or much worse than sleeping at home. The main contributing factors to poor sleep quality were noise, checking of vital signs by hospital staff, medical treatments and medical condition relating to admission (eg. pain, dysnpea). Data collection is ongoing.

Conclusion: A significant proportion of patients experienced poorer sleep quality as a result of their hospital admission, attributable to both extrinsic factors (noise and clinical care) and underlying medical conditions.

P046

MORE TEACHING, LESS SLEEPING: THE IMPACT OF STRESSFUL PERIODS OF THE SCHOOL YEAR ON THE SLEEP OF AUSTRALIAN SCHOOLTEACHERS

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Introduction: There are approximately 270,00 schoolteachers in Australia and this population experience multiple stressors at work. This can lead to poor sleep quality and quantity and, consequently, adverse outcomes for both schoolteachers and students. While it is well-established that certain periods of the year may lead to increased stress for schoolteachers, the impact of this on sleep is unknown. The current study aimed to investigate the effect of stressful periods of the school year on the sleep of schoolteachers.

Methods: The Pittsburgh Sleep Quality Inventory (PSQI) and questions on stressful school periods (including report writing, standardised testing, school appraisal, and teacher performance) were completed online by 775 Australian primary and secondary schoolteachers (89.1% female, 29.9% 25–34 years). Pearson Chi-square analyses were performed.

Results: Scores on the PSQI indicated that 611 (79.0%) of participants were experiencing poor sleep quality. There were significant relationships between each of the stressful periods of the year and PSQI score, such that increased stress during periods of report writing ($p<0.001$), standardised testing ($p<0.001$), school appraisal ($p<0.001$), and teacher performance ($p<0.001$) was associated with poor sleep quality.

Discussion: Australian schoolteachers are at risk of poor sleep quality and quantity, and this is exacerbated by stressful periods of the school year. Given the vital role schoolteachers play in the community, organisations should be mindful of these periods of the year in order to improve the sleep of schoolteachers.

P047

SLEEP AND DIET IN OLDER ADULTS: WHAT DO WE KNOW AND WHAT DO WE NEED TO FIND OUT?

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Older adults experience reduced sleep quality and quantity more frequently than younger adults. Inadequate sleep in older adults has been linked to several adverse outcomes such as poor psychological and physical health, cognitive impairments, increased risk of falls, lower quality of life, and greater risk of all-cause and cardiovascular mortality. Diet is one modifiable lifestyle factor that may influence sleep outcomes. The purpose of this review was to synthesise the current literature investigating the impact of diet, including foods and nutrients, on sleep quality and quantity in older adults (defined as >50 years based on age-related changes in sleep quality and quantity that begin age 50). A systematic search of four databases identified 17 articles for inclusion (observational (n=8) and interventional (n=9) studies). Overall, findings suggest that following a Mediterranean diet, consuming milk, fish, bean and egg products, cherries, vitamin D and vitamin E have demonstrated some efficacy in improving sleep outcomes in this population demographic. Given the heterogeneity of the included studies (i.e. aims, methodologies, outcomes assessed), it is difficult to consolidate the available evidence to make specific recommendations. However, this review describes dietary factors that show promise for improving sleep outcomes in older adults. More targeted research exploring the relationship between dietary factors and sleep outcomes in older adults is needed to strengthen the current evidence base. This presentation will provide a much-needed research agenda that includes a need for more randomised control trials that employ rigorous dietary assessments and objective measures of sleep.

P048

Abstract Withdrawn

P049

SLEEP REGULARITY IS ASSOCIATED WITH STABILITY OF DAILY LIGHT EXPOSURE IN ADOLESCENTS DURING SCHOOL AND VACATION

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Study Objectives: Light is the main time cue for the human circadian system. Irregular sleep/wake patterns are associated with poor health outcomes, which could be mediated by irregular patterns of light exposure. The relationship between sleep and light regularity has not been directly explored. We investigated the relationship between sleep and light regularity in adolescents, across school-term and vacation, using novel metrics for measuring light regularity.

Methods: Daily sleep and light patterns were measured via wrist actigraphy in 104 adolescents (54% male, age M±SD = 17.17±0.80 years) over two weeks of school-term and a subsequent two-week vacation. The Sleep Regularity Index (SRI) was computed for each two-week block. Stability of daily light exposure was assessed using variation of mean daily light timing (MLiT), variation in daily photoperiod, and the Light Regularity Index. Associations between SRI and each light regularity metric were examined, and within-individual changes in metrics were examined between school and vacation.

Results: More regular sleep was significantly associated with more regular scores for each light variability metric, during school and vacation. Between school and vacation sleep regularity decreased and nuanced changes in light patterns were observed. Variability measured by the MLiT variable increased, whereas variability measured by the LRI and photoperiod variable decreased.

Conclusions: Adolescents with irregular sleep also have irregular patterns of light exposure. These findings suggest sleep regularity may be a useful proxy for variability in the main circadian time cue, meaning that irregular light exposure may carry implications for the developing adolescent circadian system.

P050

FAMILIAR LOCATIONS AND NEW LOCATIONS: SLEEP'S ROLE IN THE CONSOLIDATION OF SPATIAL NAVIGATION INFORMATION USING A NOVEL VIRTUAL MORRIS WATER MAZE TASK IN OLDER ADULTS WITH MILD COGNITIVE IMPAIRMENT

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Introduction: The ability to navigate oneself in space is one of the first functional impairments in Alzheimer's disease (AD). A 3D-computerised spatial navigation (SN) task was designed to delineate, for the first time in a sleep-dependent memory paradigm, egocentric and allocentric SN, the latter identified as one cognitive biomarker of AD. We examined group differences in SN memory and associations with sleep macroarchitecture.

Methods: Older adults with mild cognitive impairment (MCI, n=32) and controls (n=25) underwent overnight polysomnography and completed the SN task before and after sleep. Participants learnt the location of a target over 5 trials (familiar location; egocentric-dependent), then were instructed to find the target from a novel start location (allocentric-dependent). Memory % retention (MR) from both start locations were calculated by the XY coordinate of marked location to correct location of the target, pre- and post-sleep. Navigational strategies were coded using self-reported description of how participants' found the target. Associations between MR with REM and SWS % duration, and AHI in REM and NREM were examined using Spearman's correlations.

Results: Repeated-measures ANOVA showed Controls MR improved overnight whereas MCI performed worse (F=7.46, p=.009), with greatest differences on familiar start location MR (p=.02). Strategy as a covariate revealed a location by strategy interaction (p=01). Novel location MR was associated with REM%, rho=.448, (p=.02) in Controls, and REM-AHI, rho=.400 (p=.02) in MCI.

Conclusion: Behavioural and self-reported results suggest disrupted SN strategies relative to environment in MCI. Future studies should examine SN in association with sleep-wake neurophysiology and neuronal integrity.

P051

SLEEP SPINDLES AND SWA DIFFERENTIALLY CORRELATE WITH OVERNIGHT EPISODIC AND VISUOSPATIAL MEMORY CONSOLIDATION IN OLDER ADULTS WITH AND WITHOUT MILD COGNITIVE IMPAIRMENT

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Introduction: Sleep microarchitecture disruption is a feature of ageing that is further altered in neurodegenerative disorders. Sleep-memory links in younger adults have been established, however mechanistic pathways of this uncoupling in ageing is poorly understood.

Method: Our sample consisted of n=46 mild cognitively impaired (MCI) older adults and n=32 cognitively-intact controls who underwent overnight polysomnography and episodic (Rey Auditory Verbal Learning test) and visuospatial (Rey-Osterrieth Complex Figure task) memory tasks that were administered before and after sleep. We examined group differences in overnight memory % retention and associations with NREM slow oscillations (SO, 0.25–1 Hz), delta power (0.5–4 Hz), N2 spindle events

(occurrence [11–16 Hz] and slow [11–13 Hz] and fast [13–16 Hz] spindle density p/min) and REM theta power (4.5–8 Hz).
Results: Repeated measures ANCOVA, controlling for age, indicated greater memory scores in Controls compared to MCI on the episodic task, F=6.7 (p=.01), and no group differences in the visuospatial task (F=1.8, p=.17). In Controls, greater delta power was associated with increased episodic memory retention (r=.515, p=.006). In the MCI group, episodic memory was associated with fast spindle density (r=-.352, p=.04), and visuospatial memory was also associated with fast spindle density (r=-.385, p=.01) and spindle occurrence (r=-.479, p=.003).
Conclusion: Sleep spindles appear to be negatively associated with memory retention, specifically in MCI. However, given the heterogeneity of MCI, further analysis of its cognitive subtypes is warranted. Comprehensive cognitive and neural pathophysiology profiling are required to better delineate the function of spindles in ageing.

P052

MENTAL HEALTH PREDICTORS FOR SHIFT WORK DISORDER IN PARAMEDICS DURING THEIR EARLY CAREER

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Introduction: Shift work disorder (SWD) involves excessive sleepiness and/or insomnia and is associated with poor health outcomes in those affected. This study assessed the prevalence of and risk factors for SWD during the first six-months of paramedics' careers. Furthermore, the study explored potential mediators in the relationship between mental health and SWD risk.
Methods: Recruit paramedics' (n=101) SWD risk (SWD-Screening Questionnaire) was assessed at baseline (i.e., before shift work) and at six-months after engaging in shift work as a graduate paramedic. Logistic regression models assessed whether baseline depression (Patient Health Questionnaire-9) and baseline anxiety (Generalised Anxiety Disorder Questionnaire-7) predicted a high risk for SWD at six-months. Lavaan path analysis was used to assess whether shift and sleep variables, created from participants' sleep and work diaries, mediated the relationship between mental health and SWD risk.
Results: After six-months of emergency work 21.5% of paramedics were high risk for SWD. Baseline depression predicted 1.28-times greater odds for SWD at six-months. Shift and sleep variables were not mediators in the relationship between baseline mental health and subsequent SWD risk. Baseline depression was independently associated with increased sleepiness levels following paramedics' major sleep periods across all work conditions (nightshift, workdays, and non-workdays) at six-months. Depression levels before shift work also predicted a greater perceived workload on nightshifts.
Conclusions: Depression symptoms before starting shift work are a modifiable risk factor for SWD. Moreover, the first six-months of paramedics' careers is a critical period for implementing preventative measures for SWD, including interventions to decrease depression symptoms.

P053

MANAGEMENT OF INSOMNIA BY AUSTRALIAN PSYCHOLOGISTS

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Introduction: Insomnia is the most common sleep disorder, 10–30% of adults have regular difficulties falling and/or staying asleep that cause significant daytime impairments. General Practitioner (GP) clinical guidelines recommend Cognitive Behavioural Therapy for insomnia (CBTi) as the first-line treatment rather than medications. However, most GPs do not have the time or training to administer CBTi, and consequently, many patients are prescribed sedative-hypnotic medicines. Psychologists have training in CBT and may be well placed to deliver behavioural therapy for insomnia. However, the amount of sleep-specific training, and knowledge of CBTi among Australian psychologists remains unknown. Identifying key barriers and enablers in the management of insomnia within psychology provides a first step in engaging with psychologists about the delivery of evidence-based insomnia treatment.
Methods: This qualitative study used a pragmatic inductive approach. Semi-structured interviews were conducted with 26 Australian psychologists. Interviews included case study scenarios to provide an in-depth exploration of psychologists' knowledge and skills in the management of insomnia, and attitudes towards further training in CBTi. Interview transcripts were analysed using thematic analysis to identify themes.
Results: Preliminary themes identified in the data include; psychologists believe sleep is important for general well-being, insomnia is usually seen as secondary to other co-morbid disorders such as depression and anxiety that are the focus of treatment, most psychologists surveyed lack training and knowledge in CBTi.
Discussion: Most Australian psychologists are not well prepared to manage insomnia effectively with CBTi. Along with other primary health care professionals, psychologists need training in the management of insomnia.

P054

THE EFFECT OF HEAD UP BED-TILT (HUT) ON SLEEP DISORDERED BREATHING (SDB) IN PATIENTS WITH SUPINE DOMINANT SLEEP APNOEA (SDOSA): AN EXPLORATORY STUDY.

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SDB severity is reduced in SDOSA when posture changes from supine to lateral. Sleeping with a head up bed-tilt(HUT) is known to reduce SDB in some OSA patients. In this exploratory study, we tested whether HUT could be used to reduce SDB in SDOSA

patients who had refused continuous positive airway pressure therapy(CPAP).
We studied 5 male patients (age: 60 to 72years, BMI: 25.8 to 32.2kg/m2). Standard, in-laboratory, overnight-polysomnography was performed (Compumedics Ltd, Australia). Posture was monitored, but not restricted, and bed position was set at horizontal(HB) for half the night and at 7° HUT for the remainder (randomised). Polysomnograms were scored by a sleep technician using AASM criteria. SDB severity was quantified using the apnoea hypopnoea index(AHI) and apnoea index(AI). For this analysis, we focus on periods of supine, stage 2 sleep (S2S) only.
Participants spent 23 to 60minutes (range) in S2S with HB and 11 to 36minutes with HUT. AHI was 49 to 138events/hr with HB and 24 to 120events/hr with HUT, representing a fall of 2 to 62events/hr across all patients. AI was 19 to 111events/hr with HB and 0 to 48 events/hr with HUT, a fall of 15 to 96events/hr across all patients.
In these CPAP non-compliant, SDOSA patients, S2S in HUT was associated with a reduction in SDB severity that varied between individuals. Notably apnoeic events were reduced in all patients and eliminated in two patients. We conclude that HUT warrants further investigation as a potential alternative therapy for SDOSA patients intolerant of CPAP.

P055

MECHANISMS UNDERLYING SLEEP DISTURBANCE IN YOUNG PEOPLE WITH BORDERLINE PERSONALITY DISORDER FEATURES

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Introduction: Sleep problems are common in young people (aged 15–25 years) with features of borderline personality disorder (BPD). Yet the mechanisms underlying this relationship remain largely unknown. This study explored the indirect roles of emotion regulation difficulties, depression, anxiety and stress in the relationship between BPD features and sleep disturbance in young people.
Method: Sleep was measured subjectively (self-report) and objectively (10 days wrist actigraphy) in 40 young people with BPD features (36 females, Mage = 19.77, SD = 2.51) and 38 healthy young people (34 females, Mage = 20.06, SD = 2.52). Participants also completed the Difficulties in Emotion Regulation Scale and the Depression, Anxiety and Stress Scale.
Results: Mediation analyses revealed that impulse control difficulties, limited access to emotion regulation strategies, and anxiety played an indirect role in subjective sleep disturbances in young people with BPD features. Lack of emotional awareness and anxiety indirectly contributed to associations between BPD features and objectively longer time in bed and bedtime variability, respectively.
Discussion: Targeting impulse control difficulties, emotion regulation strategies and anxiety through improving impulse control, improving emotion regulation skills and reducing pre-sleep arousal might be beneficial for improving subjective sleep in this population. Similarly, improving emotional awareness and reducing anxiety might help to normalise objective sleep patterns. Overall, these findings help to guide the development of targeted sleep-improvement strategies that might serve as useful adjuncts to current interventions for young people with BPD features.

P056

USING POLYSOMNOGRAPHY IN YOUNG PEOPLE WITH BORDERLINE PERSONALITY DISORDER: A PILOT AND FEASIBILITY STUDY

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Introduction: Few studies have assessed sleep in young people (aged 15–25 years) with BPD using polysomnography. The feasibility of using polysomnography in this population might be questioned due to polysomnography's invasiveness, anxiety and sensory sensitivities in BPD, and misconceptions that individuals with BPD are uncooperative and non-compliant. This study aimed to provide pilot sleep quality and architecture data and assess polysomnography feasibility.
Method: Participants were 13 females aged 15–25, 7 (Mage = 19.97, SD = 3.15) with BPD and 6 age-matched healthy controls (Mage = 20.13, SD = 3.31). Participants completed two non-consecutive nights of polysomnography monitoring (second night's data were used in analyses). Participants were given the option of completing polysomnography monitoring at home or in a sleep laboratory.
Results: Young people with BPD displayed less arousals across the night and specifically during NREM sleep compared with healthy young people. All other sleep parameters were comparable across groups. There was considerable heterogeneity among participant preferences for in-home vs. sleep laboratory-based monitoring, due to comfort, safety, convenience, interest in seeing a sleep laboratory, or their living situation (eg. presence of bed partner at home). Anxiety was identified as a potential barrier to polysomnography research in this population.
Discussion: There were some indications of more consolidated sleep in BPD, which might reflect a greater sleep need in this population. The feasibility and tolerability of in-home and sleep laboratory-based polysomnography were demonstrated. Future protocols should incorporate ways to minimise anxiety, for example through providing a choice of monitoring location.

P057

VIRUS AEROSOL PROPAGATION BY CPAP IS PROPORTIONAL TO MASK LEAK AND CAN BE PREVENTED BY USE OF A HOOD AND AIR FILTRATION SYSTEM

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Virus aerosol propagation by CPAP is proportional to mask leak

Introduction: Nosocomial transmission of SARS-CoV-2 has caused significant morbidity/mortality in the COVID-19 pandemic. Because patients auto-emit aerosols containing viable virus, these aerosols can be further propagated when patients undergo certain treatments including continuous positive airway pressure (PAP) therapy. This study aimed to assess the degree of viable virus propagated from mask leak in a PAP circuit.
Methods: Bacteriophage PhiX174 (108copies/mL) was nebulised into a custom PAP circuit. Mask leak was systematically varied to 0, 7, 21, 28 and 42 L/min at the mask interface. Plates containing Escherichia coli assessed the degree of viable virus settling on surfaces around the room. In order to contain virus spread a ventilated headboard and high efficiency particulate air (HEPA) filter was tested.
Results: Increasing mask leak was associated with virus contamination in a dose response manner ($\chi 2 = 58.24$, df=4, $p<0.001$). Clinically relevant levels of leak (≥21 L/min) were associated with virus counts equivalent to using PAP with a standard vented mask. Viable viruses were recorded on all plates (up to 3.86m from source). A plastic hood with HEPA filtration significantly reduced viable viruses on all plates. HEPA exchange rates of 170 and 470m3/hr eradicated all evidence of virus contamination.
Discussion: Mask leak from PAP circuits may be a major source of environmental contamination and nosocomial spread of infectious respiratory diseases. Subclinical levels of leak should be treated as an infectious risk. Cheap and low-cost patient hoods with HEPA filtration are an effective countermeasure.

P058

NEURAL APERIODIC ACTIVITY AS A NOVEL OBJECTIVE MEASURE OF DAYTIME SOMNOLENCE

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Background: Current assessment of excessive daytime somnolence (EDS) requires subjective measurements like the Epworth Sleepiness Scale (ESS), and/or resource heavy sleep laboratory investigations. Electroencephalographic (EEG) measures index intrinsic properties of the central nervous system. One such component is aperiodic neural activity which is thought to reflect excitation/inhibition ratios of neural populations and is altered in various states of consciousness. From this perspective, resting-state aperiodic activity may be a potential biomarker for hypersomnolence. We aim to analyse retrospective EEG data from patients who underwent a Multiple Sleep Latency Test (MSLT) and determine if aperiodic activity is predictive of subjective and objective measures of EDS.
Methods: Participants having undergone laboratory polysomnogram (PSG) and next day MSLT will be grouped into those with and without sleepiness (mean sleep latency (MSL) of < 8min and > 10min respectively). Forty patients in each group (n=80) will be assessed. The primary objective is to compare the aperiodic slope between these groups, and secondary objectives comparing aperiodic activity with ESS and time of day.
Data will be analysed using linear mixed-effect models. Simple linear regressions will be performed between the aperiodic slope and MSL and ESS, with R2 values used to estimate of effect size.
Progress: Formal ethics approval has been submitted and is pending.
Intended Outcome and Impact: In this exploratory study we hypothesise that EDS is associated with a lower aperiodic exponent/flatter slope, and hope to provoke further investigation of this metric as a novel biomarker for sleepiness.

P059

Abstract Withdrawn

P060

HYPOXIA-INDUCED OVEREXPRESSION OF REV-ERB-ALPHA AND NPAS2 PROTEINS IN OBSTRUCTIVE SLEEP APNEA PATIENTS - POSSIBLE MECHANISM OF DM2 DEVELOPMENT

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Circadian clocks are endogenous coordinators of 24-hour behavioral and molecular rhythms, which disruption may be caused by obstructive sleep apnea (OSA). It is composed of a set of genes, function as activators (CLOCK, BMAL) or repressors (PER, CRY). Neuronal PAS Domain Protein 2 (NPAS2) can substitute CLOCK in its function. Orphan nuclear receptor (Rev-Erb-α) is another protein supporting the CLOCK-BMAL1 complex, forming the loop which helps to regulate their expression. There are studies suggesting the significant influence of circadian disruption mediated via NPAS2 and Rev-Erb-α on DM2 development. The aim of the study was to determine the role of NPAS2 and Rev-Erb-α in DM2 for OSA patients.

All participants underwent polysomnography (PSG) examination. Based on apnea-hypopnea index accompanied by clinical data the recruited individuals (n=40) were assigned to one from 3 groups: OSA (severe OSA, no DM2; n=17), DM2 (severe OSA + DM2; n=7) and control group (no OSA, no DM2; n=16). Serum protein levels of Rev-Erb-α and NPAS2 were assessed with ELISA immunoassay.

Analysis between the groups revealed the statistically significant difference only in NPAS2 protein level (p=0.037). Further post-hoc analysis revealed significant differences between OSA and the control group (p=0.017). Moreover, a statistically significant correlation between AHI and NPAS2 serum protein level was observed (r=-0.478, p=0.002).

NPAS2 protein levels are associated with a number of apneas and hypopneas during the REM phase of sleep and might have a significant role in the development of OSA complications. However, further studies are needed to understand its role.

P061

THE EFFECT OF ANXIETY ON SYMPTOM BURDEN IN PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA

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Background: There is a high prevalence of anxiety in patients with obstructive sleep apnoea and such patients often describe fatigue in addition to sleepiness. We currently use the Epworth Sleepiness Scale (ESS) to quantify sleepiness in our patients, but we do not have useful tools for assessing fatigue. Fatigue is a common symptom in patients with many medical conditions but has not been well studied in patients presenting to sleep services.

Our hypothesis is that patients with obstructive sleep apnoea who have a comorbid anxiety disorder, as measured by the Hospital Anxiety and Depression Scale (HADS) are likely to have increased symptom burden such as fatigue or poorer functional outcomes of sleep.

Methods: Analysis of prospectively collected data from 128 adult patients referred for suspected obstructive sleep apnea to Monash University Health Sleep Clinic. All patients have completed a comprehensive questionnaire prior to their first clinical review assessing their symptom burden at baseline. Questionnaires completed include extensive symptom and medical history assessment, the Fatigue Severity Scale (FSS), ESS, HADS, Functional Outcomes of Sleep Questionnaire (FOSQ), Insomnia Severity Index (ISI) and Global Fatigue Score. All patients were subsequently reviewed by a clinician and have overnight polysomnography data available.

Progress to date; Data collected for all 128 participants. Preliminary analysis currently underway.

Intended outcome & impact; We intend to examine whether the comorbidity of anxiety results in an increased or different symptom burden in patients referred for suspected obstructive sleep apnoea when compared to patients without a history of anxiety.

P062

SLEEP PARAMETER VALIDATION OF A HOME-BASED BALLISTOCARDIOGRAPH SLEEP TRACKER

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Introduction: Consumer home sleep trackers are gaining popularity for objective sleep monitoring. Amongst them, non-wearable devices have little disruption in daily routine and need little maintenance. However, the validity of their sleep outcomes needs further investigation. In this study, the accuracy of the sleep outcomes of EMFIT Quantified Sleep (QS), an unobtrusive and non-wearable ballistocardiograph sleep tracker, was evaluated by comparing it with polysomnography (PSG).

Methods: 62 sleep lab patients underwent a single clinical PSG and their sleep measures were simultaneously collected through PSG and EMFIT QS. Total Sleep Time (TST), Wake After Sleep Onset (WASO), Sleep Onset Latency (SOL) and average Heart Rate (HR) were compared using paired t-tests and agreement analysed using Bland-Altman plots.

Results: EMFIT QS data loss occurred in 47% of participants. In the remaining 33 participants (15 females, with mean age of 53.7±16.5), EMFIT QS overestimated TST by 177.5±119.4 minutes ($p<0.001$) and underestimated WASO by 44.74±68.81 minutes ($p<0.001$). It accurately measured average resting HR and was able to distinguish SOL with some accuracy. However, the agreement between EMFIT QS and PSG on sleep-wake detection was very low (kappa=0.13, $p<0.001$).

Discussion: A consensus between PSG and EMFIT QS was found in SOL and average HR. There was a significant discrepancy and lack of consensus between the two devices in other sleep outcomes. These findings indicate that while EMFIT QS is not a credible alternative to PSG for sleep monitoring in clinical and research settings, consumers may find some benefit from longitudinal monitoring of SOL and HR.

P063

OPTOGENETICS FOR OBSTRUCTIVE SLEEP APNEA

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Introduction: We propose a novel sleep apnea therapy whereby a viral vector construct induces opsin expression and therefore light sensitivity to the upper airway muscles. Pulsed light to these muscles during sleep will enhance muscle contractions resulting in airway dilation and apnea prevention. Here we investigate the therapy's feasibility, and determine whether a muscle-specific promotor induces superior expression and light-evoked EMG responses compared to a non-specific promotor. Superiority will be determined by the strength and specificity of opsin expression as restricting expression to the tongue minimises the likelihood of immune responses and unwanted sensation, movement or pain with light application.
Methods: 10 rats received an intramuscular injection of a viral vector construct to induce opsin expression in the tongue. 4 rats received a non-specific construct and 6 received a muscle-specific construct. Pulsed light was applied directly to the tongue, and genioglossus EMG activity was recorded. Confocal imaging of the brainstem and tongue quantified the strength and specificity of opsin expression.
Results: Despite the greater titer of the non-specific construct, the muscle-specific construct consistently drove stronger expression in the tongue and subsequently greater light-evoked EMG activity. Additionally, whilst the non-specific construct drove retrograde gene expression in hypoglossal motor neurons, no retrograde expression was induced by the muscle-specific construct.
Conclusions: This study provides proof-of-concept of a non-invasive optogenetic stimulation-based therapy for OSA. The superior expression and light induced EMG activity generated by the muscle-specific promotor indicates that it is the preferred promotor for future studies employing direct optogenetic stimulation of skeletal muscle.

P064

THE IMPACT OF ARTEFACT-FREE RECORDING TIME ON THE DIAGNOSIS OF SLEEP DISORDERED BREATHING

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Background: Overnight studies are used to diagnose sleep disordered breathing (SDB), however the minimum artefact-free recording time (AFRT) has not been established in children.
Aim: To determine the impact of AFRT on SDB diagnoses.
Methods: Patients attended overnight cardiorespiratory polygraphy/polysomnography, alongside pulse oximetry sleep studies. Respiratory parameter reports were generated using the first 4, 5, 6 and 7 hours of AFRT. Predetermined clinically relevant cut-off (CRCO) values were defined: Obstructive AHI (OAHI; CRCO≥2); Central Apnoea-Hypopnoea Index (CAHI; CRCO≥5); 3% Oxygen Desaturation Index (ODI3%; CRCO≥6); 4% Oxygen Desaturation Index (ODI4%; CRCO≥4). Studies crossing CRCO across different AFRTs were described as 'Cases of Change' (COC). Receiver operating characteristic (ROC) curves determined ranges at 4 hours which predicted COC across subsequent AFRTs.
Results: 137 children (0.39–17.98 years) were consecutively recruited. Mean OAHI, CAHI, ODI3% and ODI4% were 1.54 (σ=2.66), 1.56 (σ=3.43), 5.21 (σ=6.53) and 2.77 (σ=4.42) respectively. For children achieving 7 hours AFRT (n=103), COC from 4 hours were: OAHI≥2 =9.7% (10/103); CAHI≥5 =2.9% (3/103); ODI3%≥6 =3.7% (4/109); ODI4%≥4 =1.8% (2/109). For OAHI≥2, optimal points on ROC curves for predicting COC provided a range of 0.875 (AUC= 0.733; 50% sensitivity; 93% specificity) - 3.125 (AUC= 0.968; 100% sensitivity; 81% specificity).
Conclusion: Four hours AFRT yields diagnostic results in > 90% cases when commonly used cut-off criteria are applied. For OSA, ranges at 4 hours within which diagnostic change is most likely with longer periods of AFRT are provided. Consideration should be given to repeating short studies where values lie within these ranges.

P065

HEART RATE AND HEART RATE VARIABILITY IN PAEDIATRIC SLEEP DISORDERED BREATHING: IS LF A PROXY FOR VASCULAR MOTOR TONE

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In children, sleep disordered breathing (SDB) is associated with changes in cardiac and vascular remodeling and hence may alter cardiac rhythm. Heart rate variability (HRV) measured during different sleep stages and at discreet times across the night, where vascular tone is known to change, provides an opportunity to better understand the effect of SDB on the cardiac function.
50 children diagnosed with SDB and 51 healthy children underwent overnight polysomnography to determine sleep staging. HRV (mean NN, SDNN, RMSSD, LF, HF, and LF:HF) was determined for the following segments pre-sleep; 3 slow wave sleep and 3 segments during rapid eye movement sleep (SWS1, SWS2, REM3, REM2, REM1). Children with SDB demonstrated higher heart rate (decreased mean NN) in all sleep segments. All HRV variables were similar between groups pre-sleep and REM3 and SWS3. LF and LF:HF were significantly lower in SWS1&2 and REM1 while as were SDNN and rMSSD were lower in the SDB group in REM1&2. LF remained low in the SDB group but rose to pre sleep levels in the control group.
Children with SDB have increased heart rate across the night even when HRV is similar between the groups. This suggests intrinsic changes to the cardiac components that determine heart rate. The HRV difference between groups was greatest post acrophase (body temperature dropping) and post nadir (body temperature rising) of the circadian cycle. We propose that impaired peripheral vascular control and sustained cardiac remodelling may underlie the heart rate and HRV changes observed in children with SDB.

P066

Abstract Withdrawn

P067

Abstract Withdrawn

P068

IMPROVING PATIENT STREAMING FOR CHRONIC INSOMNIA: SINGLE CENTRE RETROSPECTIVE COHORT STUDY

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Background: Insomnia is a common sleep disorder associated with significant morbidity and psychological distress. Cognitive Behavioural Therapy for insomnia (CBTi) is the gold standard intervention typically delivered by sleep psychologists. High demand has driven an interest in determining the case mix and characteristics of patients referred with insomnia to identify patients that may be suitable for an alternative direct-to-psychology model of care.
Methods: A retrospective cohort study was performed, including cases referred to the Princess Alexandra Hospital Sleep Centre in 2016 – 2020. Patients were categorised as either "suitable for direct-to-psychology" or "required medical review". "Direct to psychology" patients were defined as (i) referred for insomnia; or (ii) Insomnia Severity Index score ≥15/28; or (iii) diagnosed with insomnia per ICSD-3 by treating specialist; or (iv) patients referred for sleep psychology. Exclusion criteria were significant sleep disordered breathing (mean SpO2 <85%, Epworth sleepiness scale >16, driving inattention), highly co-morbid patients (neuromuscular weakness, COPD) and diagnosis of hypersomnia. These patients were categorised as "requiring medical review". The demographic and polysomnographic characteristics of these two groups were then compared.
Progress: The study protocol is complete, ethical approval obtained (EX/2021QMS/76783), and data extraction has been competed. Analysis underway currently.
Intended outcome/impact
We aim to establish the characteristics of patients suitable for a direct to psychology pathway. This data will be used for service provision planning, could reduce patient waiting list times, and improve patient care. This model could then be explored for safety and efficacy and form the basis of future service provision work.

P069

HEALTH PROFESSIONALS' PERCEPTIONS OF SLEEP IN PALLIATIVE CARE: A QUALITATIVE STUDY

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Introduction: Sleep is vital for all individuals however sleep difficulties are highly prevalent for those receiving palliative care. Impaired sleep impacts their everyday participation and overall health and wellbeing. Although sleep is recognised as an important factor for care, limited evidence exists regarding health professionals' perceptions of sleep for patients receiving palliative.
Methods: A qualitative research design was used to investigate the perceptions and roles of health professionals in identifying and addressing sleep difficulties in patients receiving palliative care. In-depth semi-structured interviews were conducted with ten health professionals across six disciplines with minimum six months experience working in palliative care. Interviews were audio recorded, transcribed verbatim and thematically analysed. Pseudonyms were used to de-identify participants.
Results: Five themes were identified: (1) patient's sleep is highly valued; (2) sleep in palliative care is complex; (3) perspectives and approaches to sleep management vary; (4) challenges in addressing sleep; and (5) health professionals desire for sleep knowledge.
Discussion: Findings highlight health professionals' perceptions of sleep difficulties and consequential implications, and the importance of sleep for both patients and caregivers. Participants perceive priorities of care and limited resources and training in sleep management hindered their clinical practice in addressing sleep. Health professionals working in palliative care could benefit from reorienting practice, development of and access to up-to-date resources regarding sleep, and support to provide sleep education for patients and caregivers.

P070

ORONASAL MASKS ARE ASSOCIATED WITH INCREASED AIRWAY COLLAPSIBILITY AND INCREASED THERAPEUTIC CPAP REQUIREMENTS.

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Introduction: Continuous positive airway pressure (CPAP) delivered via oronasal masks are associated with lower adherence, higher residual AHI and CPAP requirement in comparison to nasal masks. Mechanisms contributing to increased CPAP requirement are not well understood. This physiological study aimed to assess the effect of mask type on upper airway anatomy and collapsibility.
Methods: 13 OSA patients, underwent a sleep study during which they wore both nasal and oronasal mask for half the night each (order randomized). CPAP was manually titrated to determine therapeutic pressure. Passive upper airway collapsibility was assessed using the Pcrit technique. Participants then underwent an MRI wearing both the nasal and oronasal mask. Cine MRI was used to dynamically assess cross-sectional area of the retroglossal airway across the respiratory cycle with each mask interface. Scans were repeated at 4cmH2O, as well as at the nasal and oronasal therapeutic pressures.
Results: The oronasal mask was associated with both higher therapeutic pressure requirements (ΔM±SEM; +2.6±0.5, p<0.001) and higher Pcrit (+2.4±0.5cmH2O, p=0.001) compared to the nasal mask. The change in therapeutic pressure between masks was strongly correlated with the change in Pcrit (r2= 0.73, p=0.003). Preliminary MRI analyses indicate robust increases in cross-sectional area associated with increasing pressure. After controlling for pressure and breath-phase, the retroglossal area was larger when using a nasal compared to an oronasal mask (+12.42±5.87mm2, p=0.03).
Conclusions: These preliminary findings suggest that oronasal masks worsen the collapsibility of the airway which likely contributes to the need for an elevated therapeutic pressure relative to nasal masks.

P071

LISTENING TO BEYONCÉ: FACTORS ASSOCIATED WITH NON-ATTENDANCE AT AN OUTPATIENT SLEEP CLINIC

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Introduction: Patient non-attendance at outpatient sleep clinics is common and costly. Little is known about the factors associated with sleep clinic non-attendance, especially in an Australian context. The goal of our audit was to identify the patient, referral, and appointment factors that may affect attendance at an outpatient sleep clinic.
Methods: A case-control study was performed in 171 patients (57 cases / non-attenders and 114 controls / attenders) who had a sleep clinic appointment between September 20th, 2020 and March 21st, 2021. Statistical analysis was performed using the two-sided chi-square test with a 5% significance level.
Results: The overall rate of non-attendance was 10.8%. The rates of non-attendance between new and review cases were similar. Being single (odds ratio [OR]: 2.49; $p = 0.010$), middle-aged (OR: 4.39; $p < 0.001$ vs. older-aged), or female (OR: 2.08; $p = 0.026$) was associated with a higher rate of non-attendance. English was the primary language for all non-attenders. A higher proportion of non-attenders than attenders were born in Australia. For new cases, the source of referral, reason for referral, and triage category did not affect attendance rates. Likewise, the patient's primary sleep disorder and treatment status did not affect attendance for review cases.
Conclusion: Factors associated with non-attendance at an outpatient sleep clinic include being single, middle-aged, or female. By identifying patients at higher risk of clinic non-attendance, a more tailored approach can be developed to mitigate this issue.

P072

THE ASSOCIATION BETWEEN SNORING AND HEARING LOSS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA

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Background: Snoring is the commonest symptom of OSA, occurring in 70%-95% of patients. Snoring noise in severe OSA can reach, and exceed, peaks of 80 decibels(dB). This is a noise level at which permanent hearing loss can occur.
Given the chronicity of OSA, patients may be exposed to harmful noise levels daily for many years.
Methods: All patients underwent an overnight diagnostic sleep study. Exclusion criteria included occupational noise exposure or previously diagnosed hearing loss or head injury. Calibrated and standardised Tecpel 332 Sound-Pressure-Level meters recorded quantitative sound data. In addition to standard analysis and reporting, a customised report generated snoring and sound indices during sleep time.
Participants then underwent otoscopy, tympanogram and pure tone audiometric examination.
Progress to Date
To date 14 eligible patients have been enrolled. 3/14 have completed all investigations. 3/3 have hearing loss. AHI range was 8.5–39.5 and maximum snore sound range was 78.4–98.3dB. The average snores per hour was 340.3 and mean total snores during sleep time 1741. Mean oxygen saturation nadir 87.6%.
These initial results suggest a correlation between snore noise and hearing loss. We aim to include 25 patients in this pilot study.
Intended Outcome and impact
We hypothesise a direct relationship between snoring loudness and exposure in patients with OSA, and hearing loss due to prolonged noise exposure.
Noise-induced hearing loss is irreversible, but the extent of loss may be reduced with intervention. This pilot study has the potential to benefit patients by demonstrating the effects of snoring in OSA on hearing.

P073

CO-MORBID INSOMNIA AND OBSTRUCTIVE SLEEP APNOEA IS ASSOCIATED WITH ALL-CAUSE MORTALITY AND CARDIOVASCULAR EVENT RISK

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Introduction: Co-morbid insomnia and sleep apnoea (COMISA) is a highly prevalent and debilitating condition. Previous studies have investigated associations between insomnia and mortality, and OSA and mortality, but not COMISA. Thus, this study investigated associations between OSA, insomnia and COMISA on mortality and cardiovascular event risks.
Methods: Sleep Heart Health Study data (n = 5803) were used to identify people with insomnia defined as difficulties falling asleep, maintaining sleep, and/or early morning awakenings from sleep at least 5 times a month and daytime impairment. OSA was defined as an apnoea-hypopnoea index ≥15 events/h. COMISA was defined if both conditions were present. Cox proportional hazard models were used to determine the association between COMISA and all-cause mortality (n = 1210) and cardiovascular events (N = 1243) over 15 years of follow-up.
Results: This analysis included 5236 participants. 2504 (47.8%) did not have insomnia/OSA, 374 (7.1%) had insomnia-alone, 2027 (38.7%) had OSA-alone, and 331 (6.3%) had COMISA. Compared to participants with no insomnia/OSA, COMISA was associated with a 32% (HR, 95%CI; 1.32 (1.06, 1.64)) and 38% (1.38 (1.11, 1.71)) increased risk of mortality and cardiovascular events, respectively. Insomnia-alone and OSA-alone were not associated with all-cause mortality or cardiovascular event risk.
Conclusions: Participants with COMISA have decreased longevity and increased cardiovascular event risks compared to participants with no insomnia or OSA. It remains to be determined if these associations are causal and whether treatment of insomnia, OSA, or combination treatment can effectively decrease mortality and/or cardiovascular event risks in individuals with COMISA.

P074

NIGHT-TO-NIGHT VARIABILITY IN OBSTRUCTIVE SLEEP APNOEA SEVERITY IS ASSOCIATED WITH HYPERTENSION AND HIGH MISDIAGNOSIS RATES

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Introduction: The impact of night-to-night variability in obstructive sleep apnoea (OSA) severity on important health outcomes such as blood pressure is unknown. This study aimed to determine the effects of night-to-night variability in the apnoea/hypopnoea index (AHI) on hypertension risk and OSA misdiagnoses.
Methods: In-home nightly monitoring of 67,278 participants from 151 countries, over ~170 nights per participant between July 2020 to March 2021 using a validated under mattress sleep analyser. Blood pressure measurements were available in 12,295 participants. OSA was defined as a mean nightly AHI >15events/h. Night-to-night variability was assessed as the standard deviation of AHI across nights.
Results: 22.6% (95% CI: 20.9–24.3) of the cohort (13% of women, 25% of men) had an average AHI> 15 events/h sleep. The average nightly AHI variability ranged from 3±1 in people without OSA to 14±6 in people with severe OSA. Higher mean AHI (OR [95% CI], 1.44 [1.29, 1.61]) and greater nightly variability in AHI (1.57 [1.39, 1.76]) were associated with hypertension. In people with a mean AHI of ≥5 events/h, high night-to-night AHI variability was associated with a ~30% increased risk in hypertension, independent of OSA severity category. Likelihood of misdiagnosis of OSA based on a single night compared to the mean across all nights was ~20%; this decreased with more monitoring nights.
Conclusions: These findings highlight the novel, important information that simple multi-night monitoring of OSA can yield. This includes the potential importance of night-to-night variation and its contribution to hypertension and increased confidence of OSA diagnoses.

P075

TRAVEL OR CHEERS? EXAMINING THE DRIVERS AND MECHANISMS OF HOME COURT ADVANTAGE IN THE 2020/2021 NBA REGULAR SEASON

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Introduction: Home court advantage (HCA) in the National Basketball Association (NBA) is well-documented, yet the co-occurring drivers responsible for this advantage have proven difficult to examine in isolation. The Coronavirus disease (COVID-19) pandemic resulted in the elimination of crowds in ~50% of games during the 2020/2021 NBA season, whereas travel remained unchanged. Using this 'natural experiment', we investigated the impact of crowds and travel-related sleep and circadian disruption on NBA HCA.
Methods: 1080 games from the 2020/2021 NBA regular season were analyzed using mixed models (fixed effects: crowds, travel; random effects: team, opponent).
Results: In games with crowds, home teams won 58.65% of the time and outrebounded (M=2.28) and outscored (M=2.18) their opponents. In games without crowds, home teams won significantly less (50.60%, $p = .01$) and were outrebounded (M=-0.41, $p < .001$) and outscored (M=-0.13, $p < .05$) by their opponents. Further, the increase in home rebound margin fully mediated the relationship between crowds and home points margin ($p < .001$). No significant sleep or circadian effects were observed.
Discussion: Taken together, these results suggest that HCA in the 2020/2021 NBA season was predominately driven by the presence of crowds and their influence on the effort exerted by the home team to rebound the ball. Moreover, we speculate that the strict NBA COVID-19 policies may have mitigated the travel-related sleep and circadian effects on the road team. These findings are of considerable significance to a domain wherein marginal gains can have immense competitive, financial, and even historical consequences.

P076

SLEEP STAGING AGREEMENT BETWEEN POLYSOMNOGRAPHY AND SLEEP PROFILER IN ISOLATED REM SLEEP BEHAVIOR DISORDER

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Purpose: Evaluate the sleep staging agreement between polysomnography (PSG) and Sleep Profiler (SP) in patients with suspected isolated REM-sleep-behavior-disorder.
Methods: Twenty-six patients with reported dream-enactment-behavior (Site1=16, Site2=10; 27% women; age 64±13 years) underwent a diagnostic PSG with simultaneously recorded SP. A registered sleep-technologist at each site performed PSG-staging, while SP was auto-staged and technically reviewed/edited.
Across technicians, the initial staging was blinded. Site1 then performed unblinded restaging of PSG=N3(N2) vs. SP=N2(N3) epochs, while Site2 conducted a blinded, carefully-targeted re-staging of N3. Statistics included Cohen's kappa and Chi-square analyses.
Results: Agreement between SP and Site1 vs. Site2 were significantly different for Wake (kappa:Site1=0.816;Site2=0.650;combined=0.736), stage N1 (kappa:Site1=0.149;Site2=0.228;combined=0.188), stage N2 (kappa:Site1=0.632;Site2=0.718;combined=0.659), stage N3 (kappa:Site1=0.715;Site2=0.368;combined=0.525) and REM (kappa:Site1=0.827;Site2=0.719;combined=0.766)(all $P<0.001$).
After restaging of N3, the kappa values improved at Site1 (unblinded:N2=0.659/N3=0.883) and Site2 (blinded:N2=0.775/N3=0.736)(combined:N2=0.735/N3=0.851). The proportion of PSG-epochs restaged from N3 to N2 was 17% at Sites1 and 38% at Site2 ($P<0.001$), while Site1 had fewer remaining PSG=N3 vs. SP=N2 conflicts (5.6% vs. 20.8%, $P<0.001$).
Compared to Site2, Site1 had a superior: REM kappa due to fewer SP=N2 disagreements (8.5% vs. 16.8%, $P<0.001$), and Wake kappa resulting from fewer SP=N1 (6.6 vs. 15.6%, $P<0.001$) and SP=N2 conflicts (5.9 vs. 12.0%, $P<0.001$). Conversely, the Site1 N1 kappa was inferior due to greater SP=wake disagreement (41.6% vs. 19.8%, $P<0.001$).
Discussion: N3 was excessively stage by both PSG technicians before restaging. At Site1, Wake, N3, and REM had almost-perfect-agreement with SP, while N2 had substantial-agreement. At Site2 and across-site, substantial-agreement was observed for Wake, N2, N3, and REM.

P077

RELIABILITY OF THE CLINICAL CHARACTERIZATION OF ISOLATED REM SLEEP BEHAVIOR DISORDER

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Purpose: Compare agreements between polysomnography-based (PSG) diagnosis of isolated REM-sleep-behavior-disorder (iRBD) and Non-REM-Hypertonia (NRH), a novel biomarker independently associated with synucleinopathy-related neurodegenerative diseases.

Methods: Sixteen patients with histories of dream-enactment-behavior (DEB)(women=38%; age:64.6±13.0) underwent PSG with simultaneously-recorded Sleep Profiler (SP).

Two boarded sleep neurologists independently characterized iRBD. Physician1 combined abnormal qualitative REM-sleep-without-atonia (RSWA) by submental electromyography, with video-confirmation of probably DEB. Physician2 relied solely on qualitative RSWA. SP was auto-staged, technically reviewed, and reprocessed for automated abnormal NRH detection. Kappa scores measured physician and NRH agreements.

Results: In the 14 records with REM sleep, iRBD was characterized in: Physician1=64%, Physician2=79%, NRH=71% of the records. Across the three methods, unanimous iRBD agreement occurred in 57% of the records (positive=7, negative=1).

The between-physician agreement in iRBD classifications was fair (kappa=0.32). The agreement between NRH and Physician1 was moderate (kappa=0.52) versus slight with Physician2 (kappa=0.05). NRH comparisons to consensus physician agreement yielded one false-positive and one false-negative iRBD finding. Physician2 classified: a) iRBD in two cases that were negative by Physician1 and NRH, and b) one negative case that Physician1 and NRH characterized as iRBD. Physician1 identified one negative case that was classified iRBD by Physician2 and NRH. Additionally, NRH was abnormal in one of the two records with no REM sleep.

Discussion: NRH may assist in iRBD risk assessment, given it agreed with at least one physician in 86% of the cases and the between-physician iRBD agreement was only fair. NRH also characterized iRBD-risk in patients with insufficient REM sleep for RSWA assessment.

P078

ORAL APPLIANCE FABRICATION SETTINGS IMPACT TREATMENT EFFICACY

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Purpose: Assess the impact of custom oral appliance (CA) fabrication settings on treatment outcomes.

Methods: CPAP-intolerant patients completed a two-night home-sleep-apnea study (HSAT); Night1=baseline, Night2=Apnea Guard® trial appliance (AG). The AG vertical-dimension-of-occlusion (VDO) selection was based on tongue-scallop (women=5.5/6.5 mm, men= 6.5/8.0 mm), with a target protrusion of 70% from neutral-maximum while in situ.

Study1 CA VDO was dependent on sex (women=2.5 mm, men=5 mm), with protrusion set using a George-Gauge measured 70% from maximum retrusion-protrusion with dentist-directed titration. Study2 CA was fabricated to the AG VDO and target protrusion bite-registration.

Efficacy HSATs were conducted after completion of Study1 CA titration with vertical-elastics optional, and at the AG target protrusion with vertical-elastics mandatory in Study2. Statistics included Mann-Whitney, Chi-squared, and Bland-Altman analyses.

Results: The Study1 (n=84) and Study2 (n=46) distributions were equivalent for tongue-scallop (64/63%) and sex (women=45/41%), however, noted differences in age (53.8±11.9 vs. 58.4±12.2; P=0.052), body-mass-index (29.4±5.7 vs. 27.8±4.0; P=0.128) and pre-treatment AHI severities (24.6±14.4 vs. 29.2±17.4 events/h; P=0.155) were observed.

The Bland-Altman biases were significant different (Study1=4.2±7.8 vs. Study2=1.3±7.0 events/h, P=0.035). The significant Study1 differences between the CA vs. AG AHIs (12.3±9.2 vs. 8.2±5.9 events/h, P<0.0002) were not apparent in Study2 (11.7±8.0 vs. 10.4±6.7 events/h, P=0.362), however, the Study2 AG AHI values were higher (P=0.055).

Discussion: Despite the trend toward greater Study2 pre-treatment and AG AHI severities, CA treatment efficacy was equivalent to the AG once VMO was controlled and fabricated using the AG VDO and protrusion bite-registration. These findings confirmed CA fabrication settings impact treatment outcomes.

P079

EFFECT OF SLEEPWEAR FIBRE TYPE ON MENOPAUSAL SLEEP QUALITY – STUDY PROTOCOL AND PRELIMINARY DATA

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Introduction: Vasomotor symptoms and sleep disturbances are common in menopausal women. Different fabric types affect thermal comfort through moisture absorption and thermal insulation. This study examined the impact of cotton and wool sleepwear on menopausal women's sleep quality.

Methods: This is a randomized, crossover, repeated-measures and triple-blinded trial comparing the sleep quality and vasomotor symptoms of healthy menopausal women between cotton and wool sleepwear at 30°C, 50% relative humidity. Participants undergo 6 laboratory visits. After a screening visit and a familiarization night, participants are randomized to 4 nights (2 nights in cotton and 2 nights in wool sleepwear) during which polysomnography and actigraphy recordings are taken including objective hot flush events, room temperature and relative humidity measurements, as well as subjective questionnaires on clothing comfort, mood and vasomotor symptoms.

Results: Eleven participants (age 51.2±4.7 years, BMI 26.8±2.9 kg.m-2, Insomnia Severity Index 11.1±5.5) completed all six visits so far. Reasons for exclusion: 3 didn't have vasomotor symptoms; 1 on HRT, 5 had severe sleep disturbances, 3 on medications, 4 had diabetes, 1 asthma, and 1 had BMI>30. All sleep-related outcomes are pending analysis (blinding).

Discussion: Recruitment is a major study challenge. Many participants found it hard to arrange a time to attend overnight studies due to family/work commitments. The COVID-19 pandemic changed people's attitude as some were hesitant to attend

the laboratory. Menopause transition status is an important time during women's lifespan. Effective management, e.g., through appropriate sleepwear, would be helpful to improve menopausal women's symptom and quality of life.

P080

AN EMBEDDED PATHWAY TO MANDIBULAR ADVANCEMENT SPLINT (MAS) CONSTRUCTION IN A TERTIARY HOSPITAL REDUCES BARRIERS TO CARE FOR LOW-INCOME INDIVIDUALS

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Introduction: The aim of this study was to report the outcomes of patients referred within and to a tertiary hospital dental unit for subsidised construction of a MAS over a 5-year period.
Methods: Medical records of patients referred from 2015–2020 were examined for reason for referral, details of diagnosis, pathway to diagnosis, treatment, compliance, clinician-reported and lab-based outcomes and follow-up reviews.
Results: One hundred patients referred from: The Hospital Sleep Unit 40, other Tertiary Hospitals 27, Private Sleep Clinics 13, Medical GPs 10. 76 patients were confirmed health care card holders. 30 patients did not proceed for reasons of cost or poor oral health. 59 patients were newly fitted with a MAS (27F,32M), 17 severe, 21 moderate, 17 mild OSA, mean age 52.9(+13.9) years, BMI 30.2(+6.3) kg/m2, ESS 11.4(+5.3). 22 of 36 patients with serial ESS scores had excessive daytime sleepiness upon initial presentation. 15/22(68%)($p<0.005$) of patients had resolution of their excessive daytime sleepiness following MAS wear. 8/15(53%) of patients had a subsequent AHI <50%. 33 patients (56%) continued MAS wear, mean follow-up time 13.8(±14.6) months with an average of 5.8(+3.0) visits. 6 were lost to follow up, 20 patients (33%) ceased MAS wear with 10(50%) of these stopping because routine dental treatment affected the device fit or discomfort later developed.
Conclusion: Subsidised expert construction of MAS embedded in a tertiary hospital is a well-utilised and effective service which reduces barriers for patients. The referrals to this service appear to be appropriate, with most patients proceeding to MAS construction.

P081

ASSESSMENT OF CHANGE IN PALATOGLOSSUS LENGTH WITH MANDIBULAR ADVANCEMENT AND RELATIONSHIP TO RESPONSE TO MANDIBULAR ADVANCEMENT SPLINT THERAPY IN OBSTRUCTIVE SLEEP APNOEA

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Background: The palatoglossus is a muscle of the soft palate extending from the palatine aponeurosis inferolaterally along the pharyngeal wall inserting at the posterolateral surface of the tongue. Palatoglossal stimulation dilates the retropalatal space in subjects with obstructive sleep apnoea (OSA). Whether there is alteration in palatoglossus length during mandibular advancement and how this relates to Mandibular Advancement Splint (MAS) outcomes is unknown.
Methods: Participants with OSA referred for MAS underwent upper airway MRI with and without mandibular advancement. The linear distance between the origin of the palatoglossus muscle at the palatine aponeurosis and its insertion at the tongue was measured to approximate palatoglossus length. The difference in measured lengths with and without mandibular advancement was calculated. Change in palatoglossus with advancement was compared to treatment outcomes.
Progress to date: 71 participants with mean±SD AHI 26.0±16.1 events/hr were included in our study. Mean±SD palatoglossus length was 49.58±5.74mm. With mandibular advancement, mean±SD palatoglossus length was 51.21±5.46mm this was a significant change in length of mean±SD 1.63±4.3mm. This was a mean±SD 4.79±9.08% alteration in length with mandibular advancement. Treatment response was not significantly related to change in palatoglossus length ($p> 0.05$).
Intended outcome and Impact: Our intention was to demonstrate significant length alteration in palatoglossus with mandibular advancement and correlate this to treatment outcome. This may highlight palatoglossus as a target for MAS or other OSA therapies for future clinicians.

P082

GENDER MODERATES THE EFFECTS OF TOTAL SLEEP DEPRIVATION AND SLEEP RESTRICTION ON RISK PREFERENCE

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Introduction: Total sleep deprivation (TSD) affects risk preference in decision-making. However, little work has examined the effects of sleep restriction (SR), or the potentially moderating role of gender, on risk preference. Here, we investigate the effects of TSD, SR, and gender on risky decision-making.
Methods: 47 healthy adults (age=24.57±5.26 years, 24F) were randomly assigned to either of 2 counterbalanced protocols: 1) well-rested (WR: 9-hours time-in-bed for 6 nights) and 30hours TSD; or 2) WR and SR (4-hours time-in-bed for 4 nights). Participants performed the Lottery Choice Task (LCT) on the last day of each week. LCT requires a series of choices between two risky gambles with different risk levels. In one block, participants sought to maximise monetary gain (GAINS), and in another block, they sought to minimise losses (LOSSES). A trial-level analysis evaluated participants' likelihood of choosing the "safer" gamble under influence of each sleep condition.
Results: The version*condition*gender interaction was significant. GAINS: everyone became more risk averse during TSD. Females also became more risk averse during SR, but males did not. LOSSES: everyone became more risk seeking during SR. During TSD, females became relatively more risk averse, while males became relatively more risk seeking.
Conclusion: TSD and SR had similar impacts on risk preference. However, gender moderated some effects. Women generally became more risk averse during sleep loss for both GAINS and LOSSES. Men were more risk averse for GAINS and risk seeking for LOSSES. This has implications for real-world situations where individuals are required to make risky decisions.

P083

AGE OF NAP CESSATION AND SHORT-TERM SOCIAL-EMOTIONAL FUNCTIONING IN EARLY CHILDHOOD

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Background: Daytime nap cessation, in which sleep transitions from biphasic to monophasic sleep, is a common feature of early childhood sleep patterns. Yet, to date, understanding of the meaning of this transition for children's development is not well understood. The aim of this study is to investigate the relationship between the age of nap cessation and behavioral and social functioning in young children.
Methods: Parent report data from the Effective Early Educational Experiences (E4Kids) study of N=1700 children from across Queensland and Victoria is analysed. Data on age of nap cessation, Strengths and Difficulties Questionnaire (SDQ), and Social Skills Improvement Scale (SSIS) is examined to determine whether age of nap cessation is associated with internalizing and externalizing behaviour and social skills in early childhood.
Progress to date
Data collection and cleaning are complete. Initial descriptive analyses and identification of significant covariates are underway, and final regressions will be run shortly.
Intended outcome/ Impact
This study provides new evidence on the relationship between age of napping cessation and social-emotional outcomes in young children. Such evidence is important for building an understanding of the role of sleep cessation in children's early development, and to inform practitioners and parents responsible for supporting children's sleep.

P084

IS COGNITIVE BEHAVIOUR THERAPY FOR INSOMNIA (CBTI) RESPONSIVENESS A FUNCTION OF OBJECTIVE SLEEP EFFICIENCY RATHER THAN OBJECTIVE SLEEP DURATION?

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Introduction: Past research and our own has not shown a differential response to Cognitive Behaviour Therapy for insomnia (CBTi) based on objective sleep duration. It is valuable to investigate CBTi responsiveness is a function of objective sleep efficiency (SE) instead of objective sleep duration. This study is a secondary exploratory analysis of our earlier clinical trial to assess the differential therapeutic response to CBTi for older insomniacs based on SE prior to treatment.
Method: Seventy-nine adults (male=34, mean age=63.38, SD=6.25) with sleep maintenance insomnia were selected. Participants were grouped into 3 ordinal groups; the top 50% of participants (above the median percent sleep time-normal SE), the 25% of participants in the third quartile (moderately low SE), and the bottom 25% of participants (severely low SE) based on 1-night of home-based polysomnography. Participants were randomly allocated to CBTi or wait-list control. One-week sleep diaries, actigraphy and a battery of questionnaires evaluated the efficacy of CBTi for each SE group. Outcome measures were taken at pre-treatment, post-treatment, and 3-month follow-up.
Results: CBTi produced robust improvements in sleep quality including reduced wake after sleep onset, and improved sleep efficiency. Participants reported a reduction of scores on the Insomnia Severity Index, Flinders Fatigue Scale, Epworth Sleepiness Scale, Daytime Feeling and Functioning Scale, Sleep Anticipatory Anxiety Questionnaire, Dysfunctional Beliefs and Attitudes Scale, and increased Sleep Self-Efficacy Scale. All improvements were significant relative to waitlist and comparable regardless of objective SE at pre-treatment.
Discussion: CBTi responsiveness did not differ as a function of objective SE.

P085

BODY COMPOSITION EFFECTS OF HIGH INTENSITY FUNCTIONAL EXERCISE TRAINING DURING RAPID WEIGHT LOSS IN OBESE PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA: A PILOT RANDOMISED CONTROLLED TRIAL.

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Introduction: While Very Low Energy Diets (VLEDs) have been proven to reduce weight in patients with obstructive sleep apnoea (OSA) and co-morbid obesity, they can also result in excessive loss of muscle mass which adversely impacts health. Concurrent exercise training is considered an effective method of preventing muscle mass loss.
Methods: This prospective randomised controlled trial will recruit 30 overweight and obese men with untreated moderate-to-severe OSA to undergo a 12-week VLED with or without high-intensity functional exercise (HIFE) training. HIFE will be delivered through a commercially available supervised exercise program and incorporates interval training with a combination of progressively graded aerobic and anaerobic exercise.
The primary outcome measures are changes in body composition, assessed by dual x-ray absorptiometry (DEXA), and OSA severity (measured by apnoea hypopnea index). Secondary outcomes include glucose tolerance, ventilatory response, and peak oxygen uptake.
Data will be analysed on an intention-to-treat basis. Paired T-tests will be used to test the treatment effect of exercise compared to control. Confidence intervals will be used to analyse change in muscle mass and other secondary outcomes.
Results: Only one participant has completed the protocol to date. No results are available at this time.
Discussion: The results of this pilot study will look to confirm whether HIFE can protect against muscle mass loss, and additively benefit OSA severity during VLED, compared to VLED alone. It will also inform estimation of feasibility for a larger definitive study.

P086

THE ORGANIZATION OF SLEEP-WAKE PATTERNS AROUND DAILY SCHEDULES IN COLLEGE STUDENTS

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A potential contributor to insufficient sleep among college students is their daily schedule, with sleep sacrificed for other waking activities. We investigated how daily schedules predict day-to-day sleep-wake timing in college students. 223 undergraduate college students (M±SD = 19.2±1.4 years, 37% females) attending a Massachusetts university in the US between 2013–2016 were monitored for approximately 30 days during semester. Sleep-wake timing was measured using daily online sleep diaries and wrist-actigraphy. Daily schedules were measured using daily online diaries that included self-reported timing and duration of academic, exercise-based, and extracurricular activities, and duration of self-study. Linear mixed models were used to examine the association between sleep-wake patterns and daily schedules at both the between-person and within-person levels. An earlier start time of the first-reported activity predicted earlier sleep onset (between and within: $p<.001$) and shorter total sleep time (within: $p<.001$) for the previous night, as well as earlier wake onset on the corresponding day (between and within: $p<.001$). A later end time of the last-reported activity predicted later sleep onset (within: $p=.002$) and shorter total sleep time (within: $p=.02$) on that night. A more intense daily schedule (i.e., greater total duration of reported activities) predicted an earlier wake onset time (between: $p=.003$, within: $p<.001$), a later sleep onset time (within: $p<.001$), a shortened total night-time sleep duration (between: $p=.03$, within: $p<.001$), and greater sleep efficiency (within: $p<.001$). These results indicate that college students may organize their sleep and wake times based on their daily schedule.

P087

A VALIDATION STUDY OF THE LIMITED CHANNEL SINGLE AND MULTI-USE NIGHTOWL SLEEP TESTING SYSTEMS COMPARED TO LABORATORY POLYSOMNOGRAPHY IN THE DIAGNOSIS OF OBSTRUCTIVE SLEEP APNOEA

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Background: Obstructive sleep apnoea (OSA) is common, and its prevalence is increasing. Opportunities to screen for OSA using simplified diagnostic devices may be important to addressing this clinical burden. The NightOwl (Ectosense NV, Leuven, Belgium) is a small dual channel device that acquires data from a single fingertip and is available in a disposable version, in addition to the previously validated reusable option. The devices will provide a measure of sleep duration and derived apnoea-hypopnoea index (AHI) using a proprietary algorithm.

Methods: A prospective cohort study of patients undergoing laboratory polysomnography (PSG) for suspected OSA is underway at Monash Medical Centre, Clayton (ACTRN12621000444886). Participants are fitted with a NightOwl Sensor Mini (disposable) and a NightOwl Sensor Reusable on their index and middle fingers, in addition to the standard PSG setup (Compumedics Grael, Profusion 3). The primary outcome is the level of agreement between the NightOwl Sensor Mini, NightOwl Sensor Reusable and PSG derived AHI. We also intend to compare the proprietary algorithm against Compumedics Profusion 3 for determination of oxygen desaturation index. Level of agreement will be determined utilising Bland-Altman plots.

Progress to date

Recruitment is currently underway with 29 of an intended 100 participants having completed their sleep studies.

Intended outcome and impact

The intended outcome of this study is to externally validate the two NightOwl devices against PSG for detecting OSA and accurately assessing severity. We anticipate this will enable screening for OSA in an efficient and cost-effective manner.

P088

PRESENCE VERSUS ABSENCE OF FLOW LIMITATION DURING STABLE BREATHING IN PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA

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Introduction: Flow limitation is the distinguishing characteristic of obstructive sleep apnoea. Critically, periods of flow limitation can occur without overt reductions in airflow (e.g. disproportionate increase in ventilatory drive vs. achieved ventilation), however, such periods are ignored by clinical scoring. Here we investigate flow limitation during so-called "stable breathing", i.e. periods of sleep without scored events, by applying our recently-validated model to estimate flow limitation from the airflow signal.

Methods: Flow limitation was visually-scored (N=117,871 breaths) from N=40 participants attending an overnight sleep study for suspected sleep apnoea. Scoring was aided by physiological signals (e.g. intra-oesophageal diaphragm EMG). Model flow limitation classification used features extracted from the pneumotach signal (cross-validated accuracy=92.4%). We applied this method to investigate the occurrence of flow limitation during stable breathing, defined as periods of sleep >3 min duration without scored arousals or respiratory events.

Results: Model predicted flow limitation frequency was strongly correlated with visual scoring ($R^2=0.84$ $p<0.001$). The median flow limitation frequency during stable breathing ranged from 8–91%, with an overall median of 59% (IQR 37%-75%). Flow limitation frequency during stable breathing was only modestly associated with the apnoea-hypopnea index ($R^2=0.12$ $p<0.05$).

Discussion: Flow limitation occurs surprisingly frequently during stable breathing. While some individuals achieve stable breathing with minimal flow limitation, others demonstrate substantial flow

limitation. Heterogeneity in frequency of flow limitation (within and between individuals) may provide further insights into emergent phenotypic variability within sleep disordered breathing. Finally, this model performed similarly in nasal pressure (88.2% accuracy), indicating potential application to clinical studies.

P089

LONELINESS AND SLEEP DURATION AMONG HEALTHY OLDER ADULTS IN SOUTHEAST QUEENSLAND, AUSTRALIA

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Introduction: The relationship between sleep duration and loneliness among healthy older adults is not fully understood. Shorter sleep duration and increased variability of sleep timing (sleep onset and wake time) have recently been shown to have adverse health outcomes in younger adults. While physiological stressors associated with loneliness are likely distinct, we hypothesise that older adults who identify as lonely have reduced sleep duration and increased variability of sleep timing.
Methods: Older individuals (N=60) without significant co-morbidities were recruited via convenience sampling. Participants completed the de Jong Giervield Loneliness Scale and wore an actigraph for up to 2 weeks. Sleep metrics from actigraphy (sleep onset and wake times, and SD) were determined by algorithm assisted human scoring.
Results: Valid data was retrieved from N=37 participants (age 83±6.8 years [mean±SD]). There were no significant differences in demographics between those in the lonely (N=19) and not lonely (N=18) groupings. There was substantial heterogeneity in individual participant's sleep metrics, both within and between groupings. The average sleep onset time was similar between groups, however lonely participants typically woke earlier resulting in slightly shorter sleep duration. Variability in sleep onset and wake times was reduced in lonely participants.
Discussion: While shorter sleep duration was expected, we did not anticipate the reduction in sleep timing variability amongst those defined as lonely; more regular sleep periods have previously been associated with better outcomes. We did not see statistically significant differences between our groups, possibly due to sample size limitations, however, the unexpected trend warrants further investigation.

P090

THE EFFECT OF WORKLOAD, SLEEP DEPRIVATION AND TIME OF DAY ON SIMULATED DRIVING PERFORMANCE

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Sustained operations expose individuals to long work periods, which deteriorates their ability to sustain attention. Biological factors, including sleep deprivation and time of day, have been shown to play a critical role in the ability to sustain attention. However, a gap in the literature exists regarding external factors, such as workload. Therefore, the aim of this study was to investigate the combined effect of sleep deprivation, time of day, and workload on sustained attention. Twenty-one participants (18–34y, 10 F) were exposed to 62 hours of sleep deprivation within a controlled laboratory environment. Every 8 hours, sustained attention was measured using a 30-minute monotonous driving task, and subjective workload was measured using the NASA-Task Load Index (TLX). Workload, defined as time on task was assessed by splitting the drive into two 15-minute loops. A mixed model ANOVA revealed significant main effects of day (sleep deprivation) and time of day on lane deviation, number of crashes, speed deviation and time outside the safe zone (all $p<.001$). There was a significant main effect of workload (time on task) on lane deviation ($p=.042$), indicating that a longer time on task resulted in greater lane deviation. NASA-TLX scores significantly increased with sleep deprivation ($p<.001$), indicating that subjective workload increased with sleep loss even though the task remained constant. Workload, sleep deprivation and time of day produced a deterioration in sustained attention. With this, countermeasures that not only consider sleep deprivation and time of day, but also workload (time on task) can be considered.

P091

THE IMPACT OF COGNITIVE FITNESS AND GENDER ON SLEEP QUANTITY AND TIMING AND MENTAL HEALTH OF COMPETITIVE ATHLETES

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Introduction: Mental fitness is increasingly considered key to an athlete's competitive arsenal. Its active ingredients include cognitive fitness factors, such as impulse control, and recovery factors, such as sleep, which may differ between male and female athletes. Our study investigated: 1) gender differences in cognitive fitness; and 2) the associations of gender and cognitive fitness with sleep and mental health in competitive athletes during the COVID-19 lockdown.
Methods: 84 athletes competing at levels from regional/state to international (42F, mean age=23.2) completed a questionnaire battery containing validated measures of: a) depression, anxiety, and stress; b) sleep (Total Sleep Time, Sleep Latency, mid-sleep time on training- and competition-free days); and c) self-control, intolerance of uncertainty, and impulsivity (representing cognitive fitness constructs).
Results: Female athletes reported significantly higher depression, anxiety, and stress, a later mid-sleep time on free days, lower self-control, higher intolerance of uncertainty, and higher positive urgency impulsivity compared with male athletes. Self-control was negatively associated, and intolerance of uncertainty was positively associated, with depression, anxiety, and mid-sleep time on free days.
Discussion: Female athletes in our sample reported poorer mental health and cognitive fitness, and later sleeping times on free days. Greater cognitive fitness was associated with better mental health, independent of gender. Overall, these findings are consistent with prior work in community samples. Future work should examine the source(s) of these gender differences. If replicated, our findings would suggest a need to develop interventions aimed at improving athlete well-being, potentially with a particular focus on female athletes.

P092

IMPROVING POSTGRADUATE PSYCHOLOGY STUDENTS' SLEEP AND INSOMNIA KNOWLEDGE WITH A SLEEP EDUCATION WORKSHOP

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Introduction: Trainee psychologists receive limited sleep and insomnia education during postgraduate study. This study examined the delivery of a sleep psychology training workshop for postgraduate psychology students and examined changes in sleep knowledge from pre- to post-workshop.
Methods: A 6-hour Sleep Psychology Workshop was delivered to postgraduate psychology students around Victoria. Online pre- and post-workshop questionnaires were used to evaluate changes in sleep psychology knowledge and collect feedback on the workshop.
Results: The participants were 187 students (82% female, M age = 32), most of whom were in their 5th year of psychology training (69%) and had not received any sleep education during their postgraduate studies at the date of the intervention (77%). Students' sleep knowledge significantly improved after workshop completion (pre: 56% vs. post: 80% correct), $t(107) = -21.41$, $p < .001$. Students provided positive feedback about the workshop, with 96% rating the workshop as excellent/very good and 86% reporting that they would recommend the workshop to other postgraduate students. Overall, 94% of students agreed/strongly agreed that the sleep psychology workshop improved their confidence to manage sleep disturbances in their future psychology practice.
Discussion: Postgraduate psychology students require sleep and insomnia education. This study demonstrates that students' sleep psychology knowledge can improve after a 6-hour sleep education and training workshop and provides initial positive feedback about the benefits of sleep and insomnia education for postgraduate students.

P093

A SYSTEMATIC REVIEW OF ADHERENCE TO COGNITIVE BEHAVIOURAL THERAPY FOR INSOMNIA (CBT-I) - KEY FINDINGS

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Introduction: Research into factors influencing adherence to CBT-I and how adherence impacts treatment outcomes remains scarce. Through a systematic review, we aimed to determine how adherence is assessed; which factors predict adherence; and which treatment outcomes are predicted by adherence.
Methods: Included publications met the following criteria: adults with insomnia; an intervention of CBT-I, including sleep restriction (SRT) and/or stimulus control (SCT); a reported measure of adherence; and written in English.
Results: Final n=103 papers. Measures assessed either global adherence or adherence to specific components of CBT-I via questionnaires, sleep diaries, interviews, or actigraphy. Most common measures were sleep diary-derived CBT-I components for therapist-led studies, and module completion for digital studies. Twenty-eight papers (27.2% of total) examined predictors of adherence. Depression, pre- and post-session sleep, psychosocial support, and dysfunctional beliefs about sleep predicted adherence. Demographic variables, other psychological comorbidities, insomnia severity, and sleep questionnaires did not predict adherence. Twenty-eight papers (27.2%) examined whether adherence predicted treatment outcomes. Neither global adherence nor adherence to any specific component of therapist-led CBT-I reliably predicted sleep outcomes. For digital CBT-I, completion of treatment modules was linked to improvements in ISI, however there were only five studies.
Conclusion: There was a high degree of heterogeneity in how adherence was measured, and in predictors and outcome variables assessed. This heterogeneity likely explains why adherence does not appear to predict treatment outcome. The field needs to develop a standardised method for assessing each specific adherence construct to fully understand the role of adherence in CBT-I.

P094

CPAP SERVICE PATIENT EXPERIENCE SURVEY

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Introduction: Increasing numbers of children with obstructive sleep apnoea require continuous positive airway pressure (CPAP) treatment. We aimed to collect feedback from parents/carers about our CPAP education and follow-up programme.
Methods: An online survey link was texted to families of children starting outpatient CPAP from Jan 2019 -Feb 2021. Questions assessed satisfaction with the CPAP initiation process, including education by our nurse educator (NE), mask fitting, using equipment, accessing help, confidence using CPAP and follow up. Open-ended feedback was invited.
Results: 17/55 (31%) of eligible families responded. "Very satisfied" responses regarding CPAP education ranged from 76% (discussion of costs) to 94% (machine use and maintenance). All families felt confident starting CPAP at home. Two reported issues starting CPAP, but reported feeling fully supported by staff remotely to troubleshoot. All families were "somewhat" or "very satisfied" with NE follow-up, with 2 families more neutral about physician follow-up. Two families reported lower satisfaction ("somewhat dissatisfied" or neutral) with the range of paediatric masks, rather than with the mask fitting process itself. Of 14 general comments, 64% were positive (most common theme was high standard of care from the NE); 21% negative (lack of mask choices, location of consulting suites); and 15% neutral. Suggestions for improvement included financial support information, support groups and online consumable ordering.
Discussion: Families feel confident and well supported to commence outpatient CPAP, highlighting the care, knowledge and support provided by our team. Findings emphasize the importance of a dedicated NE. Suggestions provided will inform future service improvements.

P095

HEART RATE VARIABILITY DURING SLEEP IN PAROXYSMAL ATRIAL FIBRILLATION PATIENTS WITH AND WITHOUT OBSTRUCTIVE SLEEP APNOEA

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Introduction: Physiological studies have demonstrated the importance of the autonomic nervous system in mediating acute apnoea-induced atrial fibrillation (AF). We aimed to compare Heart Rate Variability (HRV) markers of autonomic function in paroxysmal atrial fibrillation (PAF) patients with and without obstructive sleep apnoea (OSA). A secondary aim was the analysis of ectopic beats in these groups.
Methods: Nocturnal ECG traces from 89 PAF patients who underwent in-laboratory polysomnography were included. After identifying ectopic beats in the ECGs, periods of arrhythmia as well as sleep apnoea events were excluded. HRV time and frequency domains were reported by sleep stage (REM vs Non-REM) for patients with and without OSA.
Results: Frequency domain analysis of HRV during non-REM sleep in PAF patients with OSA showed increased cardiac parasympathetic modulation (HF-nu: 39.13 ± 15.74 vs 47.98 ± 14.60, p = 0.008*) and reduced cardiac sympathetic modulation (LF/HF ratio: 2.05 ± 2.02 vs 1.17 ± 0.98, p = 0.007*). Results remained significant after adjusting for age, sex and BMI (adjusted p values 0.024 and 0.018 respectively). PAF patients with severe OSA (AHI ≥ 30/hr) had more AF beats and Ventricular Ectopic Beats than those without severe OSA (22.7 ± 42.8% vs 3.7 ± 17.9%, p = 0.006*, 1.7 ± 3.8 vs 0.3 ± 0.9%, p = 0.004* respectively).
Conclusions: This is the first study of HRV in AF patients with and without OSA. It suggests a chronic increase in parasympathetic nervous modulation and relative reduction in sympathetic modulation in PAF patients with OSA.

P096

SUBJECTIVE RATINGS OF MEDICATION STRENGTH OF LEMBOREXANT OVER 6 MONTHS IN SUBJECTS WITH MODERATE OR SEVERE INSOMNIA

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Introduction: In Study 303 (SUNRISE-2), significantly more subjects reported a positive effect of lemborexant (LEM), a dual orexin receptor antagonist, versus placebo (PBO) on their sleep at 1mo, 3mo and 6mo, as assessed by items 1–3 of the Patient Global Impression–Insomnia (PGI-I). LEM-treated subjects also reported larger and statistically significant decreases in the Insomnia Severity Index (ISI) versus PBO. This analysis examined potential LEM tolerance via patient-reported ratings of medication strength on PGI-I item 4 in subjects with moderate/severe insomnia.
Methods: In this 12mo double-blind, PBO-controlled (first 6mo), phase 3 study, subjects ≥18y with insomnia disorder and ISI scores ≥15 were randomized to PBO (n=318) or LEM (5mg, [LEM5], n=316; 10mg, [LEM10], n=315). The ISI and PGI-I were administered at 1mo, 3mo and 6mo.
Results: The percentage of subjects with moderate (ISI=15–21; n=692) or severe (ISI=22–28; n=223) insomnia at baseline who rated LEM as "just right" increased from 1mo (moderate: LEM5=46.4%; LEM10=43.3%; PBO=31.3%; severe: LEM5=35.8%; LEM10=40.6%; PBO=15.0%) to 6mo (moderate: LEM5=56.5%; LEM10=53.9%; PBO=39.7%; severe: LEM5= 54.8%; LEM10=55.4%; PBO=21.6%). Ratings of "too weak" decreased over 6 months in both ISI severity groups. PBO group ratings of "too weak" always exceeded the LEM groups by >15%. Ratings of "too strong" were low and stable over time.
Conclusions: Findings suggest that LEM tolerance does not occur over 6mo with either LEM dose since patient perceptions of LEM treatment being "too weak" did not increase over the study period. These data support the persistent efficacy of long-term LEM treatment for chronic insomnia.

P097

INCIDENCE OF ABNORMAL DREAMS AND NIGHTMARES WITH LEMBOREXANT IN ADULTS WITH INSOMNIA: RESULTS FROM TWO PHASE 3 STUDIES

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Introduction: Abnormal dreams and nightmares have been reported by insomnia patients before and after treatment with sedative-hypnotics. Since dual-orexin-receptor-antagonists such as lemborexant (LEM; approved in multiple countries for adult insomnia) increase REM sleep, during which dream content is more likely to be recalled, we assessed the frequency of nightmares/abnormal dreams in Phase 3 studies.
Methods: Study 303 (SUNRISE-2) was a 12mo, randomized, double-blind, placebo (PBO)-controlled (first 6mo [Period 1]), phase 3 study that enrolled subjects ≥18y with insomnia disorder and ISI scores ≥15. During Period 1, the safety analysis set (SAS) included: PBO, n=319; LEM 5mg, (LEM5), n=314; LEM 10mg (LEM10), n=314. Study 304 (SUNRISE-1) was a 1mo, randomized, double-blind, PBO- and active-controlled (zolpidem tartrate extended-release 6.25mg [ZOL-ER]) study of LEM5 and LEM10. The SAS included: PBO, n=209; ZOL-ER, n=263; LEM5, n=266; LEM10, n=268.
Results: In Study 303, Period 1, 28/947 subjects (3.0%) reported nightmares (n=12; PBO-1; LEM5-4; LEM10-7) or abnormal dreams (n=17; PBO-6; LEM5-7; LEM10-4) as treatment-emergent adverse events (TEAEs). In Study 304, 12/1006 subjects (1.2%) reported nightmares (n=4; PBO-1; ZOL-ER-0; LEM5-2; LEM10-1) or abnormal dreams (n=8; PBO-1; ZOL-ER-3; LEM5-0; LEM10-4). 32/40 subjects (80.0%) reporting these events were female (% females in the studies: 303=67.9%; 304=86.4%). In the LEM groups, 11/28 subjects (39.3%) reported the TEAE within 3 days of treatment initiation. There were 2 TEAEs of nightmare/abnormal dreams during the PBO run-in prior to randomization.
Conclusion: Abnormal dreams/nightmares were not common events in either study. Incidence was slightly higher with LEM10 and proportional to enrollment based on sex.

P098

PREDICTING DELAYS IN OR FAILURE TO INITIATE CPAP THERAPY: A RETROSPECTIVE COHORT STUDY

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Background: Suboptimal CPAP usage is associated with negative outcomes and inefficient use of medical resources. Demographic and polysomnographic characteristics are well established predictors of poor adherence, however the literature regarding patients who fail to initiate treatment is limited. This audit aimed to identify features associated with the delayed commencement or failure to initiate CPAP therapy.
Methods: A single institution, retrospective cohort study was performed. The cohort comprised adults with obstructive sleep apnoea prescribed CPAP between 2017 and 2018. The demographic, clinical and polysomnographic features of this cohort were identified. Comparisons were conducted between patients who initiated therapy and those who did not, as well as between early and delayed initiators of treatment, which was defined as uptake after one month. Multiple logistic regression was performed with significance defined as a $p<0.05$.
Results: 916 patients were identified. 38.2% of patients did not uptake prescribed CPAP, with male gender ($p < 0.001$), younger age ($p=0.007$) and lower pressure ($p=0.016$) identified as prognostic factors. Socioeconomic disadvantage ($p=0.774$) and Epworth Sleepiness Scale ($p=0.111$) were not associated with failure to start treatment. Of the 61.8% of patients who initiated CPAP therapy, 33% exhibited a delayed start to therapy, with indigenous status a significant feature of this cohort ($p=0.002$).
Discussion: A large portion of patients displayed either delayed commencement or failure to initiate CPAP therapy. Younger age, male gender and lower prescribed pressures were identified as negative predictive factors. These characteristics, as well as delayed treatment experienced in the indigenous population, provide focus points for intervention.

P099

PHYSIOLOGICAL PHENOTYPES OF OBSTRUCTIVE SLEEP APNOEA (OSA) IN PACIFIC ISLANDERS AND EQUALLY OBESE CAUCASIANS

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Background: Pacific islanders (PI) have a high prevalence of severe OSA, attributed to obesity. Ethnic differences in mechanisms contributing to OSA have been reported. We compared physiological polysomnography characteristics in obese PI and Caucasian (C) patients with OSA.
Methods: Retrospective polysomnography (PSG) studies from a tertiary hospital sleep laboratory were identified for PI and age, gender and BMI matched C patients (BMI>30 kgm^2). All PSGs were rescored by a single scorer, and pharyngeal collapsibility (Vpassive), upper airway muscle compensation (Vcomp), arousal threshold (AT), [all expressed as percentage of steady-state breathing (Veupnea)], and loop gain (LG) were determined non-invasively via established/validated techniques.
Progress to date
14 PI [8 female] and 29 C [15 female] were identified. There were no differences in age [52.2±17.0 PI; 52.5±13.3 C years], BMI [46.9±7.7 PI; 48.2±10.1 C kgm^2] or AHI (35.6 [17.9–77.5] PI; 41.2 [20.9–83.6] C events/hour) (mean±SD or median[IQR]; all $p>0.4$; paired t-test or Wilcoxon signed rank). There were no significant differences in Vpassive (88.8 [88.4–97.1] PI; 91.8 [44.4–95.8]C %Veupnea; $p=0.38$), Vcomp (1.2 [-12.0–9.2] PI; 5.8 [-1.9–9.6] C %Veupnea; $p=0.30$), AT (131.4 [110.5–140.8] PI; 126.1 [110.4–180.7] C %Veupnea; $p=0.67$) or LG (0.6±0.1 PI; 0.7±0.3 C; $p=0.23$).
Intended outcome and impact
In a small cohort of PI and age, gender and BMI matched C with OSA, upper airway obstructive event frequency was the same and there were no differences in physiological phenotypes, suggesting similar mechanisms contribute to OSA severity in both groups. Confirmation of these findings in a larger cohort is ongoing.

P100

MODIFIED BRP AND TONGUE CHANNELLING: CAN WE CURE FRIEDMAN III?

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Aim: The primary aim of this study was to determine the success rate of modified barbed reposition pharyngoplasty (BRP) and coblation tongue channelling (CCT) in adult patients with obstructive sleep apnoea (OSA). The secondary objective was to determine the anatomical sites that were most amenable to surgical intervention. We predicted that Friedman would be a poor predictor of success for this surgical technique and that a new prognostic index would be required.
Methodology: Adult patients with OSA underwent combined MODIFIED BRP and CCT (n = 40) in this prospective, 2-centre cohort trial. Data analysed included pre- and post-operative (3 months) polysomnography, Epworth sleepiness scale (ESS) and VOTE anatomy assessment (using awake nasoendoscopy) performed by a single investigator.
Results: 40 participants have enrolled in this study. So far, 26 patients have pre- and post-operative data. 42% of these patients had Friedman 3 anatomy. Statistically significant decreases in AHI 20.3 + 24 to 4.9 + 8.6 ($p=0.001$) and ESS 12.4 + 4.9 to 4.8±3.4 ($p=0.001$) were observed in pre- to post-operative measurements. Friedman stage 3 patients had an 82% surgical success rate and 64% cure rate. Oropharyngeal lateral collapse and velum anteroposterior collapse were the most correctable forms of anatomical collapse.
Conclusion: MODIFIED BRP with CCT is a safe and effective surgical option for patients with OSA, as indicated by the reduction in AHI and ESS. Friedman stage III is no longer a barrier for surgical success, and therefore a newer staging system is required to help prognosticate success with modern sleep surgery techniques.

P101

ECONOMIC EVALUATION OF DIAGNOSTIC SLEEP STUDIES FOR OBSTRUCTIVE SLEEP APNOEA IN THE ADULT POPULATION: A SYSTEMATIC REVIEW

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Background: Obstructive sleep apnoea (OSA) is a significant public health problem with large health and economic burden. Despite the existence of effective treatment, undiagnosed OSA remains a challenge. The gold standard diagnostic tool is polysomnography (PSG), yet this test is expensive, labour intensive, and time-consuming. Home-based, limited channel sleep study testing (Level 3 and 4) can advance and widen access to diagnostic services. This systematic review aims to summarise available evidence regarding the cost-effectiveness of limited channel tests compared to laboratory and home PSG in diagnosing OSA.
Method: Eligible studies were identified across the following databases: MEDLINE, Psychinfo, Proquest, Scopus, CINAHL, Cochrane, Emcare and Web of Science. Studies were screened, critically appraised and eligible data were extracted using a standardised template. Relevant findings were summarised using a qualitative approach adhering to economic reporting standards.
Results: 915 non-duplicate abstracts were identified, 82 full-text articles were retrieved for review. 32 studies met the inclusion criteria and were included in the final analysis: 28 studies investigated Level 3 and four assessed Level 4 OSA diagnostic tests. Using a dominance ranking framework to compare cost and outcomes, both Level 3 and Level 4 OSA diagnostic tests were cost-effective compared to PSG.
Discussion: Although study designs and methodologies differ broadly, findings indicate that using limited channel diagnostic sleep tests for OSA is associated with lower cost and non-inferior health outcomes relative to PSG. Limited channel tests also resulted in shorter waiting times and improvements in access to diagnostic services for patients with OSA.

P102

ACCESSING HEALTHCARE FOR SLEEP PROBLEMS DURING THE COVID-19 PANDEMIC

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Introduction: As part of a study to assess the impact of the COVID-19 pandemic on the sleep of patients of a multidisciplinary sleep clinic, we surveyed how they accessed healthcare for sleep problems.
Methods: Patients were invited to complete an online survey in October 2020.
Results: 74 patients completed the survey (mean age 50.2 years, range 21–83 years, 56.8% female). 26/74 (35%) reported at least one delay in accessing healthcare for sleep problems. In particular, 7/49 (14.3%) had delays seeing a general practitioner whilst 16/43 (37.2%) experienced delays accessing a sleep physician. 7/26 (26.9%) reported delays booking a sleep study and 4/15 (26.7%) had delays hiring continuous positive airway pressure equipment. 11/31 (35.5%) experienced delays seeing a psychologist for sleep problems. 11/74 (14.9%) preferred to wait until they were able to attend the clinic in person. 21/74 (28.4%) had telehealth consultations with a sleep physician and/or psychologist. 19/21 (90.5%) described it easy to participate and 20/21 (95.2%) reported receiving satisfactory care through telehealth consultation. Only 5/21 (23.8%) preferred to attend in-person instead of participating in a telehealth consultation again. 11/74 (14.9%) had telephone consultations with a sleep physician and/or psychologist. 8/11 (72.7%) found it easy to participate and 8/11 (72.7%) reported receiving satisfactory care through telephone consultation. Only 3/11 (27.3%) preferred to attend in-person instead of participating in a telephone consultation again.
Discussion: During the COVID-19 pandemic, 35% of patients reported delays accessing healthcare for sleep problems. Most patients who participated in telehealth and telephone consultations described positive experiences.

P103

IMPACT OF THE COVID-19 PANDEMIC ON THE SLEEP OF PATIENTS OF A MULTIDISCIPLINARY SLEEP CLINIC

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Introduction: This study aimed to assess the impact of the COVID-19 pandemic on the sleep of adult patients of a multidisciplinary sleep clinic.
Methods: Patients were invited to complete online surveys: Survey 1 in October 2020 (increased COVID-19 restrictions) followed by Survey 2 in February 2021 (after easing of restrictions for a COVIDSafe summer).
Results: Of the 746 patients invited to participate, 73 completed and 8 partially returned Survey 1 (mean age 50.1 years, range 21–83 years, 58% female). Subsequently, 46 completed and 5 partially answered Survey 2. In Survey 1, 22/74 (29.7%) reported reduced sleep quantity and 31/75 (41.3%) indicated worse sleep quality compared with prior to the pandemic. In Survey 2, 33/46 (71.7%) described unchanged sleep quantity whilst 5/46 (10.9%) reported increased sleep quantity since easing COVID-19 restrictions. 36/46 (78.3%) indicated unchanged sleep quality whereas 5/46 (10.9%) described improved sleep quality since easing restrictions. However, 9/46 (19.6%) reported that their sleep remained worse compared with pre-pandemic. For patients who completed both surveys, there was no significant change in Insomnia Severity Index scores (Survey 1 mean 13.6, Survey 2 mean 12.9, mean difference -0.67 [95%CI -2.02, 0.68], p=0.32) or PROMIS Sleep-Related Impairment 8a T-scores (Survey 1 mean 59.0, Survey 2 mean 59.5, mean difference 0.44 [95%CI -1.55, 2.42], p=0.66).
Discussion: The COVID-19 pandemic has negatively affected the sleep of 44% of patients. Following easing of restrictions, symptoms of insomnia and sleep-related impairment did not change significantly, and 19.6% reported that their sleep was not back to their pre-pandemic baseline.

P104

Abstract Withdrawn

P104
Abstract Withdrawn

P105
ENDOCRINE, AUTONOMIC AND VASCULAR FUNCTION IN CHILDREN WITH SLEEP DISORDERED BREATHING

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SDB is a risk factor for cardiovascular disease and co-exists with chronic endocrine disorders such as type II diabetes and metabolic syndrome. Children with SDB have increased blood flow velocity, an indicator of reduced vascular compliance and early vascular aging. Increased blood flow velocity is positively associated with sympathetic activity, increased arterial sympathetic nerve fibre density and endothelial damage. Whether changes in endocrine function occur concomitantly with altered autonomic and vascular function in children with SDB was assessed.

Thirty six children scheduled for tonsillectomy underwent overnight polysomnography (SDB severity), pupil light reflex (autonomic function), fasting brachial artery blood flow assessment (vascular function - Doppler Ultrasound). Leptin and Ghrelin - both hormonal markers associated with sympathetic activity were measured in urine using ELISA and serum using MagPlex. The following dimensions of the dorsal lingual artery (tonsil) were measured – medial thickness, medial area, smooth muscle cell number/layers.

We observed a positive correlation between serum and urine leptin and ghrelin concentrations. Increased blood flow velocity and arterial medial thickness were both associated with increased serum and urine leptin and ghrelin concentrations. Pupil light reflex was negatively associated with serum leptin and ghrelin levels. OAHI was positively correlated with leptin and ghrelin concentration (urine and serum) but not blood flow velocity. Blood flow velocity was inversely correlated with SpO2 nadir (REM).

Our findings suggest that SDB has a global effect on the autonomic, vascular and endocrine systems.The impact of untreated paediatric SDB on the development of comorbidities in later life needs urgent attention.

P106
EVALUATING THE CORRELATION BETWEEN OBJECTIVE DAYTIME SLEEPINESS, DAYTIME FUNCTIONING AND SUBJECTIVE SLEEPINESS

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Introduction: Daytime sleepiness is typically assessed in clinical settings with the Multiple Sleep Latency Test (MSLT) and Maintenance of Wakefulness Test (MWT). However, these tests do not necessarily assess daytime functioning. This study aimed to assess the correlation between a 10-min Psychomotor Vigilance Test (PVT), as a measure of daytime functioning, and excessive daytime sleepiness as measured with the MSLT or MWT.

Methods: Patients attending the sleep clinic for assessments of daytime sleepiness underwent overnight polysomnography (PSG) and completed the Epworth Sleepiness Scale (ESS). The following day, patients completed four test sessions every 2h starting 1.5h after waking. Testing sessions included the Stanford Sleepiness Scale (SSS), PVT, MWT or MSLT. PVT lapses (reaction time >500ms), SSS score and sleep latencies (MSLT and MWT) were averaged within participants across sessions and regression analyses performed to assess the relationship between PVT lapses and sleepiness measures.

Results: A total of 41 patients (BMI: 33.7±8.7kg/m²; aged 44.8±17.8 years) completed the study. Of these, 22 (19 F) underwent the MSLT and 19 (2 F) underwent the MWT. PVT lapses correlated with MWT mean sleep latency (r^2=0.62; $p<0.001$), ESS (r^2= 0.19; $p<0.01$) and SSS (r^2= 0.12; $p<0.05$) but not MSLT mean sleep latency (r^2= 0.02; $p = 0.50$).

Discussion: In clinical practice, MWT and ESS are often used in conjunction to assess daytime functioning. Results suggest that the PVT could be used alongside MWT to aid clinical judgments around an individuals' daytime functioning.

P107
PATIENT SELF-REPORTED SLEEP QUALITY, NOISE AND LIGHT LEVELS IN A TERTIARY ICU: A PROSPECTIVE OBSERVATIONAL STUDY

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Introduction: Sleep is poor in intensive care units (ICU). However, there is limited research examining the causes from the patient perspective, especially in an Australian population. The current study

investigated the factors that patients perceive as affecting their sleep in a major Australian tertiary ICU.
Methods: Patients (n=138, 51F; aged 58.1±16.8 years) completed a survey assessing sleep before and during their ICU stay, factors contributing to poor sleep, and factors that may have improved their sleep in the ICU. Night-time sound (16 nights) and light (28 nights) levels in rooms were also measured.
Results: Most patients reported good (38%) to very good (25%) sleep quality before their ICU stay, and poor (28%) to very poor (32%) sleep quality in the ICU. Over half (56%) reported an abnormal sleep-wake cycle and most (60%) felt as though they did not obtain sufficient sleep. Noise (54%), pain (50%) and lights (48%) were the top reasons for self-reported poor sleep. Patients felt as though their sleep would have been improved with dimmed lights (64%), a sleeping pill (57%) and closing door/blinds at night (46%). Median (IQR) overnight noise and light levels were 52.8 (51.4–54.6) dB and 39.9 (8.2–90.9) lux respectively.
Discussion: Of the top three factors that patients perceive to be the primary reasons for poor sleep, two are modifiable (noise and lights). Night-time sound levels exceed standard recommendations and light levels, while mostly low, were higher than indicated for a healthy sleep environment, suggesting that these could be modified to improve patients sleep.

P108

EFFECTS OF DIFFERENT PILLOW DESIGNS ON PROMOTING SLEEP QUALITY AND SPINAL ALIGNMENT BY REDUCING NECK PAIN, WAKING SYMPTOMS, NECK DISABILITY IN ADULTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Poor sleep quality is more prevalent in patients with neck pain than in the control without neck pain. The effectiveness of using different pillows in the management of neck pain, waking symptoms and sleep quality is inconclusive.
Objectives: To identify the randomized controlled trials assessing the effect of different types of pillows on sleep quality, spinal alignment, neck pain, waking symptoms and neck disability.
Methods: A systematic review was conducted by searching CINAHL Complete, Cochrane Library, EMBASE, Medline, Pubmed and Psychinfo databases from inception to September 2020. Two reviewers independently assessed the articles and evaluated the methodological quality using the Physiotherapy Evidence Database (PEDro) scale.
Results: Thirty-five articles fulfilled the inclusion criteria of the study. There were nine high-quality studies involving 555 participants. The meta-analysis revealed significant differences favouring the use of rubber pillows to reduce neck pain [standardized mean difference (SMD: -0.263; P < 0.001). Moreover, favourable outcomes by using rubber and spring pillows were found in waking pain (SMD: -0.228; P < 0.001), neck disability (SMD: -0.506; P = 0.020) and pillow satisfaction (SMD: 1.144; P < 0.001). However, pillow designs did not influence sleep quality (SMD = 0.047; P = 0.703) or spinal alignment at side-lying position (SMD=0.049; P=0.280) in patients with chronic neck pain.
Discussion: The use of spring and rubber pillows shows positive effects on reducing neck pain and disability. Although pillow designs do not change the sleep quality, waking symptoms can be reduced with positive pillow satisfaction in patients with chronic neck pain.

P109

THE ASSOCIATION BETWEEN SLEEP MICROARCHITECTURE AND COGNITIVE FUNCTION IN MIDDLE-AGED AND OLDER MEN: A COMMUNITY-BASED STUDY

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Introduction: Sleep microarchitecture metrics determined by quantitative power spectral analysis (PSA) of the electroencephalogram (EEG) have been proposed as potential biomarkers of cognitive function. However, there remain no data from community-based samples. This study examined cross-sectional associations between sleep microarchitecture metrics determined by PSA and cognitive function outcomes in community-dwelling men.
Methods: Men, Androgen, Inflammation, Lifestyle, Environment, and Stress (MAILES) study participants (n=477) underwent home-based polysomnography between 2010–2011. All-night EEG recordings were processed using PSA following exclusion of artefacts. MAILES participants also completed the inspection time task, Fuld object memory evaluation, and trail-making test A (TMT-A) and B (TMT-B). Multivariable linear regression models were used to determine the associations of sleep microarchitecture (relative spectral power) with cognitive function in the complete and age-stratified samples.
Results: Power spectral densities in theta-alpha ranges during NREM and REM sleep were associated with worse TMT-A performance, whereas higher delta density was associated with better TMT-A performance in the complete sample and men ≥65 years (all p<0.05). Similar associations were observed with TMT-B performance in men ≥65 years. Furthermore, in men <65 years, higher sigma density during NREM sleep was associated with faster inspection time (B= -3.14, 95% CI [-6.00, -0.27], p=0.032), whereas in men ≥65 years, higher theta density during NREM sleep was associated with faster inspection time (B = -3.33, 95% CI [-6.65, -0.02], p=0.049).
Discussion: PSA markers of sleep microarchitecture are independently associated with cognitive function. Longitudinal studies are needed to determine whether sleep microarchitecture metrics predict future cognitive dysfunction and decline.

P110

THE ASSOCIATION BETWEEN SLEEP SPINDLES AND COGNITIVE FUNCTION IN MIDDLE-AGED AND OLDER MEN: A COMMUNITY-BASED STUDY

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Introduction: The association between sleep spindles and cognitive function and the potential confounding influence of obstructive sleep apnea (OSA) remains uncertain. This study examined cross-sectional associations between sleep spindle metrics and cognitive function outcomes in community-dwelling men.
Methods: Men, Androgen, Inflammation, Lifestyle, Environment, and Stress (MAILES) study participants (n=477) underwent home-based polysomnography between 2010–2011 and completed the inspection time task, trail-making test A (TMT-A) and B (TMT-B), and Fuld object memory evaluation. Frontal spindle metrics derived from sleep electroencephalography included occurrence (total no. of sleep spindle events) and slow (11–13 Hz) and fast (13–16 Hz) spindle density (no./min) during N2 and N3 sleep.
Results: Men with OSA (any OSA and severe OSA) had significantly impaired sleep spindles (reduced occurrence and densities). In the complete study sample, higher spindle occurrence during N2 sleep was independently associated with faster inspection time (B= -0.44, 95% CI [-0.87, -0.02], p=0.041), whereas higher fast spindle density during N3 sleep was independently associated with worse TMT-B performance (B=20.7, 95% CI [0.55, 40.9], p=0.044). Furthermore, in men with severe OSA (apnea-hypopnea index ≥30/h), higher slow spindle density during N2 sleep was independently associated with worse TMT-A and TMT-B performance, whereas only higher spindle occurrence during N2 sleep was independently associated with worse TMT-A performance (all p<0.05).
Discussion: Specific spindle metrics during N2 and N3 sleep are independently associated with cognitive function in an unselected population of men and men with undiagnosed severe OSA. The utility of sleep spindles for predicting cognitive dysfunction and decline requires further investigation.

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SLEEP DISTURBANCES ARE ASSOCIATED WITH POOR NEUROBEHAVIOURAL OUTCOMES FOLLOWING TRAUMATIC BRAIN INJURY: A STUDY OF MILITARY SERVICE MEMBERS AND VETERANS

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Introduction: Sleep disturbances are pervasively reported in military service members and veterans, especially following traumatic brain injury (TBI). The purpose of this study was to examine the association between sleep disturbances and neurobehavioural outcomes in a large group of U.S. military service members and veterans, with and without a history of TBI.
Methods: Participants were enrolled into the Defense and Veterans Brain Injury Center/Traumatic Brain Injury Center of Excellence, 15-Year Longitudinal TBI study (N = 606). Participants self-reported sleep disturbances (PROMIS 8A) and neurobehavioral symptoms. Data were analyzed using analysis of variance with post-hoc comparisons. Four groups were analyzed separately: uncomplicated mild TBI (MTBI; n=218); complicated mild, moderate, severe, or penetrating - combined TBI (CTBI; n=118); injured controls (IC, i.e., orthopedic or soft-tissue injury without TBI; n=162); and non-injured controls (NIC; n=108).
Results: Participants in the MTBI group reported the highest proportion of moderate-severe sleep disturbances (66.5%) compared to the IC (54.9%), CTBI (47.5%), and NIC groups (34.3%). Participants classified as having Poor Sleep reported significantly worse scores on almost all TBI-QOL scales compared to those classified as having Good Sleep, regardless of TBI severity or even the presence of TBI (ps<.05, Cohen's ds>.3).
Discussion: This study demonstrates that sleep disturbances remain a prevalent and debilitating concern in service member and veteran populations. Regardless of group (injured or NIC), sleep disturbances were common and were associated with significantly worse neurobehavioral functioning. When assessing and treating neurobehavioural symptoms, it is important to assess sleep, especially in service member and veteran populations.

P112

UNDER-MATTRESS SLEEP MONITORING TO PREDICT READMISSION RISK AFTER COPD EXACERBATION

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Background: Recurrent hospitalisation for COPD exacerbations is a major contributor to disease burden and healthcare costs. This study aims to establish if post-discharge sleep or vital sign parameters are predictive of hospital readmissions after COPD exacerbations.
Methods: Patients admitted with a COPD exacerbation were recruited from November 2019 until May 2021. Sleep parameters were assessed for at least one night in hospital and 10 nights post-discharge using an under-mattress device (EarlySense). Analysis on data from the first 26 participants were conducted using independent sample Mann-Whitney U tests comparing device-estimated sleep parameters between participants admitted versus not readmitted at one- and three-months post-discharge.
Progress to date: Thirty-four participants have consented. In the 26 participants completing the study to date, all-cause hospital readmission rates at one- and three-months were 26% and 65% respectively. Participants readmitted versus not readmitted at one-month had lower percentage of time in light sleep (43 ± 12% vs 58 ± 12%, p=0.029) and lower estimated AHI (5.6 ± 1.9 vs 17 ± 11 /hr, p=0.042). There were no differences at three-months.

Intended outcome and impact: Data from the full cohort will be used to assess heart rate and respiratory rate across each night and stage of sleep which could reveal clinically useful methods in the emerging field of ambulatory sleep monitoring. The feasibility and challenges of using ambulatory monitoring devices in patients with chronic respiratory disease will be reported. This study will guide future work that could potentially improve ambulatory monitoring through user-friendly and clinically feasible devices.

P113

AN EXPLORATION OF FACTORS THAT AFFECT PERCEIVED ONSET LATENCY DURING THE MSLT TEST

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It is assumed that during the MSLT test, the sleep laboratory environment will be appropriately resourced to facilitate sleep. However, anecdotal evidence suggests that a variety of factors may actually hinder sleep onset, although this possibility has not been formally investigated in the literature. Thirty-four MSLT participants, who attended the sleep unit between 2018 and 2019, completed a questionnaire that was designed to test perception of sleep onset latency by asking them how easy/difficult it was for them to fall asleep on 17 items that came from four categories. The four categories were the 1. sleep unit environment, e.g. noise/ room temperature; 2. the MSLT procedure, e.g. wires/fixed nap times; 3. the MSLT staff e.g. manner/ clarity of explanations and 4. pain/distress unrelated to the test. All items were rated on a five-point Likert scale. Space was provided for written comments for each category. Overall, the relationship with staff had the greatest impact on perceived sleep onset latency. Forty-one percent of participants reported that the provision of a thorough explanation of the day's procedure helped them fall asleep in naps. Thirty-five percent reported that their own pain and discomfort affected their ability to sleep. Light and noise had little impact. This research indicates that the staff-patient relationship plays a significant role in patient's experience of the MSLT and may potentially affect test outcomes.

P114

THE EFFECT OF LIGHT INTERVENTIONS ON SLEEP MACRO- AND MICRO-ARCHITECTURE IN SLEEP AND CIRCADIAN RHYTHM DISORDERS: A SCOPING REVIEW

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Introduction: Light interventions have been used to treat sleep and circadian rhythm disorders. However, there are limited studies on the effect of light on electroencephalographic (EEG) activity during sleep. Therefore, we aimed to provide an overview of research using light intervention on sleep macro- and micro-architecture.
Methods: We searched for randomised controlled trials that used light interventions and examined the effect on sleep measured using EEG in MEDLINE, PubMed, CINAHL, CENTRAL and PsycINFO databases. We included studies that examined the light intervention on sleep EEG in participants with a sleep or circadian rhythm disorder.
Results: Four studies met the inclusion criteria in patients with insomnia only. These studies reported only sleep macro-architecture outcomes with three studies showing no effect of the timing or intensity of light intervention on total sleep time, wake after sleep onset, sleep efficiency and sleep stage duration. Only one study reported a significantly higher sleep efficiency after night-time light intervention (>4,000 lx, 21:00-23:00 h) compared with afternoon light intervention (>4,000 lx, 15:00-17:00 h). However, none of these studies reported sleep micro-architecture (power spectral analysis).
Conclusion: Overall, there was limited evidence about the effect of light intervention on EEG sleep measures and studies were confined to insomnia patients only. This review could not find any data on sleep EEG spectral power related to light interventions. Research needs to be conducted into the effect of lighting interventions in clinical populations on sleep macro- and micro-architecture to better understand the effect on objective sleep timing and quality.

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Abstract Withdrawn

P116

Abstract Withdrawn

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CHANGES IN PRESCRIPTION OF HOME NON-INVASIVE VENTILATION (NIV) IN SOUTHERN ADELAIDE LOCAL HEALTH NETWORK (SALHN) FROM 2016 – 2020

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Background: Long term NIV is established therapy for patients with chronic type 2 respiratory failure (T2RF) due to neuromuscular disorders and obesity hypoventilation syndrome (OHS) without significant OSA. There is emerging evidence that COPD patients with T2RF also benefit from NIV. In our centre, there appears to be an increase in the prescription of long term NIV to patients over time, with 60% of all active long term NIV patients commencing therapy from 2017 onwards. In this study we will determine if (i) there has been increased provision of long term NIV to ward patients recovering from acute T2RF, (ii) there has been an increase in patients with COPD and T2RF commenced on long term NIV, (iii) there are patients with OHS and comorbid OSA who can be changed from NIV to CPAP and (iv) there is adequate follow up for patients who initiated NIV in the ward acutely.

Methods: Retrospective, observational study using a pre-existing database of all current and previous patients commenced on NIV from July 2016 to July 2020.

Progress to date

All active long term NIV patients have been identified and a database (n= 220) created containing all relevant information including date and place of NIV initiation and indication.

Intended outcome and impact

This audit will objectively assess the growth of our NIV service to facilitate better allocation of resources. It will also determine if our commencement and management of those on long term NIV is aligned with current evidence and best practice guidelines.

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THE PREVALENCE OF SELF-REPORTED SLEEP DIFFICULTIES IN WIND FARM NOISE, URBAN ROAD TRAFFIC NOISE AND QUIET RURAL EXPOSURE AREAS IN SOUTH AUSTRALIA.

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Introduction: The prevalence of sleep difficulties from wind farm noise (WFN) compared to road traffic noise (RTN) or other sources is unknown. This study investigated the prevalence, severity and source of sleep difficulties in WFN, RTN and quiet rural exposure areas.

Methods: Geographic sampling and computer assisted telephone interviews were used to evaluate sleep difficulties (falling or staying asleep, waking too early, or feeling unrefreshed) attributed to RTN, WFN or non-WFN and RTN related factors using 0–4 scales (none, mild, moderate, severe, very severe). Three groups were sampled; WFN exposed (n=38–84 in five 2 km bands <10 km from a wind farm; total 372), RTN exposed (n=87 <800 m from a busy road >50,000 vehicles/day) and quiet rural controls (n=83). Preliminary prevalence estimates and odds of moderate-to-very severe sleep difficulties attributed to RTN, WFN or other sources were evaluated.

Results: Few WFN exposed respondents attributed sleep difficulties to WFN (0.8%) compared to moderate-to-very severe difficulties from RTN (2.2%) or other sources (16.1%). Sleep difficulties were higher in RTN exposed (17.2%) compared to quiet (6% OR[95%CI] 4.1[1.3–13.0]) or WFN exposed (OR[95%CI] 9.5[3.9–23.3]) rural areas. Sleep difficulties attributed to other sources were not different between groups (Chi^2 p=0.054), but tended to be higher in urban RTN exposed residents (26.4%).

Conclusions: Preliminary findings do not support more prevalent sleep difficulties in WFN compared to RTN exposed or quiet rural area residents. Given low rates of WFN-attributed sleep difficulties, larger and/or more sensitive studies remain warranted to further clarify potential WFN effects on sleep.

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CPAP AND ADVERSE CARDIOVASCULAR EVENTS IN OSA: ARE PARTICIPANTS OF RANDOMIZED TRIALS REPRESENTATIVE OF SLEEP CLINIC PATIENTS?

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Introduction: Randomized controlled trials (RCTs) have shown no reduction in adverse cardiovascular (CV) events in patients randomized to continuous positive airway pressure (CPAP) therapy for obstructive sleep apnea (OSA). This study examined whether randomized study populations were representative of OSA patients attending a sleep clinic.
Methods: Sleep clinic patients were 3,965 consecutive adults diagnosed with OSA by in-laboratory polysomnography from 2006–2010 at a tertiary hospital sleep clinic. Characteristics of these sleep clinic OSA patients were compared with participants of 5 well-known RCTs examining the effect of CPAP on adverse CV events in OSA. We determined the percentage of patients with severe (apnea hypopnea index, [AHI]≥30/h) or any OSA (AHI≥5/h) who met the selection criteria of each RCT, as well as identified those criteria that excluded the most patients.
Results: Compared to RCT participants, sleep clinic OSA patients were younger, sleepier, more likely to be female and less likely to have established CV disease. The percentage of patients with severe or any OSA who met the RCT selection criteria ranged from 1.2% to 20.2% and 0.8% to 21.1%, respectively. The selection criteria that excluded most patients were pre-existing CV disease, symptoms of excessive sleepiness, nocturnal hypoxemia and co-morbidities.
Discussion: A minority of sleep clinic patients diagnosed with OSA meet the selection criteria of RCTs of CPAP on adverse CV events in OSA. OSA populations in RCTs differ considerably from typical sleep clinic OSA patients. This suggests that the findings of RCTs may not be generalisable to most sleep clinic OSA patients.

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THE RELATIONSHIP BETWEEN SLEEP ARCHITECTURE AND COGNITION IN LATE-LIFE DEPRESSION

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Introduction: Depression in older people is associated with changes in sleep, however associations between sleep architecture and cognition have not yet been delineated. We examined sleep architecture in older people with and without depressive symptoms, and relationships with neuropsychological performance.
Methods: Adults over 50 years underwent overnight polysomnography and memory and executive function tests. Depression and controls groups were defined by a Geriatric Depression Scale-15 cut off score of 6. Sleep architectural outcomes included amount of slow wave sleep (SWS), rapid eye movement (REM) sleep, REM onset latency (ROL), NREM slow wave activity (SWA, 0.5–4 Hz), N2 sleep spindle density and REM density.
Results: The sample comprised of 71 participants with depressive symptoms and 101 controls (mean age both groups = 64, mean GDS-15 dep= 9.3, con= 1.8). There were no significant group differences in time spent in SWS, REM, REM density or SWA. Those with depressive symptoms had later ROL (p=.008) and less N2 sleep spindles (p=.03) compared to controls. A differential association was observed with less SWS being associated with poor memory recall in the depression group only (z=.342, p=0.008). No associations between sleep and executive function performance were observed.
Discussion: The link between less time in SWS and poorer memory in those with depressive symptoms could suggest that SWS is particularly pertinent for cognition in depression or that both sleep and cognition mechanisms are influenced by depressive state. Further studies are needed to determine if changes in sleep are linked with underlying neurobiological changes.

P121

COMPARISON OF ACTIGRAPHY VERSUS PSG AND PERCEPTION OF SLEEP IN PATIENTS WITH EXCESSIVE DAYTIME SLEEPINESS.

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Actigraphy is used as a validated measure of rest and sleep, however, there are reported differences in WASO in healthy individuals (Chinoy, 2021).
Methods: This study compares the sleep parameters from PSG with simultaneous overnight actigraphy on patients the night prior to MSLT. We also compare the actigraphy data collected on the week prior to the PSG with the patient's sleep diary.
22 subjects, age 38.7 ± 3.1 years, BMI 23.5 ± 1.4 kg/m2, 40.1% male, 4 participants were treated with CPAP.
Results: WASO was found to be under estimated by actigraphy versus PSG (y=-0.957x+18.014, R2=0.51), there is an increase in underestimation beyond 18minutes. Our data also show on overestimation of sleep onset latency by actigraphy versus PSG when sleep latency is longer than 12 minutes (y=0.27x-12.04, R2=0.08). Total sleep time was perceived to be longer on the PSG night than the PSG data shows (y=0.68x-4.65, R2=0.21). Data demonstrated participants to overestimate their sleep period in their sleep diary compared to the actigraphy data (y=-0.87x+6.58, R2=0.21). T-tests showed a significant difference between WASO (minutes) detected by PSG and the actigraphy data (67.4 ± 8.9 vs 33.3 ± 3.9 p=0.0007). There were no other significant differences in the datasets.
Conclusion: Actigraphy uses activity data and light detection to estimate rest and sleep periods in wearers. Our data reflects expected differences reported in the literature of actigraphy data versus PSG due to the limitation of actigraphy being able to differentiate between sleep and motionless wakefulness.

P122

COMPARISON OF SLEEP ESTIMATION USING APPLE WATCH ACCELEROMETRY AGAINST POLYSOMNOGRAPHY

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Introduction: Consumer wearables offer new ways to improve our health and well-being, including sleep. Researchers are interested in consumer wearables because their widespread adoption creates the potential for larger studies than could be run with clinically validated measurement methods, as those are more expensive or less convenient. This study investigates sleep tracking using sensor data from Apple Watch in comparison to the gold standard polysomnography (PSG).
Method: We used Apple Watch accelerometer data to establish both activity and heart rate (using ballistocardiography). Thirty participants (13 female, 17 male) wore the Apple Watch on their non-dominant wrist during clinical PSG. We compared predicted sleep status at the epoch level and overall sleep parameters, taking PSG as the ground truth.
Results: Our method achieved sleep-wake classification accuracy of 84%, sensitivity of 95%, and specificity of 47%. Apple Watch overestimated total sleep time (mean+SD) by 39.4 + 57.7 mins, underestimated WASO by 45.5 + 54.6 mins and the number of awakenings by 5.0 + 6.9. We observed worse performance for participants who had PSGs exhibiting frequent respiratory events.
Discussion: Accelerometry cannot replace PSG for diagnostic purposes. However, the Apple Watch results compare favourably to previously published Actiwatch-PSG comparisons. The performance we measured suggests that Apple Watch based accelerometry could be used in longitudinal studies to gather information similar to clinically validated accelerometers, potentially on a larger scale for lower cost. Further study is needed to understand how sleep disorders affect this kind of measurement.

P123

ACCURACY AND RELIABILITY OF THE TRANSCUTANEOUS CARBON DIOXIDE (TCCO2) SIGNAL IN THE SLEEP LABORATORY

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Carbon Dioxide (CO2) monitoring is an essential part of assessing and treating disorders of hypoventilation in the sleep laboratory. While reliablity issues have been previously reported with the Transcutaneous Carbon Dioxide (TcCO2) signal, there is limited data assessing the validity of this signal or its trend in the sleep laboratory context. Therefore, this study aimed to investigate the change in TcCO2 accuracy from the beginning to the end of the sleep study in real world conditions across two different Victorian public hospital sleep laboratories that used two different TcCO2 monitors. The sample included 13 consecutive patients from Monash Health and 44 consecutive patients from Alfred Health with an average age of 64 and 56 years respectively. Arterial Blood Gas (ABG) measurements were taken prior to and following each sleep study and compared concurrently with the TcCO2 value. Bland-Altman analysis revealed an average difference between TcCO2 and PaCO2 of 3.29mmHg with agreement between -11.44 and 16.64mmHg for the TCM4 device and 1.31mmHg with agreement between -7.64 and 9.05mmHg for the TCM5 device. When accuracy was compared across time points for each patient, 46% of patients had an overnight accuracy change of ≥ 8mmHg when using the TCM4 compared with 20% when using the TCM5. It was concluded that the TcCO2 signal was un-reliable across the different monitors and that the TcCO2 trend may be difficult to interpret with confidence without blood gas calibration at the commencement and conclusion of the sleep study.

P124

CHRONOTYPE AND OSA COMBINE TO MODIFY RISK OF HYPERTENSION

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Introduction: There are limited data on the association of chronotype and hypertension and on their interaction on hypertension. This study aimed to investigate the independent and combined effects of chronotype and OSA on risk for prevalent hypertension in a middle-aged community population.
Methods: Baseline data on adult participants (n=1098, female=58%; age mean [range]=56.7[40.8–80.6] years) from an Australian community cohort study were analysed. Shift workers and individuals with incomplete data were excluded. Prevalent hypertension was defined as 'doctor diagnosed' and/or an elevated average systolic blood pressure (BP; ≥140mmHg) or diastolic BP (≥90mmHg). OSA was diagnosed when apnoea hypopnoea index (AHI) ≥10 events/hour from in-laboratory polysomnography. Chronotype was determined from actigraphy mid-sleep time on work free days. Tertiles of mid-sleep time were used to categorise morning, intermediate and evening chronotypes. Logistic regression (adjusted for sex, body mass index, age, alcohol consumption and sleep duration) were used to assess the cross-sectional relationship between chronotype, OSA and hypertension.
Results: After applying exclusion criteria 496 participants were analysed (female=58%; age mean[range]=57.0[42.1–81.6] years). All those with OSA had greater odds of hypertension than those without and there was no difference in risk of hypertension according to chronotype. Compared to morning chronotypes with no OSA (n=84), evening chronotypes with OSA (n=79) had non-significantly increased odds (OR 2.15, 95% CI 1.00–4.76; P=0.054) for hypertension while morning chronotypes with OSA (n=82) had significantly increased odds (OR 3.02, 95% CI 1.44–6.58; P=0.004).
Discussion: Morning chronotypes with OSA might be at increased risk of hypertension compared to evening chronotypes with OSA.

P125

SLEEP AND FEAR CONDITIONING, EXTINCTION LEARNING AND EXTINCTION RECALL: A SYSTEMATIC REVIEW AND META-ANALYSIS OF POLYSOMNOGRAPHIC FINDINGS

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Sleep may contribute to the long-lasting consolidation and processing of emotional memories. Experimental fear conditioning and extinction paradigms model the development, maintenance, and treatment of anxiety disorders. The literature provides compelling evidence for the involvement of rapid eye movement (REM) sleep in the consolidation of such memories. This meta-analysis correlated polysomnographic sleep findings with psychophysiological reactivity to the danger (CS+) and safety stimuli (CS-), to clarify the specific role of sleep stages before and after fear conditioning, extinction learning and extinction recall. Overall, there was evidence that more pre-learning sleep stage two and less slow wave sleep was associated with higher psychophysiological reactivity to the safety stimulus during extinction learning. Preliminary evidence found here support the role of REM sleep during the post-extinction consolidation sleep phase in clinical populations with disrupted sleep, but not in healthy controls. Furthermore, the meta-regressions found that sex moderated the associations between sleep and psychophysiological reactivity throughout the paradigm providing evidence for diverging correlations in male and females. Specifically, increased post-extinction REM was associated with poorer extinction and safety recall in females while the opposite was found in males. These results have implications for future research in the role of sleep in emotional memory processing.

P126

SYSTEMATIC REVIEW OF OUTCOME MEASURES USED IN NARCOLEPSY CLINICAL TRIALS

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Introduction: Treatment of the sleep disorder narcolepsy is primarily symptomatic. With limited population data and insufficient systems to capture patient data, a greater emphasis has been placed on the patient perspective in determining satisfaction and treatment success in clinical settings. While Randomised Controlled Trials (RCTs) are considered the gold standard when determining treatment effectiveness, how effectiveness is measured in a narcolepsy population remains unknown. Therefore, we aimed to explore the outcome measures used in narcolepsy RCTs, and further evaluate the adequacy of any self-reported outcome measures used.
Methods: Electronic databases (MEDLINE, EMBASE, CINAHL, SCOPUS, PSYCHINFO) and clinicaltrials.gov were searched in April 2020, with primary and secondary outcomes extracted from eligible studies. Self-reported outcome measures used at least once as a primary outcome measure were further explored, with validation studies of these systematically searched for (using the above databases) and analysed using the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) Risk of Bias tool.
Results: We identified 82 published RCTs involving patients with narcolepsy, of which 35 objective and 46 subjective measures were used. Of these, the Maintenance of Wakefulness Test (n=29), Epworth Sleepiness Scale (ESS) (n=14) and Multiple Sleep Latency Test (n=9) were the most frequently selected primary outcome measures. While our analysis of self-reported outcome measures is ongoing, preliminary results suggest that few have been adequately validated in a narcolepsy-specific population.
Discussion: Our preliminary results identify a high level of heterogeneity between outcome measures used in RCTs, thus difficult to draw conclusions and compare interventions.

P127

PARLIAMENTARY INQUIRY INTO SLEEP HEALTH AWARENESS IN AUSTRALIA: HOW PATIENT-CENTRIC IS THE PROCESS?

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Introduction: The parliamentary inquiry into sleep health represents one of few platforms accessible to patients and their family/carers to contribute to the development of healthcare policy alongside other key stakeholder groups (i.e. healthcare professionals, organisations). Balancing diverse and sometimes divergent views of various stakeholder groups can be challenging, thus we set out to explore how patients and family/carer submissions were interpreted by the inquiry and translated into health policy recommendations.
Methods: Written submissions made to the Parliamentary Inquiry into Sleep Health Awareness in Australia 2018 by self-identified patients or family/carers with narcolepsy (n=13) were extracted and thematically analysed using the Framework Approach. Each submission was systematically coded, with emergent themes evaluated against the final policy recommendations made by the inquiry.
Results: We identified three major themes: 1) 'Pathways to Treatment & Care' regarding concerns around lack of healthcare and research resource allocation for narcolepsy; 2) 'Help-seeking Experience' related to barriers to help-seeking and accessing care; 3) 'Patient and Family/Carers' Lived Experience of Disease' which encompassed the tangible effects narcolepsy has on the daily lives of patients and family/carers.
Discussion: While patients and their family/carers prioritised issues that affected their daily lives (i.e. mental health sequela, workplace accommodations), policy recommendations focused on healthcare infrastructure, funding and engagement. Increased transparency, developing processes to balance stakeholder priorities and improving accessibility to stakeholder engagement are needed if

patient and family/carer needs are to be met, and for healthcare policy to remain targeted and trusted by the public.

P128

SLEEP NEED IS MORE STRONGLY ASSOCIATED WITH SELF-RATED HEALTH AND DAYTIME FUNCTION THAN SLEEP DURATION.

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Introduction: Most studies examining associations between sleep and health outcomes focus on sleep duration or efficiency, ignoring individual differences in sleep need. We investigated whether sleep need is a more influential correlate of self-rated daytime function and health than sleep duration.
Methods: This study is a secondary analysis of the 2019 Sleep Health Foundation online survey of adult Australians (N=2,044, aged 18–90 years). Hierarchical multiple linear regressions assessed variance explained by demographics (Model 1: age, sex, BMI), self-reported sleep duration (Model 2: Model 1 + weighted variable of weekday/weekend sleep duration), and individual sleep need (Model 3: Model 2+ how often they get enough sleep to feel their best the next day, on a 5-point scale) on daytime function items for fatigue, concentration, motivation, and overall self-rated health (EQ-5D, VAS 0–100).
Results: Sleep need explained an additional 17.5–18.7% of the variance in fatigue, concentration, motivation, and health rating (all $p < 0.001$ for R^2 change) in Model 3. Model 2 showed that sleep duration alone only explained 2.0–4.1% of the variance in these outcomes. Findings were similar when stratified by sex. Sleep need also explained greater variance for older adults than for younger and middle-aged adults, especially on health rating (Model 3: R^2 change = 0.11 for ages 18-24y, 0.14 for 45-54y, 0.27 for 75y+).
Conclusions: Sleep need explains more variance in daytime function and self-rated health than sleep duration. The role of sleep need on other daytime consequences, and in clinical populations, needs further exploration.

P129

A SUBSTANTIAL PERCENTAGE OF PATIENTS WITH CHRONIC INSOMNIA DO NOT APPRECIABLY INCREASE TOTAL SLEEP TIME AFTER COGNITIVE BEHAVIOURAL THERAPY FOR INSOMNIA.

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Introduction: Total sleep time (TST) does not exceed baseline for the majority of patients after CBT-I. However by follow-up, TST increases by almost 1 hour on average. The current study investigated the extent to which this TST improvement is common and assessed for baseline predictors of increased TST after CBT-I.
Methods: This study is an archival analysis of data from a randomised clinical trial comparing acute CBT-I to acute CBT-I plus maintenance therapy (N = 80). The percent of patients that exceeded baseline TST by ≥30 minutes was assessed at post treatment and 3, 6, 12, and 24 months following treatment. Linear mixed models were conducted to assess the effect of patient demographics (age, sex, ethnicity, marital status), and baseline Sleep Diary-reported sleep continuity and Insomnia Severity Index (ISI) scores on changes in TST.
Results: 17% of patients achieved an appreciable increase in TST by treatment end, and this proportion only increased to 58% over time. Sleep Diary-reported sleep latency, wake after sleep onset, early morning awakenings, total wake time, TST, and sleep efficiency at baseline were associated with greater increases in TST after CBT-I (interaction ps < .03). Demographics and ISI scores were not significant predictors (interaction ps > .07).
Conclusion: A substantial proportion of patients do not appreciably increase TST after CBT-I, but patients with more severe sleep continuity disturbances at baseline exhibited the largest improvements. Whether all patients could increase their TST even further after CBT-I is a topic for further investigation.

P130

AN AUDIT OF URINARY DRUG SCREENING USE IN MULTIPLE SLEEP LATENCY AND MAINTENANCE OF WAKEFULNESS TESTING IN AN AUSTRALIAN TERTIARY CENTRE

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Multiple sleep latency test (MSLT) and maintenance of wakefulness test (MWT) are objective measures of excessive daytime sleepiness, used in diagnosing and monitoring patients with sleep disorders. MSLT and MWT can be affected by substances such as psychotropics, stimulants, opioids and sedatives. Recent studies demonstrate high prevalence of positive urine drug screening (UDS) results in patients undergoing MSLT and MWT.
We retrospectively audited patients who underwent UDS with MSLT/MWT at a tertiary centre from 1st January 2019 to 1st January 2020. The following data was collected: MSLT/MWT/UDS results, sleep disorder diagnosis/es, return to driving/work after testing and pre-existing and subsequent prescription of stimulants/wakefulness-promoting agents/psychotropics/sodium oxybate.
Our cohort featured 32 patients (23 female). 29 MSLTs and 3 MWTs were performed. Median age was 31 years old. 13 patients were on wakefulness-promoting agents/psychotropics when tested, where 8 were on serotonin–norepinephrine reuptake inhibitors/selective serotonin reuptake inhibitors.
13 patients (~45%) had a reduced mean sleep latency (MSL), where 10 minutes was used as the cut-off. All 3 MWTs were within normal limits. 5 patients (~16%) had a positive UDS. 1 patient had a low MSL and tested positive for cannabinoids and opioids. The other 4 patients with normal MSL tested positive for benzodiazepines (2), cannabinoids (1) and opioids (1). All patients were cleared for

work and 85% of patients who had a low MSL returned to work during follow-up.
The rate of positive UDS in patients undergoing MSLT/MWT was comparable to existing publications and re-emphasizes the relevance of mandating UDS prior to MSLT/MWT.

P131

THE IMPACT OF AN ONLINE SLEEP EDUCATION PROGRAM ON UNIVERSITY STUDENTS' SLEEP KNOWLEDGE, ATTITUDES, AND BEHAVIOURS.

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Introduction: Sleep is essential for optimising health and academic performance, yet university students consistently report poor sleep quality. We conducted a before-and-after study to determine if an interactive, online sleep course improved sleep (1) knowledge, (2) attitudes, and (3) behaviours among university students.
Methods: Undergraduate students completed the course from August-November 2020. The course involved activities that encouraged students to reflect on their own sleep behaviours and goals. Baseline data was collected through course surveys and students were invited to complete a 6-month follow-up survey via email.
Results: N=212 students completed the baseline questionnaires and n=75 (35%) completed the follow-up survey. Students retained at follow-up possessed higher baseline sleep knowledge and received higher grades. At 6-months follow-up, sleep knowledge increased from baseline (mean quiz score: 60 vs 84%, p<0.001). 85% of students aimed to increase their sleep knowledge at baseline and 91% reported that they were more knowledgeable at follow-up. 83% of students aimed to improve their sleep at baseline and 37% reported improvement at follow-up. 53% of students' attitudes towards their sleep behaviours had changed from baseline. There was reduction in sleep latency (mean 33.3 vs 25.6min, p=0.015), but no change in total Pittsburgh Sleep Quality Index score at follow-up.
Discussion: Completion of an interactive sleep education course led to increased sleep knowledge and changes in sleep attitudes, with no meaningful change in sleep behaviours. Future interventions require careful design and evaluation, and should consider components of behavioural change (e.g. motivation, triggers) that go beyond the knowledge-attitudes-behaviour continuum.

P132

RESEARCH IN THE TIME OF COVID-19: RECRUITMENT TO A CLINICAL TRIAL COMPARING MODELS OF NIV IMPLEMENTATION IN PEOPLE WITH MND.

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Introduction: A pilot randomised controlled trial (RCT) examining the feasibility of a new model of non-invasive ventilation (NIV) implementation was due to commence in early 2020. Based on previous research, it was anticipated that 100% of people with motor neurone disease (MND) would be eligible, 60% would consent to participate and 20 people would be randomised in five months. The aim of this report is to describe the impact of COVID-19 pandemic contingencies on trial recruitment.
Methods: Report of project progress, participant screening and recruitment.
Results: First reports of COVID-19 coincided with study commencement and changed usual healthcare delivery. Lockdowns meant telehealth substituted for face-to-face assessment, respiratory function testing was limited and/or patients were reluctant to seek medical treatment. This modified pathway impacted evaluation of diagnosis, timing of need for NIV and procedural safety, with patients then referred specifically for a single-day hospital NIV implementation to enable face-to-face multidisciplinary assessment to aid decisions. Of 81 potential participants screened in an 8-month period, 64% were ineligible for the RCT. Despite this shift in eligibility rate, 16 people with MND have been recruited as of May 2021.
Conclusion: The current climate has amplified the significance of this research trial; people with MND have had reduced access to face-to-face services globally and clinicians have had to quickly adapt to a changing landscape of telemedicine and remote monitoring of patients. This trial's screening data suggest that COVID-19 hasn't stopped people with MND being implemented on NIV, but it has altered assessment pathways.

P133

BACKWARD ROTATING SHIFTS ARE ASSOCIATED WITH REAL-TIME DROWSINESS DURING DAYTIME DRIVES IN HEAVY VEHICLE DRIVERS

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Purpose: While 10–20% of heavy vehicle crashes (HVDs) are drowsiness-related, the contributions of subsequent shifts to chronic drowsiness in HVDs is largely unknown. Eye-blink parameters indicate driver drowsiness reliably. This study examined the association of consecutive shifts and real-time drowsiness in HVDs.
Methods: Habitual sleep-wake of HVDs (all males, aged 49.5 ± 8 years) was monitored objectively (Philips Actiwatch, N=15) for 5 weeks (5.75± 1.4 hours). Johns Drowsiness Score (JDS, a composite eye-blink parameter in one-min intervals) was monitored for 4 weeks in HVDs (N=14) using an infrared oculography (Optalert, Melbourne, Australia) device. We assessed the association of drowsiness events (JDS equal or larger than 2.6) with consecutive shift types via mixed linear regression models.
Results: Eigth consecutive shifts increased drowsiness by 1.06 times compared to 2 shifts (8.37 events/h vs 6.77 events/h, P= 0.03). Consecutive shift sequences included afternoons (9%), mornings (29%), nights (5%), mixed rotating shifts (28%), forward-rotating shifts (11%) and backward-rotating shifts (12%). Drowsiness event rates were 1.23 times greater during night consecutive shifts

relative to afternoon shifts (8.37 events/h vs 6.67 events/h, P= 0.03). Backward-rotating shifts (morning-night-evening- afternoon) elevated daytime drowsiness between 10 am and 3 pm by 1.55 times (10.01 events/h vs 6.47 events/h, P= 0.016).
Conclusions: Regardless of the number of consecutive shifts, sequential night shifts increase real-time drowsiness in HVDs, with backward rotating shifts resulting in higher rates of drowsiness events during daytime. The interaction of schedule features should inform the work scheduling of HVDs to reduce the risk of drowsiness.

P134
MODIFIED UVULOPALATOPHARYNGOPLASTY AND RADIOFREQUENCY-IN-SALINE TONGUE IN THE MANAGEMENT OF SNORING

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Objective: The modified uvulopalatopharyngoplasty has not been investigated as an option in primary snoring. The aim of this study was to determine whether combined palatal and tongue surgery to enlarge and stabilize the upper airway is an effective treatment for patients with primary snoring who cannot tolerate or decline device therapy.
Study design: This was a retrospective cohort study, and included adult patients with primary snoring who underwent modified uvulopalatopharyngoplasty and radiofrequency-in-saline tongue between January 2009 and December 2020. Patients with clinically significant obstructive sleep apnoea were excluded.
Setting: Single centre study, based in New South Wales, Australia.
Methods: Primary outcome measures were the Snoring Severity Scale (a questionnaire, which indicates loudness and frequency of snoring) completed both prior to and following surgery, and the Epworth Sleepiness Scale. Mean questionnaire scores prior to and at three-month follow-up were analysed.
Results: 97 adult patients underwent upper airway surgery for simple snoring, of which 68 were included in the present study (37.3 ± 11.5 years, n=17 female). The mean SSS prior to surgery was 7.0 ± 1.6 and 1.9 ± 2.3 at 3-month follow up (P < 0.0001).The mean ESS prior to surgery was 9.0 ± 4.8 and 4.1 ± 2.8 at 3-month follow up (P <0.0001).
Conclusion: The results of this study indicate that modified uvulopalatopharyngoplasty with radiofrequency-in-saline tongue is an effective treatment modality with a low complication rate. This procedure should be offered to carefully selected patients with primary snoring who have failed or declined device therapy.

P135
AN AUDIT INVESTIGATING THE LENGTH OF TIME FROM GP REFERRAL TO DIAGNOSTIC POLYSOMNOGRAPHY TESTING IN AN AUSTRALIAN TERTIARY CENTER.

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Introduction/Aim: Obstructive sleep apnoea is increasingly prevalent, with shorter referral to treatment time being associated with improved outcomes. Current studies describe a mean wait-time from initial referral to first outpatient review of 88 days, and from first review to diagnostic polysomnography of 123 days. This quality assurance initiative assessed how our sleep disorders centre in an Australian tertiary hospital compared to existing literature, and attempted to verify how triaging affected wait-time.
Methods: We retrospectively reviewed patients undergoing diagnostic polysomnography from 1st January 2019 to 30th June 2021. Time from initial referral to first clinic review, plus time from initial review to polysomnography, were recorded. Patient demographics and triage category of requested polysomnography were noted. Microsoft Excel was used to collect data and derive descriptive statistics.
Results: 380 patients (202-male, 178-female) were included. 251 GP referrals were received. 112 patients were triaged for polysomnography within 30 days of initial review (category 4), 204 patients were triaged within 90 days (category 5), and 44 patients were non-urgent (category 6). Mean number of days between initial referral and first review was 136.13 days. Mean number of days between first review and polysomnography was 28.95 days in category 4, 93.38 days in category 5, and 180 days in category 6.
Conclusion: Time from initial referral to initial review appeared longer in this study compared to published standards. However, time from initial review to polysomnography appeared shorter. Adjusting patient triaging and/or our ability to see new referrals sooner is required to match the published standards.

P136
DOMICILIARY BILEVEL VENTILATION AT SUNSHINE COAST UNIVERSITY HOSPITAL.

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Introduction: Positive airway pressure therapy, including bilevel (BPAP) and continuous positive airway pressure (CPAP), is the mainstay of management of a group of chronic conditions that culminate in chronic hypercapnic respiratory failure such as chronic obstructive pulmonary disease (COPD), obesity hypoventilation syndrome (OHS) and respiratory muscle weakness. Heterogeneously across these conditions, BPAP can decrease hospital admission and prolong quality and duration of life. In COPD (when with comorbid obstructive sleep apnoea) and OHS, there has been some evidence to suggest that the far more economical CPAP is as effective. Here we compare local practice to guideline suggested management and previous Australasian audit data.
Methods: Adult patients currently managed with domiciliary BPAP by the SCUH Sleep Department were identified from local a database. Demographics, medical diagnoses, premorbid functional status, indications for BPAP, funding of BPAP, outcomes of therapy and attempts to de-escalate to CPAP were collected.
Results: 64 patient were identified. Data collection and analysis is ongoing and will be presented at full at the conference.
Intended Outcome and Impact: We aim to review local practice managing chronic hypercapnic respiratory failure with BPAP with hope it could inform future local practice.

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DEEP LEARNING ENABLES ACCURATE AUTOMATIC SLEEP STAGE CLASSIFICATION IN A CLINICAL PAEDIATRIC POPULATION

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Introduction: Sleep disorders are widespread in children and associated with a myriad of detrimental health sequelae. Accurate identification of sleep stages is crucial in diagnosing various sleep disorders; however, manual sleep stage scoring can be subjective, laborious, and costly. To tackle these shortcomings, we aimed to develop an accurate deep learning-based approach to automate sleep staging in a paediatric cohort.
Methods: A clinical dataset (n=115, 35% girls) containing overnight polysomnographic recordings of 10–13-year-old Icelandic children from the EuroPrevall-iFAAM study was utilised to develop a combined convolutional and long short-term memory neural network architecture. A three-channel input comprising electroencephalography (F4-M1), electrooculography (E1-M2), and chin electromyography was used to train and evaluate the model to classify sleep into five stages (wake/N1/N2/N3/REM) using 10-fold cross-validation. Further, inter-rater reliabilities between two manual scorers and the automatic method were investigated in a subset (n=10) of the population.
Results: The automatic classification model achieved an accuracy of 84.5% (Cohen's kappa κ=0.78: substantial agreement with manual scorings). Inter-rater reliability attained between two manual scorers was 84.6% (κ=0.78), and the automatic method achieved similar concordances with them, 83.4% (κ=0.76) and 82.7% (κ=0.75).
Discussion: The developed model achieved high accuracy and compared favourably to previously published state-of-the-art methods (performance range: 74.8%-84.3%). Inter-rater reliabilities were on par with the consensus between manual scorers and even better than among international sleep centres (commonly 0.57–0.63 as per literature). Therefore, incorporating the proposed methodology in clinical practice could be highly beneficial as it enables fast, cost-effective, and accurate sleep classification in children.

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NOCTURNAL OXYGEN DESATURATION AND MET CALL CRITERIA DURING IN-LABORATORY SLEEP STUDIES

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Introduction: Patients undergoing sleep studies can experience frequent and profound oxygen desaturation. Most hospitals have standard MET (Medical Emergency Team) call criteria which obligate a response to severe oxygen desaturation. At our tertiary institution this is "Pulse oximetry/oxygen saturation: < 90 despite oxygen administration". For most sleep studies provision of oxygen overnight would not be appropriate. We sought to examine the proportion of our sleep study patients who would meet MET call criteria.
Method: We retrospectively examined the data of all sleep studies which were performed in our laboratory between 01/01/2021 and 30/04/2021. Demographic and pulse oximetry data was collected.
Results: We collected data from 448 studies (95 CPAP, 342 diagnostic, 9 Split, 2 other). Patients were 40% female, 49±15 (mean±SD) years old and had a median AHI of 10 events per hour. 290 (65%) patients had a nadir SpO2 of <90%. The percentage of patients below with nadir SpO2 of 80%, 70%, 60% and 50% was 20%, 9%, 5% and 3% respectively. These proportions did not significantly change if treatment studies were excluded. In contrast, 23 (5%) of patients had a mean overnight SpO2 < 90%. During the period studied no serious adverse event was recorded.
Discussion: Most patients presenting for a sleep study to our tertiary institution would potentially meet standard hospital MET call criteria. This demonstrates the need for hospitals to be flexible in terms of hospital wide protocols when it comes to sleep laboratories. Evidence based criteria for medical escalation in sleep laboratories are required.

P139

CO-MORBID INSOMNIA AND SLEEP APNOEA (COMISA): IDENTIFYING PATIENTS THAT ARE RESPONSIVE TO CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY.

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Introduction: Co-morbid insomnia and sleep apnoea (COMISA) is a prevalent and debilitating condition that is difficult to treat. COMISA patients have lower average adherence to continuous positive airway pressure (CPAP) therapy compared to patients with sleep apnoea alone. However, a sub-sample of COMISA patients may show adequate CPAP use that improves both the insomnia and sleep apnoea. It is important to identify this group of CPAP-responsive COMISA patients to guide personalised-medicine approaches.
Methods: Seventy-three COMISA patients (AHI≥15; ICSD-3 insomnia; 55% male, Age M=57y) completed questionnaires, home-based polysomnography, and one-week sleep diaries before and 6-months after commencing CPAP therapy. No patients accessed CBTi. We investigated baseline predictors of CPAP adherence (min/night) and overall change in Insomnia Severity Index (ISI) scores during treatment.
Results: Average CPAP adherence was 205 minutes/night (SD=153). 56% of patients used CPAP at least 4h/night. Average CPAP adherence was predicted by higher baseline AHI (r=0.39), arousal index (r=0.28), N1 sleep (r=0.32) and age (r=0.26), and lower N3 sleep (r=-0.28). The ISI decreased from baseline (17.9, CI=1.2) to 6-month follow-up (11.6, CI=1.3; p<0.001). There

was a significant positive association between ISI reduction and CPAP use (r=0.31). 26% of patients reported an ISI<8 at 6-month follow-up.
Conclusion: Approximately half of COMISA patients show CPAP adherence of ≥4h/night and one quarter experience insomnia remission with CPAP. CPAP use is positively associated with AHI, light sleep, and age at baseline, and reduction of insomnia severity during treatment. Future randomized controlled trials are required to confirm the results of this small un-controlled study.

P140

A STUDY OF SLEEP QUALITY, SMARTPHONE USE AND CHRONIC NECK PAIN AMONG MALE AND FEMALE UNIVERSITY STUDENTS

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Purpose: Intensive smartphone use may contribute to chronic neck and shoulder pain and sleep disturbance. This study aimed to examine the relationship of sleep quality with daytime smartphone use and self-reported neck-shoulder symptoms among university students in Hong Kong.
Methods: Nineteen university students participated (11 males, 9 females, mean age=21.7±3.9). The actigraphy device Actiwatch 2 (Philips Ltd) was used to record 7 nights of sleep data. Daytime smartphone use and neck and shoulder pain scores (on a Pain scale 0–10) were recorded.
Results: Total sleep time (TST) was significantly longer in females (410.2min) than males (359.6min) (p=0.012), as was the sleep efficiency (females: 87.8%, males: 79.8%, p=0.003). Their sleep onset latency was similar at around 18min. The mean weekly Screen time and pre-bed Screen time were 430.1min and 37.9min for females, and 427.2min and 26.7min for males respectively. All the participants reported mild neck-shoulder symptoms (mean pain scores=0.9±1.8 for neck, 1.5±2.4 for shoulder). Pearson correlation showed no statistically significant association between sleep parameters, neck/shoulder pain score, screen time during day, and pre-bed screen time.
Conclusion: The present results showed that university students in Hong Kong were sleep deprived with on average, ~6h of sleep per night and spending ~30min each night on screen devices. Female students slept ½h more than male students. Given the low pain scores and small sample size, no significant relationship was found with musculoskeletal symptoms and smartphone use. Future study should recruit those with more severe symptoms and increase the sample size.

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HIGH PREVALENCE OF OBSTRUCTIVE SLEEP APNOEA IN PATIENTS WITH MILD COGNITIVE IMPAIRMENT OR MILD DEMENTIA

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Aims: Obstructive sleep apnoea (OSA) occurs with greater frequency in advancing age. The resulting sleep fragmentation and oxygen desaturations may induce or contribute to neurodegeneration. As such, OSA may be an important modifiable risk factor for the development of dementia. However, the prevalence of OSA within the population with cognitive impairment remains uncharacterised. This study aims to assess the prevalence of OSA in patients attending a specialist memory clinic with either mild cognitive impairment (MCI) or mild stages of dementia (Mini-Mental State Examination (MMSE) > 20).
Methods: Eligible and consenting participants were asked to wear an ApneaLink™ (ResMed) device overnight that measured nasal airflow and oximetry to generate a Respiratory Disturbance Index (RDI). The Epworth Sleepiness Scale (ESS) was used to evaluate subjective symptoms.
Results: 64 participants completed the study. Mean(±SD) age=76.1±9.2 years, MMSE=25.6±2.8, RDI=15.5±12.0. The distribution of normal, mild, moderate and severe OSA was 16%, 44%, 26% and 14% respectively. 84% of participants had an abnormal RDI (>5), with 40% being moderate to severe (RDI >15) where CPAP may be the recommended treatment. Mean ESS was 7.08±4.45 and not correlated with OSA severity.
Conclusion: The prevalence of OSA in MCI or early stages of dementia is high and represents a potential target for therapeutic intervention. Further research studies are required to determine whether treatment of OSA alters dementia progression.

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HEAD FLEXION HAS THE GREATEST IMPACT ON OSA SEVERITY DURING REM SLEEP

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Introduction: Recent work has shown that head flexion has a modest worsening effect and head rotation has a modest protective effect on OSA severity. However, there is substantial variability both within and between individuals. In this analysis we aimed to identify if this variability is explained by sleep-state, BMI, age or sex.
Methods: 28 participants provided informed consent and were studied using diagnostic polysomnography with the addition of a customised, accelerometry based, head posture measurement device. For each epoch during supine sleep, the sleep state (NREM/REM), average head flexion (degrees) and average head rotation (degrees) were recorded. A logistic mixed effects model was fit across all epochs with the anthropometrics (BMI, sex, age), sleep state, average head flexion and average head rotation as explanatory variables with the absence/presence of one or more respiratory event(s) as the binary outcome variable.
Results: In total, 2122 of 5369 supine sleep epochs had a respiratory event. Three participants had no supine sleep. There were significant interaction effects for flexion-rotation, BMI-rotation and REM-flexion. The REM-flexion interaction effect was the strongest interaction effect with an odds ratio per 5 degrees of head flexion in REM sleep of 1.47 (95% CI: 1.13 – 1.86).
Discussion: Head flexion related worsening of OSA severity is greatest during REM sleep. This may be explained by attenuated upper airway neuromuscular activation in REM sleep compared with NREM sleep.

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SLEEP-DEPENDENT DECLARATIVE MEMORY CONSOLIDATION AND NREM SLEEP EEG OSCILLATIONS IN OLDER ADULTS WITH OBSTRUCTIVE SLEEP APNEA

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Objectives: To compare overnight declarative memory consolidation and NREM sleep EEG oscillations in older adults with OSA to an age-matched control group, and to assess the quantitative sleep EEG features as correlates of memory consolidation.
Methods: 46 participants (24 without OSA and 22 patients with OSA) were recruited. Participants completed a word-paired associates declarative memory task before and after an 8-hour sleep opportunity with full polysomnography. Power spectral analysis was performed on all-night EEG recorded at frontal and central electrode sites. We calculated slow wave activity (slow oscillations absolute power 0.25–1 Hz; and delta EEG power (0.5–4.5 Hz) in NREM sleep. Slow spindle density (11–13 Hz, events p/min) and fast spindle density (13–16 Hz, events p/min) in stage N2 was derived using an automated spindle detection algorithm.
Results: Patients with OSA showed no significant differences in overnight memory recall and recognition compared to individuals without OSA. The OSA group showed reduced slow spindle density at the central region and fast spindle density at the frontal region relative to controls. No differences were observed in SWA. Within group correlations showed slow and fast spindle density were correlated to percent recognition in the control group.
Conclusion: Older adults with OSA had deficits in slow and fast sleep spindles compared to controls. OSA patients showed preserved sleep-dependent declarative memory consolidation despite sleep fragmentation and intermittent hypoxemia. Sleep spindles were positively correlated with overnight memory consolidation in controls but not OSA patients. Targeted interventions to boost spindles may enhance memory consolidation in older adults.

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SLEEP-RELATED LIMB MOVEMENTS AND SUBJECTIVE SLEEPINESS IN A PROFESSIONAL RUGBY LEAGUE TEAM

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Title: Sleep-Related Limb Movements and Subjective Sleepiness in a Professional Rugby League Team
Introduction: This study aims to assess the relationship between LMs, PLMD and limb related arousals during sleep and subjective sleepiness in a group of professional athletes (National Rugby League (NRL) players).
Methods: 25 type II HSAT polysomnographic (PSG) studies were performed on 23 male individuals (2 repeated studies). 2 x Piezo limb EMG sensors were applied to each HSAT. PSG data analysed as per AASM Manual for the Scoring of Sleep and Associated events. Epworth Sleepiness Scale (ESS) collected for each participant obtaining subjective daytime sleepiness. PSG data was checked for normality using the Shapiro-Wilk normality test. Parametric data was then subsequently analysed using Pearson correlation coefficients, whereas non-parametric data was analysed with the Spearman correlation coefficient. A line of best fit was implemented using Deming's linear regression model to report r2.
Results: The most significant relationships were noted between daytime sleepiness and the frequency of limb-related arousals (Pearson's r 0.273) and the relationship between PLM arousals and ESS (p-0.082). No significant relationships were noted between LMs, PLMs, limb related arousals and daytime sleepiness were found. No results were found to be statistically significant.
Conclusions: This PSG data demonstrates a mildly positive correlation with all limb movement parameters measured against the athletes' self-reported sleepiness. This may therefore be of significance with their performance and recovery. Further research is recommended to verify these relationships.

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ASSESSING THE PERFORMANCE OF AUTOMATIC ANALYSIS DURING ROUTINE INTRALAB CONORDANCE ACTIVITIES

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Title: Assessing the Performance of Automatic Analysis During Routine Intralab Conordance Activities
Introduction: This study aims to retrospectively assess the performance of somnolyzer against trained scientist performance of PSG analysis, under routine interlab concordance conditions in an Australian laboratory.
Methods: Retrospective study (2016 – 2018). Study data included 200 epoc fragments with SWS, REM and NREM. PSG data sets (n = 36) consisted of type 1 (n = 31) and type 2 (n = 5) studies. Individual scorers were compared to a master scoreset set by consensus from two experienced sleep scientists. The automatic analysis system used was Somnolyzer 24x7. Data analysis involved; Group 1: intraclass correlations and Bland-Altman plots, Group 2: Paired T-tests.
Results: Human analysis was shown to outperform automatic analysis in each major metric assessed, except sleep latency. Automatic analysis performed to a similar level in 6 out of 9 of the major metrics assessed ($r > 0.9$), however the 95% limit of agreement range was found to larger. Automatically analysed RDI's were more likely to be lower than the master score sets, as were arousal indices.
Conclusions: These findings support using caution with automatic analysis, particularly with medical interpretation and practice. Automatic analysis performance can vary dramatically between PSG data sets. This output can vary from one that is comparable to a human analysis through to a level that is well below that of human scorers, under concordance conditions. Consideration should be given to the accuracy of automatic analysis when making scientific conclusions with borderline cases.

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ASSESSING THE PERFORMANCE OF AUTOMATIC ANALYSIS DURING ROUTINE POLYSOMNOGRAPHY

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Title: Assessing the Performance of Automatic Analysis During Routine Polysomnography
Introduction: This study aims to retrospectively assess the performance of automatic analysis (AA) during routine type 1 & 2 PSG studies. A literature review identified a gap in the current research for assessing the use of automatic analysis in routine clinical practice. Routine scientific practice often involves multiple scorers analysing data sets from a variety of study types with varied signal derivations and signal quality.
Methods: Retrospective study (2018–2020). All PSG data were analysed by experienced scientists (ES). The automatic analysis system used was Somnolyzer 24x7. All relevant parameters were analysed using paired T-tests with significance level of $\alpha = 0.05$. PSG data sets included: Type 1 studies (n = 1370) split into two groups: Group 1 (n= 1148) included studies with automatic analysis only and Group 2 (n = 222) which included studies with automatic analysis and scientist review (SR) overnight. Type 2 studies (n = 235) included studies only with automatic analysis.
Results: Significant differences were found in 13 parameters between AA and ES in type 1 PSG (including total RDI), but with only 4 parameters in type 2 PSG studies.
Conclusions: There were statistically significant differences between automatic analysis and human scoring with routine scientific practice, however there were no differences when involving interscorer variances. These differences may have clinical significance, particularly with medical interpretation and practice.

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SOLRIAMFETOL TITRATION & ADMINISTRATION (START): CHARACTERISTICS OF PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA (OSA) AND PRESCRIBER RATIONALE FOR STARTING TREATMENT WITH SOLRIAMFETOL

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Introduction: Solriamfetol (Sunosi) is a dopamine/norepinephrine reuptake inhibitor approved (EU/US) to treat excessive daytime sleepiness (EDS) in adults with OSA (37.5–150 mg/day) or narcolepsy (75–150 mg/day). This study examined characteristics of patients with OSA initiating solriamfetol and prescribers' rationales.
Methods: This descriptive study included a retrospective patient chart review among US-based physicians prescribing solriamfetol for patients with OSA/narcolepsy. Solriamfetol initiation strategies were classified as de novo (no prior EDS medication), transition (switched/switching from existing EDS medications), or add-on (adding to current EDS medication).
Results: Physicians (n=24) entered data from 50 patients with OSA (mean+/-SD age, 52+/-9.1 years; 62% male). EDS was primarily moderate (56%) or severe (36%). Mean+/-SD Apnea-Hypopnoea Index at OSA diagnosis was 33.1+/-19.7 (n=37). The most common nonpharmacologic treatment was positive airway pressure (n=39, 78%); 36/39 (92%) were considered adherent. Common comorbidities included obesity (BMI>/=30) (n=25, 50%), cardiovascular disorders (n=16, 32%), and type 2 diabetes (n=14, 28%). Twenty-two (44%) patients were de novo, 26 (52%) transitioned (primarily from wake-promoting agents [18/26, 69%]), and 2 (4%) added solriamfetol (to stimulants). The efficacy of solriamfetol prompted most discussions to prescribe de novo (18/22, 82%); a desire for improved efficacy and/or augmentation of other medications prompted most transitioning (15/26, 58%) and add-on (2/2, 100%) therapy. At data collection, 48 (96%) patients were stable on solriamfetol; one each discontinued due to lack of efficacy and side effects.
Discussion: Efficacy was a key consideration for physicians prescribing solriamfetol for EDS in a real-world sample of patients with OSA.
Support: Jazz Pharmaceuticals

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SOLRIAMFETOL TITRATION & ADMINISTRATION (START): DOSING AND TITRATION STRATEGIES IN PATIENTS WITH NARCOLEPSY STARTING SOLRIAMFETOL

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Introduction: Solriamfetol (Sunosi) is a dopamine/norepinephrine reuptake inhibitor approved (EU/US) to treat excessive daytime sleepiness (EDS) in adults with narcolepsy (75–150 mg/day) or obstructive sleep apnoea (OSA) (37.5–150 mg/day). This study characterised real-world dosing and titration with solriamfetol in patients with narcolepsy.
Methods: A retrospective patient chart review was conducted among US-based physicians prescribing solriamfetol. Initiation strategies were de novo (no prior EDS medication), transition (switched/switching from existing EDS medications to solriamfetol), or add-on (adding solriamfetol to current EDS medication).
Results: Twenty-three physicians entered data from 70 patients with narcolepsy (type 1, 24/70; type 2, 46/70; mean+/-SD age, 40+/-11 years; 57% female; 6 also had OSA). EDS was mainly moderate (59%) or severe (36%). Nineteen patients (27%) initiated de novo, 31 (44%) transitioned, and 20 (29%) were add-on. Most patients started solriamfetol at 75 mg (86%) and were stable at 150 mg (76%). Most (67%) had 1 dose adjustment; median (range) time to a stable dose was 14 (1–60) days. EDS severity (44% of patients) was frequently considered when titrating. Fourteen of 22 (64%) transitioning from wake-promoting agents (WPAs) stopped them abruptly; 5/9 (56%) using stimulants tapered off.
Discussion: In a real-world study, most physicians prescribing solriamfetol to patients with narcolepsy started at 75 mg, tapered stimulants, abruptly discontinued WPAs, and made 1 dose adjustment.
Support: Jazz Pharmaceuticals

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THE ROLE OF OSA PATHOPHYSIOLOGICAL TRAITS ON MANDIBULAR ADVANCEMENT TREATMENT RESPONSE AND EFFICACY OF A NOVEL MANDIBULAR ADVANCEMENT DEVICE

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Mandibular advancement devices (MAD) are an effective therapy for OSA. However, treatment response is difficult to predict. Recent studies have investigated the influence of OSA endotypes on MAD outcomes albeit using simplified endotyping methods. We aimed to prospectively quantify and compare OSA pathophysiological traits between responders and non-responders to a novel MAD using gold-standard endotyping methodology.

Data from 30 OSA patients (AHI>10events/h) are analysed to date. OSA was confirmed via in-laboratory polysomnography. Next, a detailed physiology night was conducted before MAD therapy. Participants were instrumented with EEG, nasal mask, pneumotachograph, epiglottic pressure catheter and intramuscular genioglossus electrodes to quantify baseline OSA pathophysiological traits. Pcrit was quantified via CPAP drops and non-anatomical traits from naturally occurring respiratory events. Participants were fitted with a novel MAD with a built-in oral airway (Oventus O2Vent Optima™) and titrated to ≥75% of maximum mandibular advancement. A treatment efficacy PSG followed therapy acclimatisation.

OSA severity decreased by 41±30% (25.1[16.3,39.2] vs. 12.1[7.3,20.0] events/h P<0.001) with MAD therapy. Similar reductions occurred in participants with high nasal resistance. OSA pathophysiological traits measured by gold-standard methodology were similar between responders and non-responders to MAD (residual AHI>10events/h). MAD responders had less collapsible airways at baseline when measured using simple estimates (Vpassive: 92.5[86.3,97.0] vs. 72.5[43.0,91.3] %Veupnea, P=0.022).

The novel MAD reduced OSA severity by ~40% including in those with nasal obstruction. The upper airway was less collapsible in responders to MAD when estimated but not when directly measured. Simple estimates of OSA pathophysiological traits may be used to predict responses to MAD.

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Abstract Withdrawn

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Abstract Withdrawn

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SHORT-TERM MANDIBULAR ADVANCEMENT SPLINT THERAPY FOR OBSTRUCTIVE SLEEP APNOEA IMPROVES PARASYMPATHETIC MODULATION

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Introduction: Altered autonomic function (specifically, sympathoexcitation and vagal withdrawal) contributes to cardiovascular risk. Obstructive sleep apnoea (OSA) is associated with altered autonomic function. Heart rate variability (HRV) is a non-invasive measure of autonomic function. We aimed to assess whether short-term OSA treatment with mandibular advancement splints (MAS) improves autonomic function measured by HRV.

Methods: A retrospective analysis of participants in MAS treatment studies (N=105, 56% male, age, 56±1 years; BMI, 30±5 kg/m2) was undertaken. Nocturnal HRV was assessed using electrocardiograms from pre and post-treatment polysomnograms. HRV was calculated across 2-minute epochs over the entire electrocardiogram and divided into each sleep stage (wake, non-rapid eye movement (NREM), and rapid eye movement (REM)). HRV measures reflecting sympathetic (normalised low frequency (LFnu)), parasympathetic (pNN50%, RMSSD (ms), normalised high frequency (HFnu)), total HRV (SDNN (ms) and HTI) and R-R interval were calculated. Changes in HRV measures following treatment were assessed (paired t-test) and compared to AHI change (linear regression, with adjustment for age, sex, BMI).

Results: Following MAS treatment, HTI increased (14.78±39.99, p=0.008), and LFnu reduced during wake (-0.43±38.18, p=0.03). Linear regression, showed AHI reduction related to increased R-R interval during wake (-0.002, 0.001), p=0.009) [unstandardised β/SE]

and REM (-0.002, 0.001) [unstandardised β/SE], p=0.008), and increased pNN50% during wake (-0.24, 0.08), p=0.005) [unstandardised β/SE] suggesting MAS efficacy relates to these improvements.
Conclusion: We found evidence of reduced sympathetic and increased parasympathetic modulation, following short-term MAS therapy. This suggests MAS therapy has potential to improve cardiac autonomic function and hence reduce cardiovascular risk.

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POOR SLEEP QUALITY, INDIVIDUAL EXPERIENCES AND INCREASED RISK OF SELF-HARM – A MULTI-METHOD STUDY

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Introduction: The COVID-19 pandemic has caused significant psychological distress to many people across the globe. Poor sleep quality may be linked to poor mental health and increased suicide ideation. To contextualise the risk factors associated with self-harm or suicidal ideation during the COVID-19 pandemic, this cross-sectional study examined links between poor sleep quality, individual experiences and self-harm risk.
Methods: N=1544 (Mage=44.3y) from 63 countries completed an online survey in March-April 2020. Participants reported their pandemic experiences as free text responses, which were examined quantitatively for frequent word usage using Linguist Inquiry and Word Count software. Pittsburgh Sleep Quality Index assessed poor sleep quality (cut-off score >8). Item-9 of Patient Health Questionnaire-9 measured the risk of self-harm.
Results: Individuals with poor sleep quality (45%) used more negative emotional tone and had greater use of anxiety or money-related words in their comments than good sleepers (all ps<.05). Additionally, 19% of respondents (n=295) reported thoughts of self-harm at least several days a week (3.4% nearly every day). Logistic regression indicated that younger individuals, males, and those feeling isolated or less resilient had 1.2 to 1.5 times greater risk of self-harm (all ps<.001). Poor sleep quality was associated with a two-fold increased risk of self-harm (95%CI=1.5–2.7, p<.0001) after controlling for demographic variables.
Discussion: Poor sleep quality is linked to negative emotionality and increased risk of self-harm during the COVID-19 pandemic. Sleep is a modifiable factor; therefore interventions aimed at addressing sleep disturbances may improve resilience and reduce the risk of self-harm in vulnerable individuals.

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SLEEP TIMING AND CHRONOTYPE IN PERINATAL PERIODS: LONGITUDINAL CHANGES AND ASSOCIATIONS WITH WELLBEING FROM PREGNANCY TO 2 YEARS POSTPARTUM

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Introduction: Significant changes to sleep occur during perinatal periods. Existing research focuses on sleep duration and quality, but not sleep timing or chronotype. This study investigated change trajectories of sleep timing and chronotype from late pregnancy to two years postpartum, and examined associations between chronotype and insomnia, sleep-related impairment, and mood at seven different perinatal time-points.
Methods: Data were from a 2-arm randomised controlled trial testing behavioural sleep and diet interventions. A community sample of nulliparous females without severe sleep/mental health conditions participated. Participants self-reported bedtime, rise-time, chronotype (short Morningness-Eveningness Questionnaire), Insomnia Severity Index, and PROMIS Depression, Anxiety, and Sleep-Related Impairment over seven time points: gestation weeks 30 and 35, and postpartum months 1.5, 3, 6, 12 and 24.
Results: 163 participants (mean age 33.4±3.4 years) took part. Mixed effects models adjusting for age and group allocation showed that both bed- and rise-times became progressively earlier by approximately 20–30 minutes over time (p<.001); chronotype shifted progressively towards more morningness (p<.01). After adjusting for covariates (sleep duration and efficiency, mental health history, social support, age, group allocation), greater morningness was significantly associated with lower symptoms of insomnia and sleep-related impairment over time (p-values<.001); at each time-point, associations between chronotype and symptoms of depression and anxiety were non-significant (p-values>0.65).
Conclusions: Sleep timing and chronotype became progressively earlier over the first two postpartum years. Greater morningness was associated with less sleep complaints and sleep-related daytime impairment during the postpartum period. The mechanisms of these findings may be investigated through further research.

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UPPER AIRWAY SENSATION IN OBSTRUCTIVE SLEEP APNEA - A SYSTEMATIC REVIEW AND META-ANALYSIS TO INFORM PATHOGENESIS, TREATMENT AND FUTURE RESEARCH.

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Introduction: Upper airway sensory impairment may contribute to obstructive sleep apnea (OSA) for certain patients. However, the type of sensory impairment and its role in OSA pathogenesis remain unclear. This study aimed to: (1) evaluate methods of upper airway sensory testing in the OSA literature, (2) compare upper airway sensation in people with and without OSA and (3) investigate the relationship between OSA severity and upper airway sensory impairment.
Methods: Electronic databases were searched up to February 2020 for studies reporting methods of upper airway sensory testing in people with OSA (n=3,819). From the selected studies (n=38), information on the type of sensation, testing methods, validity and reliability were extracted. Meta-analyses were performed on case-controlled studies and studies reporting correlations between upper airway sensation and OSA severity.
Results: Seven types of upper airway sensation were reported: olfactory, gustatory, chemical, tactile, vibratory, thermal and neurosensation. Methods of upper airway sensory testing varied. No tests were validated or assessed for reliability in OSA populations. People with OSA had impaired sensation on airflow (p<0.001), chemical (p<0.001), gustatory (p=0.01), olfactory (p=0.04) and tactile (p<0.001) tests. Upper airway sensory impairment correlated with OSA severity (p<0.001).

Conclusions: People with OSA demonstrated impaired upper airway sensation, which related to increasing OSA severity. The extent to which upper airway sensation was impaired varied across testing methods. The findings suggest that development of valid and reliable upper airway sensory tests, that relate to upper airway function in people with OSA, are necessary for future clinical and research practices.

P155

EFFECTS OF UPPER AIRWAY MUSCLE TRAINING ON UPPER AIRWAY PHYSIOLOGY IN PEOPLE WITH OBSTRUCTIVE SLEEP APNEA

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Introduction: Previous studies demonstrate that oropharyngeal exercises can reduce obstructive sleep apnoea (OSA) severity. However, the physiological mechanisms underlying this improvement are unknown. Thus, this study aimed to evaluate the effects of a speech-pathology led, targeted upper airway muscle training protocol on upper airway physiology.
Methods: People with mild-moderate OSA (n=12 studied to date, 5 females, 7 males) completed 12 weeks of daily upper airway muscle training targeting the muscles of the tongue and soft palate. Pre- and post-training outcome measures included anterior and posterior tongue muscle strength and endurance and upper airway collapsibility via the upper airway collapsibility index.
Results: Preliminary findings indicate that 12 weeks of targeted exercise training improved anterior and posterior tongue muscle strength, respectively (54.3±12.7 vs. 61.5±7.7kPa, $p<0.01$, 50.1±8.5 vs. 58.0±8.5kPa, $p<0.01$), and anterior and posterior tongue muscle endurance, respectively (15.7±10.9 vs. 24.1±8s, $p<0.01$, 9.5±4.2 vs. 23.3±17.7s, $p<0.01$). The upper airway collapsibility index improved post-training (25.5±18.9 vs. 12.26±12.11 %, $p=0.03$).
Conclusions: Twelve weeks of upper airway muscle training improved tongue muscle strength, endurance and upper airway collapsibility in people with mild-moderate OSA. These physiological changes provide insight into the potential mechanisms mediating reductions in OSA severity with oropharyngeal exercises.
This research was supported by the 2019 Phillips/ASA Sleep Research grant.

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GLOBAL SLEEP HEALTH SURVEILLANCE OF ADULTS: A SCOPING REVIEW

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Introduction: The monitoring of sleep health is an emerging but globally under-recognised public health opportunity to help address poor health and social outcomes in the general population. This scoping review aims to identify the existing national surveillance systems monitoring sleep health and to describe the sleep indicators used in the questionnaires.
Methods: We systematically searched the grey and peer-reviewed literature for cross-sectional national health surveys that included measurement of the sleep of adults aged 18+. Countries screened were the 194 Member States of the World Health Organization (WHO). Searches included 1) targeted searches of the websites of national and international health agencies and statistics departments, 2) customised internet search, and 3) search of electronic databases (PubMed and EMBASE).
Progress to date
Searches of targeted websites and the internet have been completed. Preliminary analysis shows that 49 (25%) countries have national surveys that include at least one sleep health-related question. Breakdown by the WHO defined regions reveal the European Region (45%) with the highest sleep health surveillance and the African Region (6%) with the lowest. An electronic database search is currently being conducted.
Intended outcome and impact
This scoping review will provide an overview of the current status of global sleep health surveillance including how sleep is measured in population health surveys. The results will raise awareness about the need to monitor sleep at a national level to improve health and social outcomes.

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MODELLING THE DEVELOPMENTAL TRAJECTORY OF INFANT AND CHILD SLEEP

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Introduction: Sleep is important for infant and child neurodevelopment, yet there is a lack of mechanistic understanding of what drives the changes in sleep over the early years of life. While sleep in the adult brain has been studied and modelled extensively, very little has been done in infants and children, mainly limited to descriptive studies of sleep behaviour.
Methods: We adapted an existing, physiologically based model of adult sleep to study infant and child sleep behaviour. We compared modelled sleep behaviour to published data on sleep characteristics over a range of ages, both cross sectional from 0 to 5 years and densely-sampled individual data in the first year of life. We performed Bayesian inference to estimate the likely physiological parameters underpinning population-level diversity in sleep characteristics as a function of age from 0 to 5 years. We also fitted the model to individual sleep architecture in the first year of life.
Results: The empirically observed decrease in total sleep duration and consolidation of sleep bouts with increasing age are well explained by decreases in the constant inhibitory input to the ventrolateral preoptic nucleus and increases in the characteristic somnogen clearance time during sleep. Further, our model produced realistic sleep-wake dynamics consistent with early maturation of sleep in the heavily sampled, single infant data.
Discussion: Our results show that a greater understanding of the neurophysiology of sleep in infants and children can be achieved through the use of physiologically based models.

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Abstract Withdrawn

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SUCCESSFUL TREATMENT OF SLEEP DISORDERED BREATHING IMPROVES COMORBIDITIES IN PATIENTS WITH NOCTURIA

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Introduction: Sleep disordered breathing (SDB) has been shown to increase nocturia (waking with the need to void urine) frequency. Nocturia negatively affects sleep, autonomic dysfunction, mental health and mortality. Nocturia and these co-morbidities share central control areas in the brainstem. We hypothesised that treatment of SDB would decrease nocturia frequency and impact these co-morbidities.
Methods: A prospective repeated measures study with participants ≥40 years, naïve to treatment, with an AHI ≥30/hr and experiencing ≥1 episodes of nocturia was conducted. Participants undertook two months of CPAP with before and after measures of lower urinary tract symptoms (Overactive Bladder Symptom Score (OABSS) and urine volume), sleep quality (PSQI and actigraphy), autonomic dysfunction (blood pressure and orthostatic change) and wellbeing (Nocturia quality of life score (NQoL) and the Hospital anxiety and depression scores (HADS)).
Results: 490 diagnostic studies screened, 36 patients met criteria, and 30 participants (57% male) were recruited. 15 patients completed treatment with 55% of completed participants meeting the required compliance of >4 hours. Significant changes in OABSS (p=0.035), nocturnal voiding frequency (p=0.007), nocturnal urine volume (p=0.013) and nocturnal diuresis (p=0.013). Improvement was observed in PSQI perceived sleep quality (p=0.018) and actigraphy derived sleep efficiency (p=0.002). NQoL global score also showed significant improvement (p=0.037).No change was observed in autonomic dysfunction measurements.
Conclusion: With appropriate treatment of SDB an improvement was observed in nocturia frequency and associated co-morbidities in a sample of relatively healthy individuals. These results suggests that significant nocturia should prompt the assessment for and treatment of SDB.

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A TRIAL OF A POSITION MODIFICATION DEVICE FOR THE PREVENTION OF SUPINE SLEEP DURING PREGNANCY

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Self-reported supine position at sleep onset during late pregnancy is related to a 2.6x increase in stillbirth risk, possibly due to the enlarged uterus compressing major blood vessels supplying the placenta. This study aimed to test the effectiveness of a pillow designed to decrease supine sleep in pregnant women.

Twelve women in the third trimester of pregnancy used their own pillows for a control week and the intervention pillow for 1 week, in randomised order. Sleep position for each night of both weeks was monitored with the Night Shift Sleep Positioner, with a sleep study (WatchPat300) on the last night of each week to measure the impact of the intervention on SDB.
During the control week, the women slept supine for a median of 19.9% (IQR = 11.6, 27.4) of total sleep time (TST), compared to a median of 20.4% (10.2, 31.0) TST using the intervention pillow (p = .64). Use of the intervention pillow did not impact sleep efficiency (control = 85.3% (80.7, 88.0) v. intervention = 85.2% (78.3, 89.0), p = .48). On the sleep study night, supine sleep was reduced in the intervention compared to control condition (12.9% vs. 17.7%, p = .04), but AHI did not differ (intervention = 2.6/hr (0.8, 6.7) vs. control = 1.5/hr (0.6, 3.6), p = .11).
We found that the adoption of a pillow designed to discourage supine sleep was not effective in late pregnancy. Considering the reasonably high amount of supine sleep in our participants, alternative devices should be investigated.

P161

REGULARITY OF SLEEP-WAKE PATTERNS IN THE UK BIOBANK (N = 86 624) AND AN OPEN-SOURCE TOOL TO CALCULATE THE SLEEP REGULARITY INDEX

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Introduction: Regular sleep-wake patterns aid in the maintenance of optimal physical and mental health, by helping to align environmental, behavioural, and physiological rhythms. The distribution of sleep regularity across the population has not been well documented. Furthermore, researchers currently lack tools to easily quantify sleep regularity.
Method: We have described sleep regularity in 86 624 UK Biobank participants (age (M±SD) = 62.45±7.84; 56.2% female) using data from wrist-worn accelerometers. Regularity was measured using the Sleep Regularity Index (SRI), which quantifies day-to-day similarity in sleep-wake patterns, and which is linked to cardio-metabolic and mental health outcomes. We developed an R package to calculate SRI from accelerometer data, which works in conjunction with GGIR (a validated accelerometer processing tool) to identify sleep-wake state, including naps and broken sleep.
Results: The SRI distribution had M±SD = 78.02±11.53, and median = 80.49. The least regular quintile (SRI<70.2) had standard deviation of sleep onset = 2.23h, offset = 2.14h, and duration = 1.95h, compared with onset = 0.78h, offset = 0.85h, and duration = 0.95h in the most regular quintile (SRI>87.3). Approximately 14% of participants exhibited large day-to-day shifts in sleep timing (>3h) at least once per week.
Discussion: This is the largest description of sleep regularity to-date. The norms established here provide a reference for researchers and clinicians intending to quantify sleep regularity with the SRI. We have combined methods described here into an open-source R package to calculate SRI from accelerometer or sleep diary data, available for download via GitHub.

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HEATED HUMIDIFIED HIGH FLOW NASAL CANNULA VERSUS CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY FOR OBSTRUCTIVE SLEEP APNOEA IN CHILDREN: THE PATIENTS' PERSPECTIVE

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Introduction: Approximately 30% of otherwise healthy children will have residual obstructive sleep apnoea (OSA) after first line therapy with adenotonsillectomy (AT) with lower success rates in children with risk factors. Continuous positive airway pressure (CPAP) is often the next treatment option and, whilst highly effective therapy, can be challenging to sustain in children. A pilot study is underway at our centre to evaluate the efficacy of heated humidified high flow nasal cannula therapy (HFNC) compared to CPAP in children with residual OSA. A secondary aim of this study is to determine which therapy (HFNC versus CPAP) the patients prefer. This abstract will report preliminary findings.

Methods: Children under 18 years old identified as requiring a CPAP trial for residual OSA management were invited to undergo an additional polysomnography, where they underwent a trial of HFNC overnight, which was undertaken in a similar manner to the CPAP trial. Participants and caregivers completed a questionnaire regarding comfort level following both the HFNC and CPAP titration nights.

Results: 11 participants (4 males) between 4 months and 15 years old have completed the study to date. Using an 11-point Likert scale, the average reported comfort level grading for HFNC was 1.5 points higher than CPAP.

Discussion: This preliminary data suggests that on average caregivers and participants found HFNC more comfortable than CPAP. Alternative therapies such as HFNC may be effective in managing OSA and may be better tolerated in children non-adherent to CPAP.

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SLOW WAVE TRANSCRANIAL ELECTRICAL STIMULATION DURING WAKE TO INVESTIGATE THE CONSOLIDATION OF NEW LEARNING.

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Introduction: Slow, oscillatory, transcranial electrical stimulation (so-tES) applies a current over the scalp that oscillates in intensity at a frequency associated with slow wave sleep (SWS; 0.75Hz). When applied during SWS, so-tES can enhance SWS EEG power compared to sham stimulation, as well as overnight declarative memory consolidation. When applied during wake, so-tES can enhance local EEG power in the slow wave frequency range (0.5–4.5Hz) compared to sham. Therefore, this study will investigate whether so-tES can enhance the early consolidation of new learning compared to sham, when applied during wake. A preliminary analysis of data will be presented.

Methods: Healthy, young, right-handed adults (18–35 years) practiced a motor sequence learning task for 30 minutes, before receiving 15 minutes of active or sham so-tES (0.75Hz) during quiet wakefulness. Task performance was assessed by recording the total number of correct sequences performed in 30 seconds before practice, after practice, and after stimulation. Performance improvements will be compared between stimulation conditions. Non-invasive, electrophysiological corticospinal excitability measurements (i.e., motor-evoked potentials) were also recorded at six timepoints throughout each session, to investigate whether active so-tES can modulate corticospinal excitability differently to sham.

Progress to date

Data collection is ongoing, and completion is expected by late 2021.

Intended outcome and impact

We expect so-tES to enhance early skill consolidation during wake, and that enhanced consolidation will be associated with less variable measurements of corticospinal excitability, when compared with sham stimulation.

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BACK TO SCHOOL - SUPPORTING INVASIVELY VENTILATED CHILDREN TO RETURN TO THE CLASSROOM

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Introduction: Integration of children with high health needs into the education system, such as those who are invasively ventilated, requires careful planning.

Methods: We retrospectively reviewed data bases and medical records from January 2004 until December 2020 to profile school age children who, following insertion of a tracheostomy to facilitate invasive ventilation, required assistance in entering or returning to the education system.

Results: 44 children received invasive respiratory support. Five (11%) remain under the legal school age of 6 years. Fourteen (32%) children entered main stream education – Private or state schools. Three (7%) children attended main stream schools with extra assistance in a support unit. Eighteen (41%) children attended Special Schools that met their individual underlying health care needs. Four (9%) children received either home schooling or attended hospital school. All children received appropriate education according to cognitive ability and none were placed in an inappropriate school setting due to their need for extra support with respiratory health.

Discussion: High use of health technologies can be perceived as a barrier to the normal classroom so negotiation with education authorities should be part of the patient journey. Support for (re-) integration to the school system includes recruitment and training of support staff and appropriate assessments of ability to provide a safe environment whilst maintaining appropriate level of supervision. Collaboration between the hospital and the education facility is key to the successful integration of children into the education system.

P165

USE OF INITIATION CHECKLIST TO IMPROVE COMPLIANCE WITH BPAP & CPAP

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Introduction: Studies have shown that processes used during initiation of non-invasive respiratory (NIV) therapies (including CPAP and BPAP) for children, can influence subsequent compliance with therapy.

Methods: We implemented a structured checklist as a way of standardising a number of the steps during initiation of NIV in our paediatric sleep medicine service. This study retrospectively reviewed the medical records of children initiated on NIV between Nov 2018 and Dec 2020. We hypothesised that our use of a structured approach to the initiation process, with electronic documentation, would indicate areas in the initiation process that are associated with improved compliance with the therapy, in the long term.

Results: Initial results revealed that 220 children were commenced on therapy during the 2-year study period (51 BPAP & 169 CPAP). Total numbers with forms present 136 (62%) and complete forms 56 (41%). Forty-six (90%) children commenced on BPAP had forms present and 34 (74%) were completed. Ninety (53%) children commenced on CPAP had forms present and 22 (25%) were completed. Further analyses will evaluate whether sections of the initiation process and checklist (day (of week) of discharge, in-patient vs HITH, attendance at 1st follow-up appointment, financial assistance, severity of disease, eligibility for government-funded equipment) influence compliance when monitored by download at the first, subsequent sleep study.

Discussion: Use of standardised processes during initiation of NIV therapies can aid in evaluation of the factors that positively influence subsequent compliance with therapy.

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MEASURES OF OVERNIGHT SLEEP STABILITY IN PATIENTS WITH HYPERSOMNOLENCE

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Introduction: Hypersomnolence causes significant impairment of daytime functioning. The multiple sleep latency test (MSLT) measures objective hypersomnolence (OH). Patients with hypersomnolence with a normal MSLT are said to have subjective hypersomnolence (SH). The mechanisms of hypersomnolence in such patients is uncertain. This study describes differences in measures of sleep stability derived from the overnight polysomnography (PSG) in patients with OH and SH.

Methods: A retrospective analysis of 100 patients undergoing PSG/MSLT for investigation of hypersomnolence was performed. Patients were classified as OH (MSLT≤8 min) or SH (MSLT>8min). Sleep stage distribution and PSG-derived markers of sleep stability including cardiopulmonary coupling (CPC), cyclic alternating pattern (CAP) and sleep stage shifts were compared between the two groups.

Results: When compared to OH patients (N=50), SH patients (N=50) had significantly more sleep stage shifts, more shifts to stage N1 and longer PSG sleep latency. Small but significantly lower sleep efficiency, higher stage N1 and N3 proportions were also observed in SH patients. OH patients had a small but significantly higher CAP rate and CAP index compared to SH patients. There were no significant differences in CPC metrics between the two groups.

Conclusion: Several PSG-derived markers of sleep stability indicated that patients with SH experienced more unstable sleep than OH patients. This may provide insight into the underlying pathophysiological mechanisms which differentiate these patient groups and may serve as a future therapeutic target.

P167

Abstract Withdrawn

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PRE AND POSTNATAL FACTORS ASSOCIATED WITH PERIODIC BREATHING IN PRETERM INFANTS

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Introduction: Immature cardio-respiratory control in preterm infants often manifests as periodic breathing (PB). A number of pre- and postnatal demographic and clinical factors, such as exposure to maternal smoking, respiratory support and medications may affect respiratory control. We aimed to identify specific factors affecting the frequency of PB in preterm infants before hospital discharge.
Methods: 32 healthy preterm infants (14M, 18F) born between 28–32 weeks of gestational age were studied for 2–3 hours with daytime polysomnography at 31–36 weeks (when they had been off respiratory support for ≥ 3 days). % sleep time spent in PB was calculated. Variables are reported as median (IQR) and were compared with Mann-Whitney U and Chi square tests, between infants who spent greater or less than the median time in PB.
Results: 29 infants (91%) exhibited at least one episode of PB. Median sleep time in PB was 9.6% (IQR 0.6, 15.6%). Infants with time in PB above the median spent fewer days on respiratory support (4.0 days (1.0, 7.5) vs 9.0 (6.5, 21.5) days, p=0.035), and were younger (post-menstrual age 33.8 (IQR 32.1, 34.5) vs 35.1 (IQR 32.4, 35.6) weeks, p= 0.039).
Conclusions: Of the large number of maternal and infant demographic and clinical variables examined, we found few associations with the time preterm infants spent in PB. Greater % time spent in PB was associated with earlier discontinuation of respiratory support, however larger studies are required to confirm these findings and to investigate if there are any long-term consequences.

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COMPARISON OF WORK OF BREATHING: HEART FAILURE VERSUS INTERSTITIAL LUNG DISEASE

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Background: Heart failure with central sleep apnoea and Cheyne Stokes respiration (HF-CSA-CSR) and interstitial lung disease (ILD) are characterised by tachypnoea, reflecting an increased work of breathing (WOB). Whilst tachypnoea is continuous in ILD, it is periodic in HF-CSA-CSF. Our hypothesis is that the periodicity reflects adaptive efficiency.
Methods: We assessed polysomnograms of male patients attending for either heart transplant or ILD assessment. WOB during non-REM sleep was estimated by the breath to breath interval (BBI), from which respiratory rate (RR) was calculated. An age matched control group with snoring, AHI<5 and neither HF or ILD was included.
Progress to date: Four patients (mean age 70 years) were identified in each group. The HF-CSA-CSR and ILD groups had similar awake PaCO2. The HF-CSA-CSR group had a lower LVEF and higher TLCO than the ILD group. There was similar BBI in the HF-CSA-CSR group during hyperpneic phase mean = 3.4±0.1 seconds and ILD group mean = 3.5±0.3 seconds, p=0.31. However, the RR during slow wave sleep was significantly lower in the HF-CSA-CSR group compared with ILD and control groups: HF-CSA-CSR mean = 10.3±0.8 breaths/min, control mean = 14.3±1.0 breaths/min, ILD mean 18.2±2.3 breaths/min, P=0.0002.
Intended outcome and Impact: This data would suggest that both HF-CSA-CSR and ILD have similar severities of tachypnoea (aka work of breathing) compared with controls, however the RR is significantly lower in the HF-CSA-CSR group compared with ILD, despite similar PaCO2. This would indicate HF-CSA-CSR has similar WOB, yet greater efficiency, than ILD during non-REM sleep.

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