# SLEEP Advances

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2023 Sleep DownUnder Abstracts

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## ORAL PRESENTATIONS

### New Investigator Award

### O001
NOT PUBLISHED

### O002
**HIGH STRAIN EVENING EXERCISE DISRUPTS SLEEP: INSIGHTS FROM A REAL-WORLD EXAMINATION OF ~7-MILLION NIGHTS**

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**Introduction:** Exercise is among the most effective daytime behaviors for promoting and maintaining sleep. However, late-night bouts of strenuous exercise that require high physiological demand (i.e., high strain) induce persistent increases in sympathetic arousal, which may disrupt sleep. We examined whether exercise strain moderates the relationship between evening exercise and objective sleep in free-living conditions.
**Methods:** A total of 19,977 individuals (26% female, M-age=37.9 years) wore a validated sleep and exercise biometric wearable device for 365 days between Sep 1, 2021 and Aug 31, 2022 (n=6,943,372 nights). Summated-heart-rate-zone-scores were used to categorize exercise strain into four groups: light, moderate, high, and all-out. Exercise timing was normalized to each individual's habitual bedtime to account for individual differences in sleep/wake timing. Generalized additive mixed model analyses were used to model the non-linear relationship between exercise timing and sleep at different levels of exercise strain.
**Results:** Later exercise timing was associated with delayed sleep onset, reduced sleep quantity and quality, and increased sympathetic activity compared to no-exercise rest days (ps<.001). Importantly, a dose-response relationship was observed such that higher levels of exercise strain predicted worse sleep (ps<.001). Regardless of strain, exercise bouts ending at least 4 hours before habitual bedtime were not associated with changes in sleep.
**Discussion:** Evening exercise—particularly involving high exercise strain—can disrupt subsequent sleep (both duration and quality). It is recommended individuals stop exercising at least 4 hours before their habitual bedtime. However, when evening exercise is unavoidable, individuals could select lighter strain exercises to mitigate sleep disruption.

### O003
**INVESTIGATING THE RELATIONSHIP BETWEEN CORE BODY TEMPERATURE AND CHANGES IN COGNITIVE PERFORMANCE DURING SIMULATED NIGHT SHIFTS**

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**Introduction:** The timing of circadian and sleep-wake behaviours is disrupted by night shift-work. Interventions involving light may prove beneficial in adjusting the circadian rhythm to shift work, although the changes in vigilance remain uncertain. This study examined the temporal relationship between core body temperature (CBT) rhythm and vigilance during a work-shift through lighting.
**Methods:** 19 healthy individuals (12 males, mean±SD age of 28.7±10.4 years) participated in two 8-day experimental conditions with 4 days of circadian-informed lighting vs standard lighting. On Day 2, participants transitioned from a typical day-night wake-sleep schedule to night shift-work from 00:00 to 08:00 on Days 3 to 7. Psychomotor vigilance tasks (PVTs) were administered six times on shift. CBT was monitored via ingestible capsules. Daily CBT minimum (CBTmin) time was compared to the timing of the worst PVT performance on-shift (task with most lapses).
**Results:** In the parent study, circadian lighting improved on-shift performance and sleep quality. These effects were accompanied by a significant day-by-condition interaction effect on the degree of temporal offset between CBTmin time and worst PVT performance time during the work shift, $F(3,74.660)= 4.09$, $p=0.01$; the disparity increased over successive days under the influence of circadian-informed lighting compared to standard lighting., $p<0.01$.
**Conclusions:** The modest adjustment in the timing of the worst on-shift performance provides support that circadian lighting improves on-shift performance. These results emphasise the importance of considering the combined impact of circadian rhythms, sleep patterns, and time-on-task effects on performance outcomes when assessing fatigue and implementing countermeasures to phase-shift biological rhythms.

### O004
**THE EFFECT OF TREATING OSA WITH CPAP ON MOOD AND SLEEPINESS**

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**Introduction:** Excessive sleepiness and symptoms of depression and anxiety are highly prevalent in individuals with obstructive sleep apnoea (OSA). The aim of this study was to determine the effect of treating OSA with continuous positive airway pressure (CPAP) on mood and daytime sleepiness.

**Methods:** Seventy-eight participants (mean age 51.3±12.2 years; 41% female) with previously diagnosed OSA were randomised to either treatment as usual (TAU CPAP, n=43) or to a waitlist control group (WL, n=35). Participants in the TAU CPAP group were implemented with CPAP via an in-laboratory sleep study at the Austin Health sleep laboratory. CPAP initiation was delayed for participants in the WL group by 4 months. Sleepiness and depression, anxiety and stress symptoms, were measured at baseline and 4 months follow-up and compared between groups. CPAP use was measured in the TAU CPAP group.

**Results:** Participants in both groups reported mild symptoms of depression at baseline. Daytime sleepiness (p<.001) improved in the TAU CPAP group compared to the WL group, but not symptoms of depression, anxiety and stress. Baseline stress symptoms in females improved in the TAU CPAP group compared to the WL group (p<.007). Mean CPAP use was 3.5(2.9) h/night in the TAU CPAP group.

**Discussion:** Daytime sleepiness was improved with 4 months of CPAP use compared to no treatment. Mood did not improve with 4 months of CPAP therapy. Developing an OSA-specific tool to measure mood symptoms may be beneficial, and future studies should carefully consider recruitment criteria to include participants with mood symptoms at baseline.

## O005
### DEFICITS IN LEARNING AND OVERNIGHT MEMORY CONSOLIDATION IN CHILDREN WITH MILD SLEEP DISORDERED BREATHING

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**Objectives:** Sleep disordered breathing (SDB) is associated with sleep fragmentation that can compromise daytime learning and impact overnight memory consolidation. Yet, research into learning and overnight memory consolidation of children with SDB is very limited. The objective of the current study is to determine if school aged children with SDB show deficits in learning and overnight consolidation of declarative and non-declarative memories compared to healthy control (HC) children.

**Methods:** This study included 50 school aged (7-16 years) children (25 SDB, 25 HC) of comparable sex, parental SES, and BMI. Parents completed the paediatric sleep questionnaire (PSQ) for all children. Children with SDB underwent an overnight sleep study. All children completed a cognitive battery, including assessment of IQ and memory. We employed two declarative memory tasks, one verbal and one visual, and one non-declarative memory task. We measured learning and recall at two delays (30 minutes and overnight) on memory tasks.

**Results:** On the visual declarative memory task children with SDB performed more poorly in learning, and recalled significantly fewer pictures following a night of sleep, compared to HC. On the non-declarative task learning of children with SDB and HC children was comparable but following a night of sleep accuracy improved less in the SDB group compared to the HC group.

**Discussion:** This study provides, to our knowledge for the first time, evidence of impairment of overnight declarative and non-declarative memory consolidation concurrently in school aged children with mild SDB, whose declarative (but not non-declarative) learning was also impaired.

## O006
### MAJOR ADVERSE CARDIOVASCULAR EVENTS IN SEVERE OBSTRUCTIVE SLEEP APNOEA: ASSOCIATIONS WITH SYMPTOM SUBTYPES AND SYMPTOM BURDEN

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**Background:** Obstructive sleep apnoea (OSA) is a heterogeneous disorder with certain phenotypes at increased risk of major adverse cardiovascular events (MACE). We investigated whether symptom subtypes and/or symptom burden are useful predictors of MACE risk in severe OSA.

**Method:** In a longitudinal sleep clinic cohort with apnoea-hypopnoea index ≥30 events/hour (n=1767), we investigated 19 OSA-related symptoms across four symptom domains (upper airway [UA], insomnia and disturbed sleep, morning, and daytime sleepiness) and the Epworth Sleepiness Scale score. Latent class analysis identified five symptom subtypes. A symptom burden score (0–8) was developed by selecting the two symptoms from each domain most strongly associated with MACE. Multivariable-adjusted associations of subtypes and symptom burden with future MACE were investigated using Cox regressions.

**Results:** Over a median follow-up of 7 years, 18.7% developed MACE. Relative to the moderately sleepy subtype, the disturbed sleep (adjusted hazard ratio [HR], 1.65; 95%CI, 1.15–2.37) and UA symptoms predominant (HR, 1.57; 95%CI, 1.05–2.34) subtypes showed increased MACE risk. There was a graded increase in MACE risk with increasing symptom burden score (adjusted p for linear trend = 0.003). Compared to patients that reported ≤2 of 8 symptoms, those with ≥7 symptoms showed an independent risk for MACE (HR, 1.77; 95%CI, 1.12–2.77).

**Discussion:** Both symptom subtypes and symptom burden may help identify severe OSA patients at increased risk of MACE. However, our novel symptom burden score may have more clinical utility as it is an easily calculated summative measure of OSA-related symptoms that allows objective comparisons across diverse patient populations.

**Sleep measurement / Neuroscience**

## O007
### VALIDATION OF AN UNDER-MATTRESS SLEEP TRACKER TO ESTIMATE SLEEP AND WAKE DURING DAY AND NIGHT SLEEP OPPORTUNITIES

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**Introduction:** Consumer sleep trackers are useful for tracking daily sleep, particularly in shift-workers, yet large, multi-night validations against direct sleep measures are lacking. Conducted as one of the largest sleep tracker validation studies to date, this study evaluated performance of an under-mattress sensor (Withings Sleep Analyzer [WSA]) to classify sleep and wake versus polysomnography (PSG) in a multi-night laboratory protocol with both day and night sleep opportunities.

**Methods:** 27 healthy sleepers attended the laboratory twice, for 8 consecutive days (48% male, mean[SD] age=27[9]years). Participants underwent simultaneous PSG and WSA recordings for the initial night-time sleep (22:00-07:00) and 6 subsequent daytime sleeps (10:00-19:00) during simulated night-shift work. Epoch-by-epoch analysis of the 252 nights tested accuracy, sensitivity, and specificity for the first night-time sleep opportunity versus subsequent daytime sleeps. Sleep duration estimates were compared between WSA and PSG.

**Results:** Across all recordings, the WSA showed 83% sleep-wake classification accuracy, 87% sensitivity to sleep and 25% specificity to wake. The WSA significantly overestimated sleep duration versus PSG (25[65]minutes, p<0.05). Accuracy and specificity were higher for night versus day sleeps (88% and 38% versus 81% and 18% respectively, all p<0.05), while sensitivity (90% versus 88%) did not significantly differ.

**Discussion:** The WSA was moderately accurate compared to PSG, and comparable to other movement-based sleep trackers. The WSA was more accurate at classifying sleep and wake during night sleep opportunities compared to daytime sleeps. This differential performance is likely due to poorer sleep quality commonly observed during daytime sleep that is harder to accurately classify.

## O008
### REFINING THE HYPOXIC BURDEN ALGORITHM BY INVESTIGATING DIFFERENT METHODS FOR CALCULATING THE SPO2 BASELINE

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**Introduction:** Intermittent hypoxia is a key mechanism linking Obstructive Sleep Apnoea (OSA) to cardiovascular disease (CVD). Oximetry analysis could enhance understanding of which OSA phenotypes are associated with CVD risk. The hypoxic burden (HB) is a measure calculated from the oximetry signal that shows promise for predicting CVD mortality, but its calculation is complex. With a view to simplifying its calculation, we investigated three different baseline calculation methods and its impact on predicting CVD mortality for the HB algorithm.

**Methods:** Data from Sleep Heart Health Study (SHHS) with CVD mortality outcome and complete covariate information was used. We implemented the HB method of Azarbarzin et al 2018 ERJ. The three baseline methods included an event-based baseline (same as Azarbarzin et al 2018 ERJ), a record-based baseline, and a fixed baseline. The performance of each parameter in predicting CVD mortality was assessed using an adjusted Cox proportional hazard ratio (HR) analysis.

**Results:** The best performing method was the record-based baseline method which returned a fully adjusted model hazard ratio of 1.83 (95% CI: 1.03-3.27, p<0.05). The results for the event-based and record-based baseline methods were 1.60 (95% CI: 0.86-3.00, p=0.14) and 1.73 (95% CI: 0.93-3.22, p=0.08) respectively.

**Discussion:** HB with the record-based baseline was easier to calculate than the original event-based baseline method by Azarbarzin at al. and resulted in improved CVD mortality prediction performance. We believe that this method provides a step towards providing a novel parameter with easy calculation providing early risk stratification in cardiovascular patients.

## O009
### ARE THERE DIFFERENCES IN SPO2 RECORDINGS FROM TWO OXIMETERS ON THE SAME HAND DURING AN OVERNIGHT SLEEP STUDY SIGNIFICANT?

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**Background:** Accurate non-invasive oxygen saturation (SpO2) measurement is crucial in healthcare, however is challenged by numerous devices using variable algorithms1. We compared two commonly used oximeter devices worn simultaneously in patients during an overnight polysomnogram.

**Aim:** To assess (1) differences between two SpO2 recording devices and (2) SpO2 accuracy against SaO2.

**Methods:** SpO2 data of two devices were recorded, downloaded and analysed with corresponding software: device 1 (Rad7 [Masimo, Irvine, CA, USA] set at 2-4sec averaging time) with software 1 (PSG 4 [Compumedics, Melbourne, Australia]) and device 2 (Wrist-Ox2® [Nonin Medical Inc, Plymouth, MN, USA] set at 3 sec averaging time) with software 2 (Noxturnal [Nox Medical Inc, Reykjavik, Iceland]). Responsiveness of each oximeter to changes in the patients' desaturations associated with apnoeas and hypopnoeas overnight was assessed. In addition, both device SpO2 values were compared with SaO2 from simultaneous arterial blood gas sampling.

**Preliminary Results:** 7 patients (age 56.4±7.1 years, BMI 31.6±2.2 kg/m2, 100% male, 87% light skinned) were studied. The mean SpO2 with RAD7 was higher than the Nonin (95.9±1.6 vs 94.2±1.4%, mean difference 1.6±1.0%). Differences in the responsiveness of the oximeters during overnight desaturations were also observed. However, both device SpO2 values were found to be within ±2% of SaO2.

**Conclusions:** Discrepancies in SpO2 measurement do occur between devices and may have important clinical implications especially when it comes to the measurement of hypoxemic burden during sleep.

1.Blanchet MA et al. Accuracy of Multiple Pulse Oximeters in Stable Critically Ill Patients. Respir Care. 2023 May;68(5):565-574.

## O010

### CAPTURING LOCALISED ELECTROENCEPHALOGRAPHY SIGNALS DURING SLEEP USING TRIPOLAR CONCENTRIC RING ELECTRODES

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**Introduction:** Tri -concentric ring electrodes (TCRE) evaluate the current density underlying each electrode and provide improved signal-to-noise compared to conventional electroencephalography (EEG) electrodes. This pilot study used TCRE for the first time to compare TCRE versus more conventional EEG signals during sleep .

**Materials and Method:** Twenty healthy sleepers (8 males, mean±SD age 27.8±9.6 y) completed a 9-hr sleep opportunity. Eighteen TCRE electrodes were placed based on the 10-20 system, along with more conventional EEG recorded from the outer rings of paired TCRE electrodes (emulated EEG; eEEG). A Fast Fourier Transform using multitaper-based estimation was applied in 5 second epochs to calculate absolute and relative powers in delta, alpha, theta, sigma and beta frequency bands for eEEG and TCRE signals throughout conventionally scored sleep stages.

**Results:** At the Cz position, TCRE showed reduced relative powers in beta frequency bands across sleep stages compared to eEEG. Further, TCRE demonstrated lower relative beta activity during wake (mean difference [95% confidence lower, upper]; -14%, [-15.9%, -12.1%]), N1 sleep (-5.7%, [-7.6%, -3.7%]), and REM sleep (-4.4%, [-6.3%, -2.5%]). TCRE also recorded higher relative delta power across all stages of sleep and wake.

**Conclusions:** Lower signal power in high frequency bands and higher power in lower frequency bands supports more favourable signal-to-noise ratio with TCRE compared to more conventional EEG. Thus, TCRE shows promise for evaluating sleep related brain activity. The more focal nature of TCRE recordings may be an additional advantage, that warrants further analysis.

## O011

### EXPLORING NOCTURNAL BLOOD PRESSURE SURGES RELATIONSHIPS WITH BRAIN HEALTH AND COGNITIVE FUNCTION.

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**Introduction.** Cerebral small vessel disease is a possible mechanism to explain the link between long-term incompletely treated obstructive sleep apnoea (OSA) and dementia. Recent evidence suggests nocturnal blood pressure (BP) surges triggered by OSA-related sympathetic hyperactivity could play a critical role. However, this remains to be determined as they often occur concurrently with desaturation events.

**Methods.** During an in-lab polysomnography study of 7 controls [AHI≤5] and 20 untreated OSA patients [AHI>5] aged 45-65 years the frequency of blood pressure surges (>10% systolic ↑BP) in the presence or not of desaturation events (↓SpO2>3%) were quantified with a SOMNOtouch™ NIBP device. Cerebral perfusion was assessed with pCASL MRI and brain lesions with anatomical MRI scans. The global deficit score was determined for cognitive function assessment. Inflammation was quantified with blood hs-CRP.

**Results.** After controlling for age, BMI, gender, blood glucose and cholesterol, higher AHI was associated with more frequent BP surges (r=0.52, P=0.03), BP surges occurring with desaturation events (r=0.87, P<0.001), but not with BP surges without oxygen desaturation (P = 0.11). Concurrent BP surges and oxygen desaturation was associated with increased hs-CRP (r=0.55, P=0.02). Frequency of BP surges was not related to cerebral perfusion, brain lesions or the global deficit score.

**Conclusions.** Recording nocturnal blood pressure surges during polysomnography may provide insight into the cardiovascular burden associated with OSA. Interestingly, an inflammatory response is associated with BP surges only during desaturations, i.e. during respiratory events. Further work is needed to assess the utility of BP surges in predicting longer-term cognitive deficits.

## O012

### THE IMPACT OF SLEEP RESTRICTION ON REWARD LEARNING IN HEALTHY ADULTS

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Sleep disruption can lead to enhanced reactivity towards pleasurable stimuli and impaired discrimination between rewarding and punishing cues. Thus, sleep may play a mechanistic role in the development and exacerbation of pathological reward-related behaviours (e.g., gambling, substance use, etc.). The study aimed to explore the impact of sleep restriction on reward processing. Involving a 7-night at-home sleep monitoring protocol, participants were randomly assigned an experimental condition: sleep restriction (5-hr time in bed/night; SR) or well-rested (9-hr/night; WR). Adherence to the prescribed sleep schedules was assessed daily. On the eighth day participants completed a battery of reward- learning tasks, 2-hrs post-habitual wake. Participants were healthy adults (n = 45, mean age = 25.4 yrs, 64% female). Total sleep time for the SR group (n = 18) was 297.4 mins, whilst the WR was 485.8 mins (n = 27). For the probabilistic reward task, response bias (RB) did not significantly differ between the SR and WR groups during the overall task (p = 0.28), or during blocks one (p = 0.26) or two (p = 0.90). However, at block three, the SR group showed higher RB as compared to the WR group (p = 0.03), indicating SR participants exhibited a systematic preference for the frequently rewarded cues, relative to the WR group. These preliminary results suggest initial

reward responsiveness is not impacted by SR, but over time SR may produce heightened sensitivity to rewarding cues. This may indicate a role for sleep disruption in the maintenance of maladaptive appetitive behaviours.

Abstract citation ID: zpad035.013

## O013

### PRELIMINARY RESULTS FROM A PHASE 1 STUDY OF ALKS 2680, AN OREXIN-2 RECEPTOR AGONIST, IN HEALTHY PARTICIPANTS AND PATIENTS WITH NARCOLEPSY OR IDIOPATHIC HYPERSOMNIA

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**Introduction:** ALKS 2680, a potent, brain-penetrant, highly selective orexin-2 receptor (OX2R) agonist, is being developed for treatment of narcolepsy and other hypersomnias. We report preliminary results from the ALKS 2680 first-in-human study.

**Methods:** This randomized, double-blind, phase 1 study of ALKS 2680 is being conducted at two Australia sites. Healthy participants received single- (n=48, 6 dosages) or multiple- (n=32, 4 dosages once-daily for 10 days) oral doses of ALKS 2680 or placebo. Patients with narcolepsy type 1 (NT1) or type 2 (NT2) or idiopathic hypersomnia (IH; up to 8 patients for each indication) will also be studied, receiving single doses ALKS 2680 or placebo in a 4-way crossover design with 3 active dose levels. Pharmacodynamic assessments will include the Maintenance of Wakefulness Test, Karolinska Sleepiness Scale, and tracking of sleep and cataplexy episodes.

**Results:** In healthy participants, ALKS 2680 was orally absorbed and showed biphasic distribution/elimination, with a terminal half-life suitable for maintaining daytime wakefulness with once-daily administration. There were no systematic changes in vital signs, safety laboratory tests, or ECG at any dose level, and no serious or severe adverse events (AEs). Most drug-related events were mild and resolved without medical intervention. There was a single discontinuation due to a nonserious AEs that resolved without treatment.

**Conclusions:** Preliminary results suggest that the OX2R agonist ALKS 2680 is generally well-tolerated with a pharmacokinetic profile potentially suitable for once-daily oral administration to promote daytime wakefulness. Effects of ALKS 2680 in patients with NT1, NT2, and IH are being evaluated.

**Paediatric**

## O014
**NOT PUBLISHED**

## O015
### MEASURING BODY MOVEMENTS DURING SLEEP. SONOMAT VS VIDEO POLYSOMNOGRAPHY

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**Background:** Restless sleep is common in children, and video polysomnography (vPSG) has been used to score body movements during sleep. The Sonomat provides a contactless, portable alternative for home sleep studies over several nights. This study aimed to compare body movements measured by the Sonomat with those scored using vPSG.

**Methods:** Twenty-nine children (13 females, 16 males) with a median age of 5.4 years underwent concurrent Sonomat and vPSG studies. Movement indices per hour of sleep period and movement duration (%) were blindly scored on separate days. Statistical analysis included the Wilcoxon rank test and Pearson's correlations.

**Results:** Movement indices were higher on the Sonomat than vPSG (median 38.6/hr vs. 22.7/hr, p < 0.001), but movement duration did not differ (median 10.8% vs. 10.5%, p = 0.092). Comparing movements above 5 seconds, the indices became more comparable (15.9/hr vs. 19.2/hr, p = 0.05). The correlation between devices was weak for movement indices (r = 0.37, p = 0.051) but strong for movement duration (r = 0.81, p < 0.001). The Sonomat identified 82.5% of movements seen on vPSG, while vPSG identified only 43.6% of those on the Sonomat.

**Conclusion:** The Sonomat offers a contactless and portable alternative to vPSG for assessing body movements during sleep in children. It exhibited higher sensitivity in detecting shorter movements and was comparable to vPSG in movement duration. These findings suggest that the Sonomat holds promise for evaluating restless sleep in children.

## O016
### CAREGIVERS' PERSPECTIVES ON THE SONOMAT AS A POLYSOMNOGRAPHY ALTERNATIVE IN CHILDREN WITH DOWN SYNDROME

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**Introduction:** Children with Down syndrome (DS) frequently require repeated polysomnography (PSG) to diagnose and monitor sleep disordered breathing (SDB). PSG set-up can be distressing for this population, who may struggle with sensor and lead application. The Sonomat, a non-invasive mattress overlay, has now been shown to accurately detect and profile SDB in this population. The aim of this study was to evaluate caregiver experiences of undertaking home Sonomat monitoring in their child with DS, compared to conventional lab PSG.

**Method:** Children with DS aged 2-17yrs undergoing a diagnostic PSG at the Queensland Children's Hospital completed a PSG questionnaire about their child's experience of this test. Those that also undertook home Sonomat monitoring completed a questionnaire about their experience of using the Sonomat in the home.

**Results:** Caregivers of fifty-one children with DS (median age 7yrs, 52% male) completed the PSG questionnaire and twenty-five completed the Sonomat questionnaire. 45% (n=51) of caregivers reported that in-lab PSG was 'hard' or 'very hard' for their child. 100% (n=25) of the caregivers rated their experience of using the Sonomat at home as good, very good or excellent. 88% (n=25) of caregivers felt that the Sonomat was their preferred option for monitoring in children with DS, as opposed to a traditional in-lab PSG.

**Conclusion:** In this study, the Sonomat was viewed favourably by caregivers of children with DS, and in the majority of instances was preferred to in-hospital PSG.

## O017
### REAL-WORLD UTILITY OF OVERNIGHT OXIMETRY FOR THE SCREENING OF OBSTRUCTIVE SLEEP APNOEA IN CHILDREN

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Obstructive sleep apnoea (OSA) is a common problem in children, and can result in developmental and cognitive complications if untreated. The gold-standard tool for diagnosis is polysomnography (PSG); however, it is an expensive and time-consuming test to undertake. Overnight oximetry has been suggested as a faster and cheaper alternative to PSG as it can be performed at home using limited, reusable equipment. This study aims to evaluate the effectiveness of a home oximetry service (implemented in response to extended waiting times for routine PSG) in reducing the time between patient referral and treatment. All patients who utilised the Queensland Children's Hospital home oximetry service since its inception in 2021 (n=165) were compared to a historic group of patients who underwent PSG in 2018 (n=313). The time from request of the sleep-related study to definitive treatment (ENT surgery or continuous positive airway pressure trial) was significantly reduced (161 days for the HITH oximetry group vs 348 days for the comparable PSG group; p-value <0.02), and time from sleep study request to the report of results was significantly lower for patients in the oximetry group compared to those in the PSG group (12 days vs 86 days p-value <0.01). These results suggest that a home oximetry service can be effective in reducing the waiting time for patients diagnosed with OSA to receive treatment. Further research should examine larger sample sizes to confirm the study findings, investigate the health economic impacts of the service and explore patient/family perspectives.

## O018

### IMPROVEMENT IN OBSTRUCTIVE SLEEP APNOEA IMPROVES HEART RATE RESPONSE TO OBSTRUCTIVE RESPIRATORY EVENTS IN CHILDREN WITH DOWN SYNDROME.

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**Background:** Children with Down syndrome (DS) have a much higher predisposition to obstructive sleep apnoea (OSA) compared to typically developing (TD) children. Children with DS have a lower heart rate (HR) response to respiratory event termination compared with TD children matched for age, sex and OSA severity, but the effect of improvement in OSA severity over time or with treatment is unknown. We compared the HR surge at event termination in children with DS with improved OSA to those with unimproved OSA 2 y following baseline study.

**Methods:** 24 children (3-19 y at baseline) were included. Children were grouped into Improved (decrease in obstructive apnoea hypopnoea index (OAHI) to $\leq 50\%$ of baseline OAHI; n=12; 7 treated between studies) and Unimproved (n=12; 2 treated between studies). Beat-to-beat HR was averaged 10s before (pre), during and the peak after (post) each obstructive event during sleep, and expressed as percentage change.

**Results:** 583 obstructive events at baseline and 435 at follow up were identified. % change in HR from during the event to post event was greater at follow up (mean±sem, 22.4%±0.9%) than baseline (19.0%±0.8%; p<0.01) in the improved group, but reduced at follow up (16.8%±1.1%) compared with baseline (21.1%±0.7%; p<0.001) in the unimproved group and was greater at follow up in the improved group than in the unimproved group (p<0.001).

**Conclusion:** These results suggest that the dampened HR response to events seen in DS is reversible, adding weight to the need for diagnosis and management of OSA in this population.

## O019

### SLEEP SPINDLES ARE REDUCED IN CHILDREN WITH DOWN SYNDROME AND SLEEP DISORDERED BREATHING

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**Background:** Children with Down syndrome (DS) are at increased risk of sleep disordered breathing (SDB), which is associated with sleep disruption affecting daytime functioning. There is growing evidence that sleep spindles may serve as a sensitive marker of sleep quality. We investigated sleep spindle activity and its relationship with daytime functioning in children with DS compared to typically developing (TD) children matched for SDB severity.

**Methods:** Children with DS and SDB (n=44) and TD children matched for age, sex and SDB severity underwent overnight polysomnography. Fast or Slow sleep spindles were identified manually during N2 and N3 sleep. Spindle activity was characterised as spindle number, density (number of spindles/h) and intensity (density x average duration) on central (C) and frontal (F) electrodes. Parents completed the Child Behavior Checklist (CBCL) and OSA-18 questionnaires.

**Results:** Spindle number, density, and intensity were lower in the children with DS compared to TD children for F Slow and F Slow&Fast spindles combined (p<0.001 for all). In children with DS, there were no correlations between the density of any spindle type and subscales of the CBCL, however, spindle number, density and intensity for C Fast and C Slow&Fast were negatively correlated with OSA-18 emotional symptoms and caregiver concerns and C Fast number, density and intensity were also negatively correlated with daytime function and total problems.

**Conclusions:** The reduced spindle activity in the children with DS, indicates sleep micro-architecture is disrupted and this disruption may underpin the negative effects of SDB on quality of life and behaviour.

## O020

### TWITCH IN THE NIGHT: PERIODIC LIMB MOVEMENTS DURING SLEEP IN CHILDREN WITH NEUROMUSCULAR DISEASE OR CEREBRAL PALSY

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**Introduction:** Poor sleep is frequently reported in children with neuromuscular diseases (NMD) or cerebral palsy (CP) however ventilation is often the clinical focus. Periodic limb movements (PLMs) are frequently underdiagnosed in the paediatric population (prevalence of 5-8% in clinic-referred studies) and occur in up to 33% of children with Down syndrome. We assessed the prevalence of PLMs in children with NMD or CP.

**Methods:** Retrospective review of the first polysomnogram with leg electromyography in children with NMD (including Duchenne muscular dystrophy, myotonic dystrophy, and spinal muscular atrophy) or CP between 2005-2022.

**Results:** Leg electromyography was available in 238 children (124 NMD, 114 CP) with consent. 72 (30%) were female with a median age 9y (range 1-18y), BMI z-score 0.4 (-3.5 to 2.7), RDI 3.5/h (0-100/h) and arousal index of 11.7/h (1.3-65.6/h). Median PLM index was 0 (range 0-33/h) with %PLM arousals 0 (0-74%). The prevalence of elevated PLMs (>5/h) was 9.7% and 10.5% in the NMD and CP groups respectively, with median PLM arousals of 8.5% and 4.5% respectively. There were no differences in age or sex between those with or without elevated PLMs (p>0.05).

**Discussion:** Elevated PLM index occurred at a higher prevalence in children with NMD and CP than reported in the general paediatric population, though at lower rates than in Down syndrome. It is important that PLMs are not overlooked as identification and treatment may help improve sleep outcomes in this population. Further research is required to understand the pathophysiology of PLMs specifically in this population.

## Advanced Trainees

# O021

### INDIGENOUS SLEEP HEALTH SURVEY

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**Background:** There is increasing evidence of ongoing inequity in the provision of sleep healthcare for Indigenous Australians. This cross-sectional review aims to capture the prevalence self-reported symptoms of poor sleep and correlating factors influencing this from an Indigenous perspective.

**Methods:** This survey data was collected as part of the Indigenous Human Papilloma and Oropharyngeal Squamous Cell Carcinoma study with demographic data and sleep indices collected at the 24 month follow up time point. Participants were >18 years of age, identified as Aboriginal and/or Torres Strait Islanders, and were recruited from Aboriginal Community Controlled Health Organisations in South Australia from February 2018 to January 2019.

**Progress to date:** 729 responses were collected from participants aged 18 to 79, with 227 (31.1%) males and 502 (68.9%) females . Most participants lived in rural locations (62.9% [457/727]). 21.9% (75/343) participants reported witnessed loud snoring three or more times/week, with 16.1% (55/342) reporting witnessed apnoea once or more per week. Top End Sleepiness Score of ≥8 which has been associated with moderate to severe obstructive sleep apnoea was reported in 6.6% (48) of participants. Further data analysis is underway.

**Intended outcome and impact:** This survey of Indigenous Australians included demographic details, OSA-50 scores, TESS scores, subjective assessment of factors determining sleep quality, as well as social determinants of sleep health. Correlating this data will provide a fuller understanding of the current self-perception of sleep and factors affecting it in this population.

# O022

### CHARACTERISTICS OF PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA WITH A FOCUS ON THE FIRST NATIONS POPULATION

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**Background:** Obstructive sleep apnoea (OSA) is common with an estimated prevalence of 9-38%. First Nations Australians experience a burden of disease 2.3 times that of the general population. Notably, many of the conditions prevalent in this population are associated with OSA. However, there is a paucity of data relating to the characteristics of First Nations Australians with OSA.

**Methods:** This audit aims to analyse the characteristics, co-morbidities, and sleep study data of the cohort of patients referred to our facility for a sleep study between 2010-2023, with a subgroup analysis of the First Nations population.

**Results:** To date we have analysed data for 587 patients who attended our facility from 2022-2023 of which 28 (4.7%) identify as First Nations. We analysed 325 diagnostic sleep studies. 315/325 patients were non-First Nations. Of these 61 had a normal study, 88 had mild OSA, 73 had moderate OSA and 93 had severe OSA (as defined by apnoea-hypopnea index of 5-15, 15-30 and >30 respectively). The average BMI was 34.12kg/m2. 10/325 patients identified as First Nations. Of these 3 had a normal sleep study, 3 had mild OSA, 4 had moderate OSA and 2 had severe OSA. The average BMI was 33.98kg/m2.

**Discussion:** Data collection and analysis are ongoing. Our small sample size to date likely underestimates the proportion of clients who identify as First Nations. Through this study we hope to gain a deeper understanding of, and contribute to, existing knowledge of specific risk factors present in this group.

# O023

### QUALITY OF LIFE IN CENTRAL DISORDERS OF HYPERSOMNOLENCE

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**Background:** Whilst sleep disorders are common, with up to 5.8% of Australian adults experiencing excessive daytime somnolence due to a sleep disorder, there is a relative paucity of quality-of-life data in those with central disorders of hypersomnolence. The available evidence suggests a significant impact attributable to these disorders, though it is also noted that much of this data was obtained through patient associations as opposed to sleep medicine clinics with potentially more security of diagnosis.

**Methods:** A retrospective, single-centre review will be undertaken of patients seen as new cases in the sleep clinic between January 2013 and December 2022 with a diagnosis of a central disorder of hypersomnolence. Quality of life at baseline will be assessed using metrics collected as standard-of-care, including the Epworth Sleepiness Scale, Short-Form 36, FOSQ, and PSQI. Demographics, comorbidity, baseline pharmacotherapy will also be analysed.

**Progress to date:** Planning in conjunction with co-investigators and key stakeholders has been undertaken, and a complete protocol has been drafted and submitted for ethics committee approval. Data collection is anticipated to commence and be complete by end of July 2023.

**Intended outcome and impact:** It is hypothesised that baseline quality of life in these patients will be poorer than in the general population. This study will improve upon the volume and quality of existing data, and serve to assist in planning for a potential subsequent investigation into the impact of cognitive behavioural therapy for hypersomnia.

# O024

### SODIUM OXYBATE FOR REFRACTORY NARCOLEPSY AND IDIOPATHIC HYPERSOMNIA: CLINICAL AND EMPLOYMENT OUTCOMES

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**Background:** Sodium oxybate (SOX) is an evidenced based treatment for narcolepsy. SOX is not available in Australia through the pharmaceutical benefits scheme. In 2018, Western Australia (WA) listed sodium oxybate on the state formulary for the treatment of refractory narcolepsy. We examine the demographics, clinical and employment outcomes of patients treated with SOX.

**Methods:** We undertook a retrospective study of patients treated with sodium oxybate in WA for refractory narcolepsy or idiopathic hypersomnia (IH). A database of SOX patients was cross checked with pharmacy prescribing data from across WA public hospitals. Electronic medical records were used to collect demographic, polysomnographic, prescribing and outcome data. Clinical outcomes were based on the Epworth sleepiness scale, clinical assessment and employment status. Patients that responded to SOX are to be compared to non-responders using appropriate statistical methodology.

**Progress to date:** The study has been registered as a hospital clinical audit (number 49852). A total of 50 patients prescribed SOX for the treatment of a central hypersomnia have been identified. A request for sodium oxybate dispensing data across WA has been made. Review of 10 patient's records has been completed. Correspondence, sleep studies, MSLT, HLA testing and prescriptions are being reviewed for the remaining 40 patients.

**Intended outcome and impact:** Describe the characteristics of patients treated with SOX in WA.

Explore whether clinical or sleep study characteristics predict response to SOX.

Assess patient reported outcomes from treatment with SOX based on symptoms and changes in employment status.

## O025

### SLEEP OUTCOMES IN PAEDIATRIC PATIENTS PRE- AND POST-PHARYNGOPLASTY

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**Background:** Pharyngoplasty surgery is undertaken to correct velopharyngeal insufficiency (VPI). The resultant narrowing of the pharyngeal airway can cause obstructive sleep apnoea (OSA), but limited data is available regarding the incidence or severity of this problem. This study will evaluate the effect of pharyngoplasty on the development of OSA in children.

**Methods:** We are undertaking a retrospective audit of medical records for children who underwent both polysomnography (PSG) and pharyngoplasty at a tertiary paediatric centre between January 2013 and December 2022. Data from children who underwent PSG and pharyngoplasty will be evaluated and separated according to the timing pre- or post-pharyngoplasty. Analyses will determine the effect of pharyngoplasty on the development and or progression of sleep disordered breathing.

**Results:** 176 paediatric patients underwent pharyngoplasty procedures from January 2013-December 2022, including 73 (41%) who also underwent PSG. Full PSG data are available for analysis including sleep staging, arousal, respiratory and gas exchange. Primary outcome will be the obstructive apnoea-hypopnoea index (OAHI), but additional impacts on total apnoea-hypopnea index

(AHI), oxygen saturation, $CO_2$, and arousals will also be evaluated. Not all children had studies before and after their surgery so statistical comparison will be made between parameters measured before and after pharyngoplasty, using both paired (where available) and unpaired (for the entire group) testing as appropriate. Intended outcome/impact: This study will evaluate the impact of pharyngoplasty on children's breathing during sleep. The results will assist in determining the indications for, and appropriate timing for PSG in children undergoing pharyngoplasty procedures for VPI.

## O026

### CONCORDANCE BETWEEN A HOME SLEEP APNOEA TEST BASED ON PERIPHERAL ARTERY TONOMETRY AND LABORATORY POLYSOMNOGRAPHY

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**Introduction:** Limited channel home sleep apnoea test (HSAT) devices are an emerging alternative to laboratory-based PSG. Despite increasingly commercially availability, there is limited external validation of their diagnostic performance. We recently independently validated the Night Owl Mini HSAT (NOM) against in-lab PSG and demonstrated a satisfactory level of agreement (LOA) of 63.8% overall. However, lower rates of agreement were observed for severe OSA. We speculated that signal artefact may have contributed to reduced concordance.

**Methods:** Data was drawn from our previously published prospective cohort of 100 participants undergoing PSG for suspected OSA, simultaneously fitted with the NOM. PSG and NOM studies were re-processed, manually remarking artefact. LOA was recalculated comparing only temporally aligned data segments for which both devices provided intact signals, this allowed direct comparison of pulse oximetry data and software algorithms that generated the ODI3%. Two new datasets were generated for PSG and NOM for which combined artefact was deleted (COM-PSG, COM-NOM).

**Results:** To date, datasets from 12 participants have been assessed. The mean difference in ODI3% between PSG and NOM was 5.25/hr (95% limits of agreement -0.73 – 11.23), while the mean difference in ODI3% between COM-PSG and COM-NOM was 2.53/hr (95% limits of agreement -1.77 – 6.83). In our previous study, the overall mean difference in ODI3% was –0.21/hr (95% limits of agreement -18.1 – 17.7).

**Conclusion:** Preliminary results may indicate signal artefact contributes to reduced level of agreement between PSG and NOM.

## O027

### PATTERNS OF NOCTURNAL SWALLOW FREQUENCY AND RELATED TACHYCARDIA WITH SLEEP STAGES AND OBSTRUCTIVE SLEEP APNOEA SEVERITY

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**Background:** Swallowing is a complex activity associated with cortical arousal and tachycardia in sleep(1). Obstructive sleep apnoea (OSA) has been associated with dysfunction and altered biomechanics of swallow (2-3). This study seeks to investigate patterns of

swallow frequency and associated tachycardia in relation to OSA severity.

**Methods:** Anthropometric and polysomnographic data for 70 subjects were analysed. Swallow index (SI; swallows per hour) and average heart rate changes from 30 seconds pre- to 10 seconds post-swallow were derived from epiglottic pressure and electrocardiogram signals respectively. This study had approval from the local district ethics committee.

**Progress to date:** Analysis has been completed for 34 subjects (median age 47.5, range 24-64; 24 males), most with at least moderate OSA (n=20/26). Mean SI was 3.2 in subjects without OSA (n=2), 8 in mild OSA (n=4), 5.8 in moderate OSA (n=10) and 9 in severe OSA (n=10). Mean swallow-related tachycardia was 24.3bpm in subjects without OSA, compared to 14.0bpm in those with severe OSA. Mean swallow-related tachycardia increased with progressive sleep stages (14.8bpm in wakefulness; 16.8bpm Stage 1; 16.8bpm Stage 2; 19.0bpm Stage 3; 19.4bpm in REM). A negative correlation was observed between sleep SI and magnitude of associated tachycardia (Pearson correlation r=-0.387, p=0.026).

**Intended outcome and impact:** Our results support existing observations that swallow-associated tachycardia is reliably conserved in sleep, and suggest possible new relationships between swallow frequency and associated tachycardia with OSA severity and sleep stage. We intend with further dataset analyses to explore relationships between sleep swallow physiology and OSA pathophysiology.

## O028

### WORSENED SLEEP AND MOOD AFTER INITIATING ELEXACAFTOR/TEZACAFTOR/IVACAFTOR TREATMENT IN CHILDREN WITH CYSTIC FIBROSIS

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**Background:** CFTR modulator Elexacaftor/tezacaftor/ivacaftor (ETI) significantly improves lung function and but its effect on mental health and sleep remains poorly understood. We report sleep, mood and respiratory health outcomes of adolescents with CF with ETI therapy.

**Methods:** We conducted a prospective longitudinal study of 31 adolescents (aged 10 to 18 years) from July 2021 to October 2022. Data collected include demographics, pediatric daytime sleepiness scale (PDSS), sleep disturbance scale for children (SDSC), patient health questionnaire-9 (PHQ-9), generalised anxiety disorder-7 (GAD-7) scores and FEV1 percent predicted.

**Results:** Paired-T testing demonstrated a significant improvement in FEV1, whereas PDSS, PHQ-9, and GAD-7 scores worsened following ETI therapy, but did not reach statistical significance. SDSC scores marginally reduced. Ten percent of participants developed new onset sleep concerns and new mood concerns developed in 10% following ETI initiation.

**Conclusion/Outcome:** This is the first prospective longitudinal study of sleep and mood changes with ETI in adolescents with CF. ETI does not improve sleep and mood in the same way as respiratory health outcomes.

## O029

### CLINICAL FEATURES AND OUTCOMES OF PATIENTS REFERRED TO A RESPIRATORY FAILURE SERVICE.

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Non-invasive ventilation (NIV) improves quality of life and mortality in patients with hypercapnic respiratory failure. We reviewed the last decade of long-term home NIV provision in a single centre via an observational retrospective study.

Data were prospectively collected in a database. Anthropometric and demographic data were expressed as mean±SD. Indications for chronic home NIV were categorised into: neuromuscular diseases (NMD) [including motor neuron disease (MND)]; obstructive sleep apnoea/obesity hypoventilation (OSA/OHS); pulmonary disease; and others. Linear regression analysis was performed for the annual incidence by indication, and multivariate Cox regression performed compares MND mortality with other causes.

541 new patients (Age 60.8 ±17.1 years; 273 Female; BMI 33.4±13.9 kg/m2 (n=380)) were commenced on NIV between 2012-2022. Patient numbers increased by 2.3 (0.4-4.1) per year (slope, (95% confidence intervals); p<0.02). Indications for treatment included: 52% NMD (29% MND); 19% OSA/OHS; 19% pulmonary disease; and 10 % other causes. Average referral age, BMI and gender composition were stable over the time period. There was an increase in patients with pulmonary disease commenced on NIV of 0.6 (0.7-3.5)% per year (p<0.008), other indications for treatment were unchanged. 31.4% patients died (16.8% MND). Multivariate Cox regression analysis showed that a diagnosis of MND was associated with an increased likelihood of death (HR 11.42, p<0.0001). In the last decade, there's been a gradual increase in patient numbers treated with chronic home NIV, with an increasing percentage of patients with pulmonary disease commenced on treatment. Mortality in MND patients on NIV is higher compared with other indications.

## Chronobiology / Insomnia

## O030
### GABAA RECEPTOR EXPRESSION IN THE SUPRACHIASMATIC NUCLEUS UNDER DIFFERENT LIGHT CONDITIONS

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Our research group has made inroads investigating the phase shifting effects of general anaesthesia (GA) on the circadian clock. Most clinical anaesthetics function by potentiating the effect of GABA on the GABA type A receptor (GABAARs). While the precise role of GABA in the suprachiasmatic nucleus (SCN) is still not fully understood, it has been implicated in circadian functions including photic entrainment and clock coupling. However, we have discovered that the expression of GABAARs in the central circadian clock remains poorly understood. To address this gap in knowledge, we examined the expression of GABAAR subunits α1, α5, β3, and γ2 in male (n = 80) and female (n = 82) C57Bl/6 mice under light-dark (LD) and constant darkness (DD) conditions (male, n = 95). Analysis of GABAAR subunit expression in the SCN was quantified by immunohistochemical analysis. Additionally, we investigated the time-dependent effects of isoflurane GA and light on GABAAR subunit expression in the SCN (male, n = 60). Our findings revealed rhythmic expression of GABAAR subunits in the mouse SCN under LD conditions which differed by sex, suggesting environmental light conditions may regulate GABAAR expression in the circadian clock in a sex-specific manner. In the SCN, γ2 subunit expression was increased following light and GA treatment compared to light-alone, while α1 subunit expression was increased at times of large behavioural phase delays. We conclude that the expression of GABAAR's in the SCN is phase-dependent and may contribute to the time-dependent relationship between light and GA on the clock.

## O031
### THE INTER-STIMULUS INTERVAL EFFECT IN THE PSYCHOMOTOR VIGILANCE TASK

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**Introduction:** The Psychomotor Vigilance Task (PVT) is a widely used measure of the effects of sleep deprivation on vigilant attention. The test requires a rapid response to a stimulus occurring at random inter-stimulus intervals (ISIs) between 2 and 10 seconds following a previous response. A few studies have found an ISI effect where shorter ISIs (2-4s) have slower reaction times (RTs) than longer ISIs (8-10s). How this ISI effect is impacted by circadian timing has yet to be investigated.
**Method:** This study compared the ISI effect at 3 time points coinciding with 5, 23 (circadian trough), and 29 hours of wakefulness. Data were taken from 16 healthy participants during a 30 hour period of sleep deprivation.
**Results:** A repeated-measures (3 x 3) ANOVA (3 time points, 3 ISIs) found that RTs were slower and lapses (RT>500msec) more frequent in short ISIs compared with medium and long ISIs. RTs were also slower and lapses more frequent at the circadian trough

compared to both the early testing session and after 29h of total sleep deprivation.
**Discussion:** Increased lapses in shorter ISIs could be explained by an involuntary mental "rest period" after responding, that gets longer and more frequent under sleep pressure from both circadian and homeostatic sleep pressure. These findings have implications for interpreting PVT results and their application to everyday tasks, such as driving. Further research could involve neuroimaging the brain's responses during different ISIs to confirm the mental 'rest period' following a response in the PVT task.

## O032
### IT'S OK TO LOSE YOUR HEAD!

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**Introduction:** Sleep is something that we all do, regardless of how much or how little. But why we sleep, and how sleep evolved is still something of a mystery. This research looks at a novel attribute of flatworms – the ability to regenerate whole body structure, and how neural regeneration may impact sleep.
**Methods:** Using behavioural methods, I observed the behaviour of flatworms under a 12:12 LD lighting condition. Once the baseline was established, I used a small razor to cut the head off each individual. Recordings took place every two weeks, for baseline, post-decapitation, and then at full regeneration.
**Results:** Animals that were re-growing their brains moved a lot less than their original intact data showed, a small circadian rhythm was still present. Once the animal had regained its eyespots, and thus regenerated, this rhythm was more prominent and on its way to returning to intact levels. Animals that were re-growing their bodies also showed a persistent circadian rhythm in their activity throughout the regeneration process.
**Discussion:** This research is very exciting for several reasons. It shows that flatworms themselves rely on more than just their brain and eyespots to sense the light and environment around them. It also suggests that circadian rhythms are deeply engrained and that behaviours that arise from this, such as locomotion can still be influenced even without the presence of a brain – the neurons in the ventral nerve cords, and other body systems may be equally as important.

## O033
### IS SLEEPING AND WAKING IMPORTANT FOR THE CORTISOL AWAKENING RESPONSE?

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**Introduction:** The rapid rise in cortisol after waking is known as the cortisol awakening response (CAR). However, as part of its normal circadian rhythm cortisol also rises in the morning independent of awakening. If CAR is a direct response to awakening, it should be eliminated in conditions of sleep deprivation (SD). Given that an atypical CAR is associated with several psychiatric and medical disorders, understanding the factors that influence CAR is of clinical relevance. This study explored cortisol during the normal waking period prior, during, and post-SD.

**Methods:** N=21 (11F 22.80±4.40y) completed 62h of SD in the laboratory. Salivary cortisol was collected across 5-time-points (07:00h, 07:15h, 07:30h, and 07:45h) on 2-pre-at-home-study days, 4-in-lab-study days, and 2-post-at-home-study days. Mixed-effects ANOVAs tested for fixed effects of day, time, and their interactions on cortisol, and cortisol area under the curve (AUCi, AUCg).

**Results:** SD produced significant effects of time*day (p<0.001). Cortisol levels at +30 and +45min post-awakening were lower on SD days. Cortisol levels on awakening (0mins) did not differ between any study days. There were significant effects of day (p<0.001). AUCi and AUCg were greater on in-laboratory-baseline and recovery days compared to other study days.

**Discussion:** This study found CAR is not present during periods of SD when there is no 'waking' from sleep. It showed for the first time that CAR recovers to baseline levels following recovery sleep. While the role of the CAR remains unclear this study identified factors that future research should consider to advance understanding of its purpose.

## O034

### INSOMNIA MANAGEMENT IN AUSTRALIA: AN OVERVIEW OF PATIENT, CLINICIAN AND HEALTH SYSTEM FACTORS

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**Introduction:** Insomnia is the most prevalent sleep disorder in Australia. The recommended treatment is Cognitive Behavioural Therapy for insomnia (CBTi), however most people with insomnia do not access this treatment. Understanding reasons for the discrepancy between clinical guidelines and clinical practice is essential to identify opportunities to increase access to CBTi. This research explores the perspectives of people with insomnia, clinicians, and the health system to provide a comprehensive picture of insomnia management in Australia.

**Methods:** A mixed-methods program was undertaken to comprehensively identify facilitators and barriers to CBTi access in Australia. This included two large quantitative surveys of the Australian community and people with insomnia, and semi-structured qualitative interviews with GPs and psychologists.

**Results:** Most people with chronic insomnia symptoms reported they did not receive a diagnosis of insomnia, only 37% had discussed sleep with their GP, 9% discussed sleep with a psychologist, and <1% received CBTi. Barriers to effective management of insomnia include low priority of sleep from all perspectives, impaired knowledge and awareness, and inadequate access to care. GPs are under substantial time pressure, other health conditions are often prioritised over insomnia, existing funding mechanisms are not clear, and few psychologists trained to deliver CBTi.

**Discussion:** To improve the management of insomnia in Australia efforts are needed to improve clinician and patient recognition of the importance of identifying and managing insomnia. More psychologists and primary care clinicians need to be trained in CBTi delivery, to increase awareness, understanding and access to CBTi in the community.

## O035

### DIGITAL CBT-I VERSUS DIGITAL SLEEP EDUCATION CONTROL IN AN AUSTRALIAN COMMUNITY-BASED COHORT: A RANDOMISED CONTROLLED TRAIL.

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**Background:** Insomnia is a prevalent and debilitating condition in Australia. Cognitive behavioural therapy for insomnia (CBT-i) is the recommended first-line treatment, but is accessed by very few people with insomnia. We aimed to develop and test an interactive self-guided digital CBT-i program in an Australian community-based sample.

**Methods:** A randomised controlled trial was used to investigate the effect of digital CBT-i, versus digital sleep education control, on changes in insomnia (ISI), depression (PHQ-9) and anxiety symptoms (GAD-7) by 8-week follow-up in people with insomnia symptoms (ISI≥15). Intention-to-treat linear mixed models and complete-case chi-square analyses were used.

**Results:** Participants included 62 adults with insomnia symptoms (82% female, Age M [sd] = 52.5 [16.3]). There were no between-group differences in baseline characteristics, or rates of missing data at 8-weeks. CBT-i was associated with significantly greater improvements in the ISI (M [95%CI] reduction = 9.7 [7.8-11.6], d = 3.5) and PHQ-9 (M reduction = 4.8 [3.1-6.6], d = 1.0), but not GAD-7, compared to control (M ISI reduction = 1.6 [-0.2-3.4]; M PHQ-9 reduction = 1.0 [-0.7-2.6]; both interaction p < 0.001). Compared to control, CBT-i resulted in greater rates of insomnia improvement (ISI reduction ≥6; 7%, vs 75%), insomnia remission (ISI<8; 0%, vs 42%), and lower rates of clinically significant insomnia by 8-weeks (ISI≥15; 61%, vs 12%, all p < 0.001).

**Conclusion:** This digital CBT-i program leads to large improvements in insomnia and depression symptoms adults with insomnia. Implementation programs are required to increase access to digital CBT-i in Australia.

## O036

### MEASURING SLEEP-WAKE STATE DISCREPANCY IN THE HOME ACROSS MULTIPLE NIGHTS

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**Introduction:** Sleep-wake state discrepancy, the mismatch between subjective and objective measurements of sleep/wake status, is estimated to affect 9-50% of individuals with insomnia, often undetected due to lack of objective measures. Consumer sleep devices allow efficient measurement of sleep-wake state across multiple nights in the habitual sleep environment. This study assessed

sleep-wake state discrepancies obtained by two devices across multiple nights in individuals with insomnia.

**Methods:** Individuals with insomnia completed daily sleep diaries, wore a Fitbit Charge 4 device, and used a Withings Sleep Analyser under-mattress sensor for 14-days. Sleep metrics were obtained from all three data sources to calculate sleep-wake state discrepancy (device metric − diary metric).

**Results:** 15 people participated in the study. Fitbit data were available for 12 and mattress data for 11 participants. There were no significant differences between the sleep-wake state discrepancy values derived from Fitbit and Withings devices for total sleep time (−78.7±111.8 and −95.7±124.4 minutes respectively; p .123) or wake after sleep onset (−15.4±52.9 and −17.6±110.6 minutes respectively; p .826). Significant differences were found in the sleep-wake state discrepancy values derived from Fitbit (−17.5±23.3, p <.001) and Withings devices for number of awakenings (3.2±23.1, p .175).

**Discussion:** Both devices comparably detected sleep-wake state discrepancy in people with insomnia, noting a device-difference for number of awakenings. These preliminary findings suggest that consumer devices may be useful to detect sleep-wake state discrepancy. Larger studies may reveal devices do so with different levels of sensitivity. Future studies should include polysomnography to assess relative magnitudes across devices.

## Sleep and Breathing

## O037

### DIAGNOSTIC ACCURACY OF OSA SCREENING TOOLS FOR ACUTE CORONARY SYNDROME

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Obstructive sleep apnoea(OSA) is associated with cardiovascular diseases including acute coronary syndrome(ACS). Current estimates suggest some 70% of patients with ACS have OSA. OSA in this population remains under-recognised. This high prevalence calls for effective OSA screening tools for this high-risk population. We aimed to assess the diagnostic accuracy of the Epworth Sleepiness Scale (ESS), Berlin and STOP-BANG questionnaire in screening for OSA in patients with ACS.

70 patients with ACS (age IQR: 58[52,63] years, BMI: 27[24,30] kg/m2) were recruited from the cardiology department following an admission for ACS. Patients were administered with the ESS, Berlin and STOP-BANG questionnaires within 6 months of ACS admission. A level 2 polysomnogram was conducted to confirm the presence and severity of OSA (AHI≥5). The diagnostic accuracy of ESS>10, Berlin questionnaire (high-risk category), STOP-BANG score ≥3 (intermediate-high risk) and STOP-BANG score ≥5 (high-risk) was compared to a level 2 polysomnogram for different OSA severity.

OSA (AHI≥5 events/h) was diagnosed in 94% of patients with ACS. 67% of patients had moderate-severe OSA (AHI≥15 events/h). ESS, Berlin and STOP-BANG questionnaires have poor diagnostic accuracy across all severity of OSA (ESS>10, AUC:0.60 (95%CI: 0.42-0.79); Berlin, high risk, AUC:0.54 (95%CI: 0.39-0.68); STOP-BANG ≥3, AUC:0.69 (95%CI: 0.56-0.82); STOP-BANG ≥5, AUC: 0.66 (95%CI: 0.53-0.79)).

This study confirms a very high prevalence of OSA in patients with ACS. The Berlin and STOP-BANG questionnaires alone are inadequate to identify OSA in this high-risk cohort. Simplified objective measures to screen for OSA may be better suited for this patient population.

## O038

### OBSTRUCTIVE SLEEP APNOEA PREVALENCE AND SEVERITY IN A SPECIALIST HEART FAILURE WITH PRESERVED EJECTION FRACTION (HFPEF) CLINIC

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Heart Failure with Preserved Ejection Fraction (HFpEF) is a debilitating, incurable form of HF associated with a normal left ventricular ejection fraction and elevated ventricular filling pressures. While Obstructive Sleep Apnoea (OSA) is common in HFpEF and OSA treatment may be associated with improved outcomes, the causal role of OSA in the pathophysiology of HFpEF remains unclear. Accordingly, accurate diagnosis and tracking of OSA in HFpEF patients is emerging as a potentially important approach for impacting prognosis. This study sought to identify the prevalence and severity of OSA in consecutive patients referred to a recently established tertiary hospital HFpEF clinic. All patients were confirmed to have HFpEF using standard clinical approaches and completed the Epworth Sleepiness Scale (ESS) to screen for sleep-disordered breathing and a level 2 polysomnogram to confirm OSA presence and severity. To date 28 patients have been assessed for OSA (9M/27F; Age 67±2y; BMI 35.0±1.6kg/m2; BNP 214±64ng/L). All 28 patients (100%) were diagnosed with OSA (AHI≥5 events/h), while 16 (57%) had moderate-severe OSA (AHI≥15 events/h). Average ESS was 7±1, with only 6 patients (21%) identified at risk for sleep-disordered breathing (ESS>9). These preliminary data confirm a very high prevalence of OSA in HFpEF patients when assessed via polysomnography. Furthermore, these patients appear asymptomatic in terms of sleepiness, as measured by the ESS. The nature of the association between OSA and HFpEF and the potential benefit of OSA treatment warrant study. Given that the ESS did not effectively identify OSA risk in HFpEF, alternative screening tools warrant consideration.

## O039

### A NOVEL APPROACH TO QUANTIFY BREATHING EFFORT IN OBSTRUCTIVE SLEEP APNOEA

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**Introduction:** Breathing effort is an important component of obstructed breathing and determinant of arousal in obstructive sleep apnoea (OSA). However, relative effects of hypopnoea versus apnoea on effort and work of breathing (WOB) are largely unknown. This study applied a novel modelling approach to quantify breathing effort, WOB and obstruction severity to evaluate differences between hypopnoea and apnoea events in OSA.

**Methods:** 1659 apnoea and hypopnea events from six obese males (BMI: 30-41 kg/m2; age: 34-56 years; AHI: 31-114 events/hr) with severe OSA were evaluated using conventional sleep measures and a 3-compartment (nasal, collapsible upper airway and lungs) respiratory mechanics model using mask airflow and pressure, and oesophageal and epiglottic pressures. Attempted airflow and WOB, and WOB loss to obstruction (attempted minus measured WOB), were estimated breath-by-breath via the model for comparisons between hypopnoea and apnoea events and sleep stages.

**Results:** The model explained most of the variance in attempted flow (Pearson r= 0.91 [95% CI 0.71 to 0.98]). Compared to hypopnoea events, WOB loss during obstructive apnoeas was 3.5 [95%CI 1.7 to 5.4] times higher. WOB losses were also higher during deep versus N2 sleep. Visualising breath-by-breath WOB loss revealed a significant number of flow- limited breaths not detected using traditional human scoring. Over 30% of breaths not

classified as hypopnoeas or apnoeas exhibited WOB loss higher than for hypopnoea events.

**Conclusions:** Respiratory mechanics modelling is useful to assess breathing effort and upper airway obstruction severity and could provide novel mechanistic insights into sleep-related breathing problems and treatment outcomes.

## O040

### ASSESSMENT OF HEART RATE VARIABILITY DURING RESPIRATORY EVENTS AND AROUSALS USING SYMBOLIC DYNAMICS

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**Introduction:** Beat-to-beat heart rate dynamics vary during obstructive respiratory events and in both respiratory and spontaneous arousals. However, conventional quantifications of heart rate variability (HRV) require segments of data substantially longer than the typical respiratory event or arousal. Subsequently, previous studies investigating dynamics in these significantly shorter segments have utilised simple quantifications such as peak heart rate. This study aimed to more-richly characterise HRV during obstructive respiratory events and arousals using symbolic dynamics.

**Methods:** One hundred individuals with suspected obstructive sleep apnoea (55 male, $57.1 \pm 12.9$ years) were studied with diagnostic polysomnography, including electrocardiography. R-wave intervals were calculated and extracted during respiratory events terminating with/without arousals and during spontaneous and respiratory arousals. The symbolic dynamics tool "heart rate fragmentation" was applied to quantify HRV during the events, whereby the percentage of inflection points (PIP), defined as beat-to-beat transitions from heart-rate acceleration to heart-rate deceleration, were calculated. Statistical analysis was conducted with the Wilcoxon rank sum test.

**Results:** PIP was higher during respiratory events terminated with arousal compared with those without arousal ($52.9 \pm 6.4\%$ vs. $48.5 \pm 6.7\%$, $P < 0.05$). PIP was also higher during spontaneous arousals than during respiratory arousals ($51.3 \pm 6.1\%$ vs. $45.8 \pm 6.7\%$, $P < 0.05$).

**Discussion:** Previous mechanistic experiments have associated increased PIP with greater parasympathetic activity. Thus, our preliminary results suggest greater parasympathetic activity during respiratory events terminated by arousal than those without; and during spontaneous arousals compared with respiratory arousals. Further work is required to understand the pathophysiology underlying this and other similar metrics, potentially leading to novel obstructive sleep apnoea-related cardiorespiratory pathology biomarkers.

## O041

### EXPLORING THE LANDSCAPE OF SLEEP DATA RESOURCES: A LITERATURE SURVEY

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The complex physiologic interdependencies of sleep make sleep medicine a data-rich discipline. Emerging big data approaches hold promise for novel discoveries, however, scholars have suggested these advances may be hindered by dataset limitations. We conducted a review of the field to assess the drawbacks of available sleep data resources.

**Methods:** A systematic literature survey on PubMed. A keyword search identified studies based on sleep datasets which combined polysomnography records and contextual patient health information. For eligible studies, we extracted information on data provenance (existing repositories versus self-collected), data accessibility for onward research, dataset size, cohort characteristics, data/metadata inclusions, and use of systematic nomenclatures.

**Results:** Only approximately 40% of identified studies used public datasets, suggesting that these repositories only partially met current research needs. Alternative, self-collected cohorts were typically small, with just 20% having populations greater than 1000 subjects. Most were closed-source or lacking data access indications, which may impact the strength and reproducibility of study results. Large-size resources focussed predominantly on sleep apnoea, limiting the reach of research efforts targeting less prevalent conditions.

Datasets featuring comprehensive medical histories and long-term follow-up information were rare. Where available, this information generally lacked systematisation of nomenclatures and metadata, impairing the ability of users to extract meaning from data entities and their interrelationships.

**Discussion:** Limitations in current sleep data practices were substantiated by our review. There is a clear need to develop larger, diverse, multimodal and clinically representative sleep data collections that can be more easily shared, and analysed using emergent data-driven discovery tools.

## O042

### HEALTHY LIFESTYLE IS ASSOCIATED WITH REDUCED CARDIOVASCULAR DISEASE, DEPRESSION AND MORTALITY IN PEOPLE AT ELEVATED RISK OF SLEEP APNEA

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**Background:** We evaluated 1) the independent and combined influence of obstructive sleep apnea (OSA) risk and a healthy lifestyle on typical OSA outcomes [excessive daytime sleepiness (EDS), depression, cardiovascular disease (CVD), and stroke]; and 2) the impact of a healthy lifestyle on survival in individuals presenting a heightened risk of OSA.

**Method:** We utilized data from 13,694 adults (median age 46 years; 50% men) for both cross-sectional and longitudinal analyses (15 years). A healthy lifestyle score ranging from 0 (most unhealthy) to 5 (most healthy) was computed based on diet, alcohol consumption, physical activity levels, smoking habits, and body mass index.

**Results:** A dose-response relationship was found between OSA risk and all examined chronic conditions and EDS (p for trend < 0.001). A healthy lifestyle was found to be inversely related to all chronic conditions (p for trend < 0.001), except EDS (p for trend = 0.379). A higher healthy lifestyle score correlated with lower odds

of depression and CVD. An inverse relationship was found between healthy lifestyle score and depression (P for trend < 0.001), CVD (P for trend = 0.003), and stroke (P for trend = 0.025) in those with high OSA risk. An inverse relationship was observed between a healthy lifestyle and all-cause mortality in general, and in the moderate/high and high OSA risk groups (p for trend < 0.001).

**Discussion:** This study highlights the role of a healthy lifestyle in reducing chronic conditions and in enhancing survival rates in individuals with a heightened risk of OSA.

## O043

### INVESTIGATING UPPER-AIRWAY MECHANICS WITH COMPUTATIONAL TONGUE MODELS.

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With the use of computational models of the oral cavity, we aim to understand how changes in the morphology of the oral cavity and changes the stiffness of the tongue affect the movement of the posterior surface of the tongue.

Anatomical and diffusion weighted imaging from 20 healthy individuals (10M:10F, Age: 22-54years, BMI: 17-30kg/m²), were used to develop 3D models of the tongue including the fibre orientations of the tongue muscles. All models were aligned and scaled to match the volume of the average subject's mandible, so that only differences in shape were modelled. The muscles of the tongue were modelled as transversely isotropic, with a shear moduli of 2.9 and 1.0kPa, parallel and perpendicular to the muscle fibre direction, respectively. Each individual participant model was prescribed an active contraction producing 50kPa of stress in the horizontal component of the genioglossus. The influence of initial hyoid position on the average anterior displacement of the posterior surface of the tongue was assessed with linear regression.

On average the contraction moved the posterior tongue 4.0±0.7mm anteriorly. For every millimetre of hyoid elevation, anterior tongue displacement (i.e. airway dilation) decreased by 0.1mm. These initial models demonstrate that the automated modelling pipeline can identify how structural differences alter the efficacy of dilator muscles. Future implementations of these models will also incorporate experimentally measured pharyngeal pressures, and temporal and spatial patterns of muscle activations based on experimental data, to assess the how variation in the coordinated contractions contributes to airway collapse.

## Sleep Health

## O044
### ARE WE SLEEPING ENOUGH? SHORT AND IRREGULAR SLEEP IS COMMON IN A LARGE GLOBAL COMMUNITY SAMPLE WITH OBJECTIVE, MULTI-NIGHT, IN-HOME SLEEP DATA

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**Introduction:** Evidence-based guidelines recommend that adults should sleep 7-9hrs per/night. This study used multi-night, in-home, objective sleep duration monitoring to determine how often a large global community sample meets the recommended sleep duration range.

**Methods:** Data were analysed from registered users of the Withings Sleep Analyzer under-mattress device who had ≥28 nights of sleep recordings, averaging ≥4 per week. Sleep durations were assessed as the average and standard deviation of sleep duration across a ~9-month period. Proportions of participants within (7-9hrs) or outside (<7hrs or >9hrs) the recommended sleep duration range were calculated. Associations between age groups, sex, and sleep duration were assessed using linear and logistic regressions.

**Results:** In total, data were analysed from 67,254 adults (52,523 males, 14,731 females; aged Mean±SD 50±12y). About 30% of the sample showed an average sleep duration outside the recommended 7-9hrs per/night. Even in participants with an average sleep duration within 7-9hrs, about 40% of recorded nights were outside this range, and only 15% of participants slept between 7-9h for at least 5 nights per/week. Females had significantly longer sleep durations than males, and middle-aged participants had lower sleep durations than younger and older participants.

**Discussion:** A considerable proportion of adults in this sample were not regularly sleeping the recommended 7-9hrs per/night. Even amongst those who do, irregular sleep is prevalent. These novel data raise several important questions regarding sleep requirements, lifestyle factors, and the need for improved sleep health policy and advocacy.

## O045
### SLEEP DURATION IS ASSOCIATED WITH YOUNG ADULT'S HEART RATE VARIABILITY RESPONSE TO STRESS

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**Introduction:** Young adulthood is a critical developmental period typified by heightened exposure to stress, and a tendency towards insufficient sleep. The relationship between sleep loss and stress may have lifelong health consequences. Currently, our understanding of this relationship in young adults is limited. Heart rate variability (HRV) is an important indicator of balance in the autonomic nervous system. We examined the association between sleep duration and HRV in response to cognitive stressors.

**Methods:** Seventy-six young adults (M=20.6±1.9, 72.4% female) who self-identified as short sleepers were recruited. Habitual sleep duration was monitored with actigraphy for two weeks. Participants subsequently underwent an in-lab experiment where their HRV was recorded during baseline, and during a cognitive stress condition involving the completion of computerised cognitive stress tasks. Participants also reported their habitual stress levels and sleep quality.

**Results:** Actigraphy assessment revealed that participants slept within the recommended sleep durations (M=7.8±0.7). The participants reported high habitual stress but normal sleep quality. Our moderation analysis indicates that shorter sleep duration was associated with elevated HRV during the cognitively demanding tasks.

**Conclusions:** Our findings demonstrate an association between sleep duration and HRV in the context of a cognitive stressor, indicating that sleep and stress are related in young adults. An unexpected negative relationship between sleep duration and HRV during the cognitively demanding tasks suggests complexity in this relationship; however, we should still look to reduce stress and improve sleep where we can in young adults. This association may be better understood via direct manipulation of sleep duration.

## O046
### ADHERENCE TO DIETARY GUIDELINES PREDICTS SLEEP OUTCOMES IN OLDER AUSTRALIAN WOMEN: FINDINGS FROM THE AUSTRALIAN LONGITUDINAL STUDY ON WOMEN'S HEALTH

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**Introduction:** Sleep quality and quantity is impacted by age, with women more susceptible to these age-related changes. Poor sleep in older adults is linked to adverse health outcomes and a greater risk of all-cause mortality. Given the ageing population in Australia, strategies to improve sleep in older adults is critical. Diet is a modifiable lifestyle factor that may improve sleep. This study investigated the relationship between adherence to dietary guidelines and sleep problems in older Australian women.

**Method:** Data from n=7956 Australian women from the 1946-1951 cohort of the Australian Longitudinal Study on Women's Health were included (mean age±SD: 70.8±1.5 years). Participants completed a food frequency questionnaire, reported as a diet quality score (0-100, with 100 indicating best diet quality). Sleep problems were measured with five questions that asked about early waking, time taken to fall asleep, sleep quality, wake after sleep onset, and worry related awakenings at night.

**Results:** At least one sleep problem was reported by 70.2% of participants, and 20.5% reported between 3-5 sleep problems. Overall adherence to dietary guidelines was poor, with an average diet quality score of 56.9±10.7. Linear regression revealed that better

adherence to dietary guidelines was associated with fewer sleep problems (β: –0·065, 95 % CI: –0·012, –0·005).

**Discussion:** While dietary adherence in older Australian women was poor, adherence to dietary guidelines was associated with fewer symptoms of sleep problems. To improve the sleep and overall health of older Australian women, strategies to improve dietary adherence should be prioritised.

## O047

### REPRESENTATIONS OF SLEEP IN SOCIAL MEDIA: A TIK TOK CASE STUDY

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**Introduction:** Social media platforms such as Tik Tok have broadened and potentially democratised access to health information. The narratives and quality of information about sleep on TikTok has not been studied. We sought to understand sentiment towards sleep, the types of sleep problems represented by users, and the nature and content of advice about sleep provided on TikTok.

**Methods:** All videos associated with the keyword "sleep" were collected twice daily using the keyword search function of the Ensemble data TikTok API between 4th-17th November 2022 for Great Britain, Australia, New Zealand and the USA. 7,373 unique videos were examined. After screening, videos were coded to a customised sleep narrative-specific code set. 1,913 discrete sleep-related videos were labelled according to 33 unique categories and underwent computational sentiment analysis.

**Results:** Overall, sleep was framed more positively than negatively, particularly for sleep advice. Videos about sleep problems were typically framed positively through humour. The main sleep narratives represented included (1) problems with sleep quality, initiation or maintenance due to factors such as children, worries or use of electronic media, and (2) advice for improving sleep quality through the use of sleep-promoting soundscapes, advice on improving children's sleep, and implementation of routines/habits to support sleep.

**Discussion:** Platforms such as Tik Tok provide opportunities to disseminate timely, engaging, and evidence-based information about sleep health to a wide community. However, they equally carry risks of mass distribution of false information that warrants broader oversight and critical examination.

## O048

### WHY DON'T AUSTRALIANS WITH PRIVATE HEALTH INSURANCE PRIORITISE THEIR SLEEP HEALTH?

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**Introduction:** This study sought to identify common routines and practices that may help or hinder sleep quality in a heterogenous population of Australians with private health insurance (PHI).

**Methods:** Members of a national not-for-profit health fund were invited to complete an online survey about the 'pillars' of sleep environment (place & practice), priority (value & knowledge), and impact (personal & community). Question responses were indexed on a scale of 1-100 and ratings were generated as a summation of each pillar (Low: 0-49; Neutral: 50-69; High: 70-100).

**Results:** Participants (n=1007) placed a high value on their individual sleep (73.9/100) and rated their place of sleep highly (74.5/100). However, sleep practice outcomes (56.5/100) and sleep impacts (personal: 50.4/100; community: 57.4/100) were considered neutral on average. Only 25% of participants were consistent in their sleep timing. 41% were distracted by other responsibilities (e.g., chores, children, and emails) and 30% indicated they prioritise yet cannot maintain consistency in their sleep routine. 75% of participants indicated they wanted more education on sleep and how to improve it.

**Discussion:** Australians with PHI are thought to be proactive in their health, with greater access to funded programs and claimable services to improve their health outcomes. However, the impact of poor sleep and severe lack of consistency was observed within this cohort, despite individuals placing high value on a healthy sleep routine.

**Conclusion:** With extensive benefits of good sleep, health funds should look to help improve their members' sleep education for the 55% of Australians with PHI.

## O049

### A QUANTITATIVE EEG ANALYSIS OF OVERNIGHT NOISE EXPOSURE EFFECTS ON SLEEP– A LABORATORY STUDY

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The impact of overnight wind farm noise exposure on sleep is unclear and traditional manual sleep scoring may not be sensitive enough to detect subtle changes in sleep. This study used quantitative EEG (qEEG) to assess subtle effects of noise on sleep under well-controlled laboratory conditions.

Sixty-eight individuals (Males: Females; 30:38) aged (Median [IQR]) 55.5yrs [31.3-66.3], from four groups (rural residents with and without WFN-related complaints, control rural residents, and urban traffic noise-exposed residents) underwent overnight polysomnography during six different noise exposure nights in random order. Noises included 20sec and 3min intermittent road traffic and wind farm noise exposures (full night averages 42dBA and 32dBA, respectively), continuous and intermittent wind farm noise at 25dBA, and a quiet control night (background noise,19dBA). Traditional polysomnography sleep metrics, qEEG power in delta (0.5-4Hz) to beta (32Hz) frequencies, and K-complex density (events/min) were compared between noise conditions, groups and sleep stages using likelihood ratio tests.

Wake after sleep onset, time spent in N1 sleep and relative beta activity were higher, whilst time spent in N3 was reduced on the 20 second noise exposure night compared to control (all p<0.05). Full night average qEEG outcomes were not different between nights. K-complex density was significantly increased during both 20sec and 3min intermittent noise exposure conditions compared to control (p<0.001).

Full night qEEG outcomes do not appear to be more sensitive to noise related sleep disturbance than traditional sleep scoring methods. However, K-complex density assessments may be particularly useful in future studies of noise effects on sleep.

Abstract citation ID: zpad035.050

## O050

### THE DOSE AND TIMING RELATIONSHIP BETWEEN CAFFEINE AND SUBSEQUENT SLEEP

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**Introduction:** There is currently a lack of evidence to guide recommendations for the consumption of caffeine to mitigate its effects on sleep. Therefore, the aim of this study was to investigate the effect of caffeine dose and timing combinations on subsequent sleep.
**Methods:** Twenty-three healthy adult males with a moderate habitual caffeine intake (<300mg/d) participated in a randomised, repeated-measures study. Participants completed seven conditions, including a placebo and two caffeine doses (100mg and 400mg) consumed at three different time points (12, eight, and four hours prior to habitual bedtime) with a 48-hour washout period. Sleep was measured using in-home partial polysomnography and subjective sleep diaries. Linear mixed effects models were used to estimate the effect of each caffeine condition on sleep characteristics.
**Results:** Caffeine negatively impacted sleep when compared to the placebo. The largest impact was observed when the highest dose of caffeine (400mg) was consumed closest to bedtime, with a 54.0 minute reduction in total sleep time (p=<0.001), a 10.2% reduction in sleep efficiency (p= <0.001), a 14.4 minute increase in sleep onset latency (p=0.047), a 25.3 minute increase in wake after sleep onset (p=<0.001), a 5.5% increase in the proportion of light sleep (N1&N2)(p=0.029), and a 4.55% reduction in deep sleep (N3) (p=0.026).
**Discussion:** The largest decrements in sleep occurred when caffeine was consumed at a high dose in close proximity to bedtime. These findings highlight the importance of considering the amount and timing of caffeine intake when aiming to minimise the effect of caffeine on subsequent sleep.

**Sleep and breathing clinical**

## O051

COMPARISON OF STANDARD CPAP THERAPY AND THE RACER AIRWAY DEVICE FOR THE TREATMENT OF OBSTRUCTIVE SLEEP APNOEA: A RANDOMISED CLINICAL TRIAL

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The nasal cycle is a normal ultradian physiological phenomenon where each nasal airway alternates conducting dominance. The nasal cycle occurs in obstructive sleep apnoea (OSA). Rest-Activity-Cycler positive airway pressure (RACer-PAP) is a novel treatment aiming to maintain the innate nasal cycle.

**Methods:** PAP naïve OSA patients were randomly assigned in a crossover design to 4 weeks RACer or control humidified CPAP (3 day wash-out). Treatment pressure determined by in-lab Auto-titration. Adherence, Epworth Sleepiness Score (ESS), quality of life (SF 36), nasal symptoms, side effects, sleep quality compared by SAS 9.4 or Likert scale.

**Results:** 40 subjects (of 44 recruited) (29 M, 11 F) with a mean BMI 37.7kg/m2 aged 45 yrs (range 22-70 yrs) with severe OSA (mean AHI 56.4/ hr), ESS 13.6 (range 3-21) completed the study. Ethnicity included Maori (17 %), NZ European (67%), and Pacific (12.5%). The prescribed mean pressure 12.2 (range 8-18 cmH20). Adherence was greater in the humidified CPAP control than RACer- PAP arm (4:57h/night verse 4:14h/night p < 0.01). Both devices similarly improved subjective sleepiness, quality of life and adverse upper airway symptoms. Humidified CPAP improved to a greater extent nasal symptom scores (baseline – final: control CPAP 2.8 vs. RACer 2.3, p = 0.03), sleep quality and was preferred (55% vrs 22 %).

**Conclusion:** RACer PAP improved OSA symptoms and quality of life but adherence was lower and nasal symptoms more common. This could be explained by not using humidification, technical issues with prototype machine or the use of set nasal cycle length.

## O052

PATIENT PREFERENCE AND ACCEPTABILITY OF SLEEP DIAGNOSTIC TESTS DURING EARLY PREGNANCY

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**Introduction:** A range of test options are available to diagnose OSA. Test acceptability is measured via successful completion, though this fails to capture the patient preference. There is a paucity of data on acceptability particularly in pregnancy. We thus developed questionnaires to assess test preference and acceptability of Apnealink-Air, Somte and Grael tests, in pregnancy till 24 weeks gestation.

**Methods:** Eighty-four pregnant women by 24 weeks gestation were invited to complete home Apnealink-Air, unattended-self-applied-Somte-PSG and attended-Grael-PSG. Questionnaires were beta-tested by hospital staff (unaffiliated with study). Using a 5-point Likert scale, questionnaires assessed ease of use, convenience and acceptability of repeating test. A ranking scale was used to determine test preference. Following completion of tests, participants completed questionnaires.

**Results:** Of 59 participants that completed any test, 35 completed any questionnaire (Apnealink(n=33), Somte(n=33), Grael(n=30), preferred test (n=29)). Ranking of test preference demonstrated Apnealink ranked 1st/72.4%, Grael 2nd/20.7% and Somte 3rd/6.9%. Apnealink, Somte and Grael questionnaire data responses were assessed for ease of use (very easy (51.6%), easy / neutral (34.4/34.4%) and very easy (33.3%) respectively), convenience (very convenient (51.6%)), neutral (36.7%) and convenient (50%) respectively), and acceptability to repeat test (very acceptable (41.9%), neutral (43.3%) and neutral(43.3%)), respectively.

**Discussion:** Pregnant women being assessed for OSA by 24 weeks gestation preferred Apnealink to Somte and Grael PSG. Participants reported Apnealink easiest to use, most convenient and most acceptable to repeat in a future pregnancy. Patient autonomy is an important principle; womens' preferences should be taken into consideration in clinical sleep services and research.

## O053

CARDIO-METABOLIC HEALTH EFFECTS OF CPAP TREATMENT FOR SLEEP APNOEA DURING WEIGHT LOSS: A RANDOMISED CONTROLLED PILOT TRIAL.

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**Introduction:** This study assessed whether the addition of CPAP during weight loss would enhance cardiometabolic health improvements in patients with obesity and OSA.

**Methods:** Patients with overweight or obesity, pre-diabetes and moderate-severe OSA were randomised to receive CPAP therapy with a weight loss programme (CPAP+WL) or a weight loss programme alone (WL alone). Primary outcome: 2-hour glucose assessed by OGTT. Trial registration: ANZCTRN 12617000823370.

**Results:** 17 patients completed 3-month follow-up assessments (8 CPAP+WL and 9 WL alone). Mean CPAP compliance was 5.29 hrs/night. Participants lost ~12 kg which reduced OSA severity by ~45%. The primary analysis showed no between group differences for any of the assessed outcomes. Despite this, most outcomes improved with weight loss including insulin sensitivity (.000965 units, p=.008), wake diastolic BP (-4.3mmHg, p=.03), sleep systolic BP (-16.2 mmHg, p=.0003), sleep diastolic BP (-9.8 mmHg, p=0.02), and sleepiness (Epworth Sleepiness Score -3.2, p=.0003). Two-hour glucose levels did not improve (p=0.33), but the glucose area under the curve (AUC) was reduced (-230 units, p=.009). In addition,

total (-0.86mmol/L, p=0.006) and LDL cholesterol (-0.58mmol/L, p=0.007), triglycerides (-0.75mmol/L, p=0.004), fat mass (-7.6kg, p<.0001) and abdominal fat (-310cm3, p<.0001) were all reduced. **Conclusions:** We did not establish any cardio-metabolic benefit from CPAP therapy during weight loss. In contrast, weight loss had a robust positive effect on cardio-metabolic health. The magnitude of weight loss improvements far exceeded those from trials assessing the impact of CPAP alone, suggesting that weight loss should be the primary focus of treatment for patients with OSA and obesity.

## O054
### WHAT MEASURE OF CPAP TREATMENT IS MOST CLOSELY ASSOCIATED WITH REDUCED RISK OF FUTURE MAJOR CARDIOVASCULAR EVENTS (MACE)?

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**Introduction:** Obstructive sleep apnoea (OSA) is associated with future Major Adverse Cardiovascular Events (MACE). Continuous positive airway pressure (CPAP) is the standard treatment for OSA, but it is not known which measure of CPAP treatment is most closely associated with reduction in future MACE. We compared associations between a novel and a commonly used measure of CPAP treatment and future MACE.
**Materials and Methods:** Participants: 2717 adults with moderate-severe OSA attending a tertiary sleep clinic 2006-2010 completed baseline assessments and followed-up for 7years.
CPAP treatment: Month-long CPAP trial and periodic review post-trial.
**Outcomes:** Time to cardiac death or non-fatal hospitalisations due to MACE, or end of follow-up, using Cox proportional hazards models.
**Predictors:** Average nightly CPAP use and the SARAH index (Sleep-Adjusted Residual AHI), using all available device downloads
SARAH index=([AHITreatment×HoursTreatment]+[AHIUntreated×HoursUntreated])/HoursTotalSleepTime
**Covariates:** Demographics/comorbidities associated with MACE.
**Results:** MACE occurred in 18% participants.
Average nightly use: Compared to zero use, each tertile of increasing use predicted reduction in risk of MACE (tertile-0:ref, tertile-I:HR 0.632, 95%CI 0.484-0.824, p<0.001, tertile-II:HR 0.772, 95%CI 0.602-0.990, p=0.042, tertile-III:HR 0.708, 95%CI 0.553-0.905, p=0.006).
**SARAH:** A dose-response decreasing risk of MACE with decreasing SARAH index tertiles (tertile-I:ref, tertile-II:HR 0.827, 95%CI 0.658-1.039, p= 0.102, tertile-III:HR 0.772, 95%CI 0.614-0.969, p=0.026).
**Conclusions:** Average nightly CPAP use and SARAH index were associated with a decreased risk of future MACE. The SARAH index showed a dose-response relationship with MACE; suggesting

that it may be a better estimate of residual OSA-related cardiovascular stress.

## O055
### NIV TITRATION: HOW TO MATCH VENTILATOR SETTINGS TO THE PATIENT?

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**Introduction:** Non-invasive ventilation (NIV) is a treatment that improves mortality and quality of life in chronic respiratory failure. The monitoring used to titrate NIV varies substantially; however, treatment is directed towards improving pulmonary gas exchange and sleep quality. The aim was to evaluate whether different montages of signals, influenced identification of respiratory and patient ventilator asynchrony (PVA) events and ventilation titration.
**Method:** 50 laboratory NIV polysomnography (PSG) studies were reviewed under 3 different signal conditions: NIV PSG, ventilator derived signals (V) and polygraphy (PG): ventilator signals, respiratory bands, transcutaneous carbon dioxide and oximetry. Two respiratory and sleep physicians reviewed and scored respiratory and PVA events for each individual study with agreement quantified with Cohen's kappa statistic. Physicians' confidence and satisfaction of ventilator settings and titration recommendations were ranked on a 5-point Likert scale and compared with ordinal logistic regression.
**Results:** There were marked differences in the identification of respiratory events including upper airway obstruction with reduced respiratory drive; PSG vs V kappa 0.1 (CI -0.12, 0.32) and PSG vs V kappa 0.43(CI 0.2, 0.67). Ineffective effort, a measure of PVA, PSG vs V studies demonstrated kappa 0.02 (CI 0, 0.05) compared with PSG vs PG kappa 0.34 (CI 0.16, 0.53). Physician confidence for ventilation prescription was lower in PG and V studies at -1.3 and -3.5 points respectively when compared with PSG.
**Conclusion:** Ventilator only derived signals resulted in key differences in respiratory event, PVA identification and physician confidence. This may help inform future models of NIV care.

## O056
### IS OBSTRUCTION OBSTRUCTING SURVIVAL? LONG-TERM MORTALITY IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) REQUIRING ACUTE NON-INVASIVE VENTILATION (NIV) WITH AND WITHOUT OBSTRUCTIVE SLEEP APNOEA (OSA).

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**Introduction:** COPD/OSA overlap syndrome (OVS) is associated with poor outcomes in studies conducted in ambulatory settings. However, little is known about the prognosis of patients hospitalised with acute hypercapnic respiratory failure (ARF) requiring

NIV. The aim of this study was to compare the long-term prognosis of OVS patients compared to patients with COPD.

**Methods:** In this retrospective cohort study, 129 patients with COPD and 52 OVS patients were treated with NIV for ARF and followed up for a median of 1.8 years (IQR 3.8). We compared patient characteristics and overall survival.

**Results:** Compared to patients with COPD alone, OVS patients had higher prevalence of hypertension and type-2 diabetes mellitus. There was no difference in arterial pH, PaCO2 or serum bicarbonate at hospital presentation. Mortality was lower in OVS (HR 0.57, 95% CI 0.38-0.85) and remained lower after adjustment for age, gender, BMI, FEV1%predicted and comorbid cardiovascular disease. Median survival in OVS patients discharged home on NIV was significantly higher compared to OVS not discharged on therapy, as well as COPD patients, irrespective of home therapy prescription (p<0.01).

**Discussion:** OVS patients discharged on NIV had lower mortality compared to OVS patients not discharged on NIV. Patients with COPD and ARF requiring NIV have overall higher mortality rates compared to OVS patients. These findings suggest that following hospital admission with ARF, OVS patients may benefit from ongoing home NIV.

## O057

### THE IMPACT OF SURGICAL WEIGHT LOSS ON THE PHYSIOLOGICAL ENDOTYPES CAUSING OBSTRUCTIVE SLEEP APNEA

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**Background:** Weight loss improves upper airway collapsibility in people with obstructive sleep apnoea (OSA). However, it's unclear how weight loss affects the other endotypes responsible for OSA (loop gain, arousal threshold and muscle compensation). We investigated the effect surgical weight loss has on the OSA endotypes and whether the baseline endotypes predict response to surgery.

**Methods:** Endotypes were measured using non-invasive methods in 43 OSA patients who had a clinical polysomnogram before and after (~6-18 months) receiving weight loss surgery. Linear regression was used to assess whether the baseline endotypes predicted improvement in OSA severity defined by the apnoea-hypopnoea index (AHI).

**Results:** Weight loss surgery was associated with significant improvements in AHI (43.4[28.6-64.8]events/hr vs. 16.9[11.6-33.3]events/hr, p<0.001), body mass index (42.1 ±5.5kg/m2 vs. 32.8 ±4.5kg/m2, p<0.001), upper airway collapsibility (73.8[65.2-78.5]‰eupnea vs. 77.1[71.7-81.3]‰eupnea, p=0.034) and loop gain (0.62[0.53-0.71] vs. 0.54[0.44-0.72], p=0.012). Weight loss surgery was also associated with a reduced arousal threshold (144.5[130.1-160.5] vs.136.9[121.9-156.4], p=0.007). A greater reduction in OSA severity was associated with greater improvements in upper airway collapsibility (p=0.001, r2 =0.23) and reductions in the arousal threshold (p<0.001, r2=0.27). Poor upper airway collapsibility at baseline was weakly predictive of a greater improvement in OSA severity (p=0.018, r2 =0.13). No other endotype was predictive of OSA improvement.

**Discussion:** Weight loss surgery is associated with improvements in weight, OSA severity, upper airway collapsibility and loop gain. There was a paradoxical worsening of arousal threshold. Furthermore, weight loss surgery may be particularly effective in improving OSA in those with poor upper airway collapsibility.

## Paediatric

# O058

### ARE SHORT CENTRAL APNOEAS IN PRETERM INFANTS REALLY BENIGN? EFFECTS ON CARDIOVASCULAR CONTROL.

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**Introduction:** Preterm infants frequently experience respiratory instability in the form of short apnoeas and periodic breathing. Animal studies have shown that repetitive hypoxia associated with periodic breathing can alter autonomic control. We aimed to elucidate if apnoea and periodic breathing were associated with autonomic cardiovascular control, thus exacerbating the consequences of respiratory disturbance longitudinally over the first 6 months after hospital discharge.

**Methods:** Preterm infants born between 28-32 weeks gestational age (GA) were studied during supine daytime sleep at 32-36 weeks post menstrual age (PMA) (n=29), 36-40 weeks PMA (n=27), 3-months corrected age (CA) (n=20) and 6-months CA (n=26). The percentage total sleep time (%TST) spent having central apnoeas at each study was calculated. Autonomic control was assessed using heart rate variability in ranges of total power, low frequency (LF, reflecting sympathetic + parasympathetic activity) and high frequency (HF, parasympathetic activity), and LF/HF ratio (sympathovagal balance).

**Results:** The amount of time spent with short central apnoeas decreased with increasing postnatal age in both active sleep (AS) and quiet sleep (QS). In both sleep states, total, LF and HF power increased with postnatal age, while LF/HF decreased in AS. In both AS and QS %TST spent with short central apnoeas was negatively correlated with Total, LF and HF power (p<0.001 for all) and positively correlated with LF/HF (p<0.05).

**Conclusion:** This study provides new evidence that short apnoeas, particularly periodic breathing, which is currently not detected or treated in the neonatal unit can affect autonomic cardiovascular control.

# O059

### EXPLORING ENVIRONMENTAL LIGHT EXPOSURE IN CHILDREN: A NOVEL PILOT SPECTROMETER STUDY

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**Introduction:** Light plays an important role in the timing of children's circadian system. Artificial manipulation of the timing, intensity, spectra, and duration of light exposure has increased, but with little consideration of the impact on children's development, health, and wellbeing. Children are exposed to brighter nights, darker days, and less natural light environments than prior generations. Exploring the 24-hour light environment is a critical first step in understanding how light affects children.

**Methods:** We conducted a pilot feasibility and acceptability study. The study is of children aged 5 – 8 years. Children wore a miniature spectrometer and an actigraph for 48-hours. During this period, their parents completed a survey and daily time-use diary. At the end of the study, children undergo a short evaluation interview, as this is a new form of wearable not previously used with children. This study examines the feasibility and potential utility of this form of measurement.

**Results:** 5 children have been recruited into the study (3 boys, 2 girls). Initial feasibility testing with children supports high acceptability and adherence to the study protocol. This presentation will focus on both the technology development aspects, useability and feasibility in children, and preliminary results.

**Discussion:** This study presents preliminary data that supports the feasibility of novel light exposure metrics. Understanding the impact of increased use of digital devices by children, and increased control and manipulation of their light environments, requires new measures and protocols. These tools will help improve understanding of the effects of light on children's sleep.

# O060

### LOOP GAIN AS A MEASURE OF RESPIRATORY INSTABILITY IN PREMATURE INFANTS

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**Introduction:** Respiratory control is often unstable in premature infants, with periodic breathing, and intermittent hypo- and hyperoxemia. Understanding how respiratory control changes after premature birth may lead to fewer and less severe events. The aim of this study was to quantify respiratory pattern instability in preterm infants during their first weeks of life.

**Methods:** As part of a larger study (PreVent, NHLBI U01 HL133708 & HL133700. Dennery et al., Pediatr Res 2019:85(6),769), 55 infants (born 24w1d-28w6d weeks postmenstrual age, PMA) were studied at one or more timepoints (28, 32, 36, 40 and 52 weeks PMA). Respiratory effort (thorax and abdomen bands) and SpO2% were recorded. Airflow was derived from effort bands. Respiratory instability was quantified by a previously described loop gain (LG) model fit to visually identified artefact-free spontaneous sigh breaths during quiet sleep (Edwards et al., SLEEP, 2018:41(11)).

**Results:** In N=1042 sighs, LG varied considerably within and between individuals across the timepoints studied. However, mixed effects modelling revealed a significant trend for increasing LG at each timepoint (R2=.2, p<0.0001, PMA fixed effect, random intercept per infant).

**Discussion:** On average, loop gain increased across the first ~12 weeks of life in very preterm infants. This pattern is dissimilar to that among term infants, where LG peaks between 2 and 4 postnatal weeks. In very preterm infants, understanding the PMA-specific ventilatory control instability and its typical developmental trajectory will better elucidate the challenges in maintaining SpO2%

within target range through better description of expected need for respiratory support.

## O061

### MATERNAL CIRCADIAN DISRUPTION FROM SHIFT WORK AND THE IMPACT ON THE TIMING OF MELATONIN IN THEIR BREAST MILK

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**Introduction:** Infants are not born with a circadian rhythm. Research shows that breast milk clearly exhibits a 24-hour pattern, with melatonin concentrations high during the evening and night but barely detectable in daytime milk. The presence and timing of melatonin in breast milk suggests that this hormone may help provide sleep timing information to infants, thereby supporting the development of their own circadian cycle. Currently, it is not known if disturbances of maternal circadian rhythm, such as shift work, impact the circadian rhythmicity of breastmilk. The aim of this study was to investigate whether maternal circadian disruption, from working night shift has an impact on melatonin timing in breastmilk.

**Methods:** A prospective repeated measures study design was undertaken to compare melatonin levels in breastmilk across shift types (day shift/non-workdays and night shifts). Four 10ml breastmilk samples were collected by participants the same time of the day, across five consecutive days.

Results. A total of 11 mothers completed the study. Analysis is still ongoing but preliminary results show a potential difference in breastmilk melatonin between pre-night shift, night shift and post night shift, indicating a change in the circadian timing of the breastmilk.

**Discussion:** The findings from this study suggest that there is a potential effect from maternal circadian disruption from shift work on breast milk melatonin. This is an important first step in exploring the impact of maternal circadian misalignment disorders on breastmilk hormones and provides preliminary evidence that future research is needed in this area.

## O062

### ADOLESCENTS' MENTAL HEALTH HRAJECTORIES THROUGHOUT THE COVID-19 PANDEMIC AND THE PROTECTIVE ROLE OF HEALTHY SLEEP PATTERNS

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**Introduction:** The COVID-19 pandemic has seen a rise in emotional problems among adolescents. Improving young people's mental health is a public health priority, and examining protective factors throughout the pandemic can offer insights on targets for prevention. This study aimed to investigate longitudinal trajectories of depressive and anxiety symptoms among a large sample of Australian adolescents and to examine sleep patterns in high- and low-risk trajectories.

**Methods:** This study utilises data from the control group of the "Health4Life" cluster RCT. We used three waves of questionnaire data collected annually (from 2019) from Year 7 students at 71 secondary schools across New South Wales, Queensland and Western Australia (N = 2,781, Mage = 12.6, SD = .51; 47% boys and 1.4% 'prefer not to say'). Adolescents reported on their mental health (i.e., depressive and anxiety symptoms) and sleep (i.e., sleepiness, weekday sleep duration, SOL, WASO, and chronotype).

**Results:** We found four trajectories of depressive symptoms: low-stable (64.3%), average-increasing (19.2%), high-decreasing (7.1%), moderate-increasing (9.4%), and three anxiety symptom trajectories: low-stable (74.8%), average-increasing (11.6%), high-decreasing (13.6%). Adolescents in low-risk trajectories were more likely to be boys and to report shorter SOL and WASO, longer sleep duration, less sleepiness, and earlier chronotype. Where mental health waxed and waned, sleep patterns changed in the same direction.

**Discussion:** This is the first study to thoroughly examine adolescents' sleep patterns as a protective factor for the development of emotional problems during the pandemic. Healthy sleep was clearly linked to low-risk trajectories, although this association is likely bi-directional.

## O063

### OBJECTIVE SLEEP QUALITY METRICS UNDERLYING NEXT-DAY SLEEP QUALITY RATINGS IN ADOLESCENTS

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**Introduction:** Good sleep quality is critical for good sleep health, but how sleep quality is defined remains uncertain; most defining it based solely on subjective or objective measures, and more recently, a combination of the two. PSG-derived sleep efficiency and WASO are linked to subjective sleep quality in healthy adults, but whether this is the same in adolescents (an age group notorious for not getting enough sleep), remains unknown.

**Aims:** To investigate which objective measures of sleep correlate with next-day ratings of sleep quality (primary outcome), sleep sufficiency, morning and daytime sleepiness, mood and concentration.

**Methods:** Seventy-one 16-17 y-olds (50% female) without anxiety/depression symptoms, completed a week of actigraphy and daily ratings of the subjective elements described above (469 days analysed). Statistical analyses used generalised estimating equation models.

**Results:** In unadjusted models, sleep quality showed significant within- and between-subject relationships with variables of sleep timing, amount, efficiency and variability. However after adjustment, total sleep time (TST) was the only metric that remained significant; for every 1 h less TST/night, teens were 1.56 (95%CI: 1.29, 1.88) times more likely to rate their sleep quality as poor rather than good. TST also correlated with daily mood ratings, and awakenings with morning sleepiness. No other significant relationships were found.

**Discussion:** The key sleep metric contributing to perceptions of sleep quality in adolescents was in fact one related to sleep quantity. Surprisingly, none of the sleep quality metrics used in sleep

quality guidelines, linked to subjective ratings of sleep quality in this age group.

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## O064

**SCREEN TIME, SLEEP, AND BEHAVIOURAL DEVELOPMENT IN PRESCHOOL CHILDREN: RELATIONSHIPS CAREGIVER RULES AND PERCEPTIONS OF SCREEN TIME**

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Sleep is highly important for children's behaviour (Touchette et al., 2007). However, screen time is associated with poorer sleep (Janssen et al., 2020), and greater behavioural difficulties (Hinkley et al., 2018), but they are rarely investigated together. Caregivers' rules and perceptions about screen time are also associated with children's engagement with screens. Caregivers of preschoolers completed online questionnaires about children's screen time, sleep-related behaviours (Child Sleep-Wake Scale), behaviour (Child Behavior Checklist (CBCL, 1.5-5)), person-social development (Ages and Stages Questionnaire-3 (ASQ-3)), and questions about their rules and perceptions of screen time. Greater screen times predicted lower personal-social scores, and better sleep-related behaviours predicted lower internalising scores. Greater screen times were predicted by caregivers' tendency to disagree about limits on screen time and a greater inclination to think limits cause conflict. Lower child personal-social scores predicted caregivers' tendency to disagree about screen time limits. Greater child externalising behaviours predicted caregivers' belief that screen time helps calm their child and that time limits cause conflicts. Poorer child sleep also predicted caregivers' tendency to think screen time limits cause conflict. Therefore, caregivers' rules and perceptions are associated with children's screen times, but also children's behaviours are associated with caregivers' rules and perceptions about screen time. This is concerning as screen time predicted poorer personal-social behaviours in children. Providing caregivers with alternative ways to manage behaviours and conflicts surrounding time limits could also help in managing children's screen times. This could have long-term implications for healthy sleep, social, and behavioural development in children.

## Sleep in special populations

# O065

### AUTONOMIC DYSREGULATION DURING SLEEP IN PARKINSONIAN SPECTRUM DISORDERS

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**Introduction:** Symptoms associated with autonomic nervous system dysfunction are common to patients with neurodegenerative disorders (NDD) resulting from the accumulation of α-synuclein in the neurons and glial cells. In this study we investigate whether a novel biomarker, the autonomic activation index, can discriminate these potentially affected NDD groups.

**Methods:** After ethics review and with informed consent, patients with Lewy body disease (DLB/PDD: n=20%), Alzheimer's disease dementia (AD: n=27), Parkinson disease (PD: n=14), mild cognitive impairment (MCI: n=37), isolated REM sleep behavior disorder (iRBD: n=15) and a control group (CG: n=58) were studied with the Sleep Profiler. AAI was based on a 6 BPM increase in pulse rate compared to the previous/subsequent 10th second. Between-group comparisons were assessed with Mann-Whitney U and Chi-square tests.

**Results:** The AAI values for the DLB/PDD patients were decreased compared to the AD, MCI (both p<0.03), and CG (p<0.0005), while the PD was less than AD and MCI (both < 0.05) and CG (p<0.002). The proportions of cases with abnormal AAI values (<10 events/h) was greatest in DLB/PDD patients, and greater than in ADem (p<0.02), MCI (p<0.02) and CG (p<0.0001), while AAI in PD and iRBD was greater than in CG (p<0.007 and 0.05 respectively).

**Conclusions:** These findings suggest that the AAI can be used to objectively confirm subjective complaints of autonomic dysfunction symptoms in patients with synucleinopathies. Longitudinal studies are needed determine factors that influence changes in the AAI.

# O066

### THE LIVED EXPERIENCE OF NARCOLEPSY - FROM SYMPTOMS TO STIGMA

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**Introduction:** Narcolepsy is a rare neurological sleep disorder with a substantial adverse impact on health-related quality of life and psychological well-being. Few studies have qualitatively explored how persons with narcolepsy perceive their symptoms and illness experience. Understanding how those with narcolepsy conceptualise and communicate their experience is important if we are to identify/meet their healthcare needs.

**Method:** 127 self-reported persons with narcolepsy were recruited from an Australian support group. Saturation was reached after 24, 1hr semi-structured interviews (mean age=33 (SD11), 44% reporting cataplexy). A multidisciplinary team of researchers/clinicians analysed interview transcripts using thematic analysis.

**Results:** Several key findings include: 1. participants identified fatigue, sleepiness, and two separate experiences of 'falling asleep/sleep attacks' as distinct symptoms often grouped as excessive daytime sleepiness. 2. Participants attributed their own meaning to commonly used medical terminology that differed from the literature (e.g. describing a sleep attack but calling it cataplexy). 3. 'well-managed' narcolepsy was determined by the level of functional impairment rather than symptom frequency. 4. Almost all participants experienced frequent anticipated and internalised- or self-stigma, likely stemming from societal devaluation of sleep and conflation of sleepiness with laziness.

**Conclusion:** Our findings suggest a needed shift in narcolepsy management that focuses on functional impairment, rather than just symptom treatment. They also highlight the need for clarification around common narcolepsy terms, as patients/physicians may use the same terminology to try and communicate different concepts. Having identified the type of stigmas experienced, future research is needed to explore if stigma-reduction reduces psychological comorbidity in narcolepsy.

# O067

### COMPARISON OF SLEEP QUANTITY AND QUALITY DURING WATCHKEEPING SCHEDULES

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Watchkeeping schedules expose workers to sleep and wake opportunities which are not at biologically ideal times, thus impacting sleep quantity and quality. This study investigated the impact of different watchkeeping schedules on sleep. N=29 healthy participants (16F; aged 18-34y) took part in a 10-day laboratory study. Participants were allocated to one of four schedules; 8h-on/8h-off/4h-on/4h-off (day-sleep 09:30-16:00; n=8; Condition A), 6h-on/6h-off (day-sleep 08:30h-12:30, nap 21:30-00:00; n=7; Condition B), and 4h-on/4h-on-call/4h-off/4h-on/8h-off (evening-sleep 18:00-00:30; n=7; Condition C; or night-sleep 01:30h-08:00; n=7; Condition D). Participants had 8h time in bed (TIB) for sleep at baseline and recovery. Every 24h during the schedule, participants received a 6.5h TIB. Sleep was measured using standard polysomnography and scored by a trained sleep technician. Linear mixed models found that Condition D (night sleep) had significantly longer total sleep time (TST) than Condition B (p=.003; split sleep). Participants obtained significantly less TST on Day 2 compared to remaining experimental days (Day 3 to Day 8; p<.05). Sleep onset latency was longer on Day 8, than Days 2 and 3 (p<.01). Time spent in REM sleep was shorter on Days 2 and 3 than any other days (p<.05). There were no differences in sleep stages between conditions, except for TST. The split sleep in Condition B resulted in less sleep. Shorter TST at the beginning of the study may indicate the adjustment period

of the new sleep/wake schedule. These results reveal that there are implications for sleep when sleep periods are reduced during watchkeeping.

## O068

### SLEEP CYCLISTS? NIGHT-TIME RECOVERY OF COMPETITORS IN THE TOUR DE FRANCE AND TOUR DE FRANCE FEMMES

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**Introduction:** The aim of this study was to examine the capacity of professional cyclists to recover between daily race stages while competing in the 2022 editions of the Tour de France and Tour de France Femmes.

**Methods.** The 17 participating cyclists were 8 males from a single team (aged 28.0yr) and 9 females from two separate teams (aged 26.7yr). Throughout the events, the cyclists wore a wrist-worn monitor (WHOOP 4.0) to capture recovery metrics related to sleep (quantity/quality) and autonomic activity (heart rate and heart rate variability). The primary analyses tested for a main effect of 'day type' – i.e., rest, flat, hilly, mountain or time trial for males; and flat, hilly or mountain for females – on the various recovery metrics.

**Results:** During their respective events, males obtained an average of 7.2($\pm$0.1)h sleep each night, with sleep efficiency of 86.4($\pm$1.2)%; and females obtained an average of 7.5($\pm$0.3)h sleep each night, with sleep efficiency of 89.6($\pm$1.2)%. For males, there was a main effect of 'day type' on recovery, such that heart rate variability during sleep was lowest after mountain stages. For females, there was a main effect of 'day type' on recovery, such that the percentage of light sleep in a sleep period (i.e., lower-quality sleep) was highest after mountain stages.

**Discussion:** Some aspects of recovery were compromised in cyclists after the most demanding days of racing, i.e., mountain stages. Overall however, the cyclists obtained a reasonable amount of good-quality sleep while competing in these highly demanding endurance events.

## O069

### LINKS BETWEEN SLEEP OUTCOMES AND LIFESTYLE FACTORS IN YOUNG ADULTS WHO SUSTAINED TRAUMATIC BRAIN INJURY IN CHILDHOOD

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**Objective:** We investigated the relationships between subjective and objective sleep and lifestyle factors (i.e., nap duration, screentime, chronotype, use of tobacco, alcohol, caffeine, and medications) in young adults who sustained traumatic brain injury (TBI) in childhood.

**Methods:** We report cross-sectional data collected at 20 years post-childhood TBI, as part of a prospective study. Participants included 54 young adults with TBI (Mean age, 27.7years) who were

assessed at 20 years postinjury (mild (n = 14), moderate (n = 27), and severe (n = 13) TBI) and 13 healthy controls (Mean age, 26.0 years). The Pittsburgh Sleep Quality Index and actigraphy were used to assess sleep outcomes, and lifestyle factors were assessed with study-designed measures.

**Results:** Results showed that poor subjective sleep quality was significantly associated with evening chronotype (p < 0.001) and tobacco use (p < 0.001), while being a parent (p = 0.038) and alcohol use (p = 0.035) were significantly associated with poorer objective sleep efficiency in the TBI group.

**Discussion:** These preliminary findings highlight interesting associations between poor sleep quality and lifestyle factors in young adults who sustained TBI in childhood, and indicate the need to further explore these relationships in this TBI population to inform on potential avenues for sleep interventions.

## O070

### PREVALENCE OF CENTRAL SLEEP APNOEA IN PEOPLE WITH TETRAPLEGIC SPINAL CORD INJURY: A RETROSPECTIVE ANALYSIS OF RESEARCH AND CLINICAL DATA

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**Study Objectives:** Over 80% of people with tetraplegia have sleep disordered breathing, but whether this is predominantly obstructive or central is unclear. This study aimed to estimate the prevalence of central sleep apnoea (CSA) in tetraplegia and the contributions of central, obstructive and hypopnoea respiratory events to sleep disordered breathing summary indices in tetraplegia.

**Methods:** Research and clinical data from 606 individuals with tetraplegia and full overnight polysomnography were collated. The proportions of different respiratory event types were calculated; overall and for mild, moderate, and severe disease. The prevalence of Predominant CSA (central apnoea index 5 and more central than obstructive apnoeas) and Any CSA (central apnoea index 5) was estimated. Prevalence of sleep-related hypoventilation was estimated in a clinical sub-cohort.

**Results:** Respiratory events were primarily hypopnoeas (71%), followed by obstructive (23%), central (4%) and mixed apnoeas (2%). As severity increased, the relative contribution of hypopnoeas and central apnoeas decreased, while that of obstructive apnoeas increased. The prevalence of Predominant CSA and Any CSA were 4.3% (26/606) and 8.4% (51/606) respectively. Being male, on opiates and having a high tetraplegic spinal cord injury were associated with CSA. Sleep-related hypoventilation was identified in 26% (26/113) of the clinical sub-cohort.

**Conclusions:** This is the largest study to characterize sleep disordered breathing in tetraplegia. It provides strong evidence that obstructive sleep apnoea is the predominant sleep disordered breathing type; 9-18 times more prevalent than CSA. The prevalence of CSA was estimated to be 4-8%, significantly lower than previously reported.

## O071
**MOEMOEĀ: THE DEVELOPMENT OF AN INDIGENOUS SLEEP AND WELL-BEING INTERVENTION IN AOTEAROA WHĀNAU (NEW ZEALAND FAMILIES)**
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**Introduction:** The creation of culturally relevant interventions is essential to improving access and outcomes for Māori. Moemoeā is a Māori-led, tikaka ritual-based, Multiphase Optimisation Strategy (MOST) sleep intervention. This presentation will outline the creation of three pou (components) which aimed to increase connection to Māori language, culture, and well-being as well as sleep.

**Methods:** Māori members of our team co-designed with whānau (families) and experts in mātauraka Māori (knowledge) using kaupapa Māori methods. The team undertook semi-structured interviews with experts and structured interviews with whānau using kaupapa Māori principles of: taonga tuku (passed down knowledge), ako (learning), utu (reciprocity) and aroha ki te takata (respect).

**Results:** Three pou (Rongo time, Uru time, whanau support) were created and are currently being tested in a MOST factorial trial in 500 whānau across Aotearoa. Qualitative feedback to date shows that use of ritual rather than routine works in varied whānau contexts, and that our pou create a better sense of connection to living as Māori. This connection is a significant driver of good outcomes and removes the shame that whānau often experience as research participants in Western projects.

**Discussion:** Whānau who have a strong sense of (honoka) connection felt validated in their use of ritual and mātauraka, while those who were less connected appreciated being able to grow their connection to the Māori world. Use of the western MOST trial design posed challenges as everything is interconnected in Māori culture, but our decolonizing tools and measures were able to overcome much of this.

## Occupational health safety and performance

## O072

### SIMPLE VESTIBULAR-OCCULAR MOTOR ASSESSMENT AS A PREDICTOR OF ALERTNESS STATE AND DRIVING IMPAIRMENT DURING EXTENDED WAKEFULNESS

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**Introduction:** Driver fatigue contributes to 2-16% of road crashes, highlighting the need for improved detection of at-risk drivers. We used a novel and brief test of vestibular ocular motor system (VOMS) assessed via virtual reality goggles to predict alertness state and driving simulator performance during 29hr extended wakefulness.

**Methods:** 49 individuals (Mean±SD Age, 32.6±12.9, 45% Males) undergone 9hr baseline sleep opportunity followed by ~29hrs extended wakefulness with five 60min driving assessments. Cluster analysis, combining steering deviation and number of crashes were used to split participants into groups of either poor vs good driving performance. VOMS assessment was conducted using virtual reality goggles approximately 10mins before and after each drive. Predictive importance of VOMs metrics were ranked using XGBoost machine learning model, which was then utilized to distinguish between poor vs good driving groups. Model performance was evaluated using a 5-fold cross-validation approach using ROC analysis.

**Results:** XGBoost machine learning ranked all 70 VOMS metrics on their importance in predicting driving performance group for each drive. Top 10 metrics from pre-drive VOMS test predicted both daytime driving (tests 1-3, AUC 0.8 [95%CI 0.64-0.93], p<0.001) and night-time driving (tests 4-5, AUC 0.78 [95%CI 0.6-0.95, p<0.001]). Post-driving VOMS assessments also predicted daytime (AUC 0.74 [95%CI 0.53-0.9, p<0.001] and night-time driving (AUC 0.76 [95%CI 0.52-0.94, p<0.001]).

**Conclusion:** VOMS assessment show promise as a short and effective assessment of sleepiness to predict driving failure. Future validation in independent samples, sleep disordered population and in-field on-road testing are needed to confirm these promising findings.

## O073

### THE RELATIONSHIP BETWEEN CIRCADIAN TYPE AND PHYSICAL ACTIVITY ON COGNITIVE PERFORMANCE DURING SIMULATED NIGHTSHIFTS: A RANDOMISED CONTROLLED TRIAL.

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**Introduction:** Physical activity might be a nonphotic strategy which could improve cognitive performance for nightshift workers. Innate characteristics like circadian type may also influence individual performance. Thus, this study explores the relationship between circadian type and physical activity on cognition over consecutive nightshifts.

**Methods:** Thirty-two healthy adults (age M±SD: 24.3±4.6 years; 19 females) participated in a 7-day laboratory study, with 5 nightshifts (2200-0600). Participants were randomised into the Breaking up sitting (BUS; n=19) or Sedentary (SED; n=13) condition. Overnight, BUS participants completed 3-min bouts of light-intensity walking every 30-min, while SED participants remained seated. At 2200, 0000, 0200, 0400 and 0600, participants completed the 10-min Psychomotor Vigilance Task (mean RRT). Participants completed the 11-item revised Circadian Type Inventory (factor 1: rigid/flexible; factor 2: languid/vigorous), resulting in four-subgroups (rigid; n= 12, flexible; n= 11, and languid; n= 11, vigorous; n= 13). Participants may only be one type from either factor (i.e. rigid and vigorous).

**Results:** Linear mixed models showed a significant 3-way interaction between nightshift (1-5), condition (BUS, SED), and circadian type (rigid/flexible) for mean RRT (p=0.03), such that flexible types in the Breaking up sitting condition outperformed Sedentary flexible types and Breaking up sitting rigid types, with performance worse on the first nightshift. There were no significant interactions between nightshift, condition and circadian type (languid/vigorous).

**Discussion:** Breaking up sitting improved performance for flexible types over rigid types. These findings have significant implications for nightshift rostering, suggesting that incorporating breaking up sitting may optimise cognitive performance, and therefore work efficiency.

## O074

### DOES SLEEP DURATION, SHIFT WORK OR SLEEP DISORDER STATUS PREDICT PERCEIVED WORK PERFORMANCE AND QUALITY OF LIFE IN YOUNG ADULTS?

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Young adults are vulnerable to the consequences of disturbed sleep from insufficient sleep, shift work and sleep disorders. The impact of these causes of disturbed sleep on perceived work performance and quality of life (QOL) in young adults is unclear. This study sought to investigate these associations in a community sample of 22-year-old adults. Participants studied (n=565, 53% female) were a subset of the Raine Study. All were employed and provided information on sleep disorders (obstructive sleep apnoea by polysomnography and insomnia and restless legs syndrome symptoms by validated questionnaires), shift work status, habitual sleep duration, QOL (Short Form (SF) 12) and perceived work performance (categorical response: perform better, same or worse than most workers). Multinomial and linear regression models adjusted for sex, comorbidities and work hours were used to examine the associations between disturbed sleep with work performance and QOL, respectively. In total 25% of participants had a sleep disorder, 29% were shift workers, and 31% had insufficient sleep (<6 hours). Presence of a sleep disorder was associated with

poorer perceived work performance (OR, 2.27; 95%CI, 1.3 – 4.1). Sleep disorders were also associated with significantly lower SF-12 mental (β, -4.19; 95%CI, -5.92 to -2.45, p<0.001) and physical (β, -1.56; 95%CI, -2.70 to -0.42, p<0.008) component scores. Shift work and insufficient sleep were not associated with either perceived work performance or QOL. Identifying and treating sleep disorders in young adults may be important given its negative association with perceived work performance and QOL.

## O075
### IMPROVING SLEEP HEALTH IN PARAMEDICS THROUGH AN APP-BASED INTERVENTION: A RANDOMISED WAITLIST CONTROL TRIAL

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**Introduction:** Paramedics engaging in shiftwork arrangements face unique challenges that impact their sleep health, potentially compromising performance and wellbeing. This study investigated whether tailored sleep health advice delivered through the Sleepfit mobile application improved sleep health in paramedics.

**Methods:** We conducted a two-group randomised waitlist-controlled trial. Fifty-eight paramedics were randomised to the intervention group (n = 29) or the waitlist group (n = 29). Intervention group participants trialled Sleepfit for 14 days, during which waitlist control participants continued as usual, before being provided with Sleepfit for 14 days. During the 14-day intervention period, Sleepfit provided tailored sleep health education for shift workers, relaxation exercises, and a sleep diary to track sleep quantity and quality. Measures of sleep health (e.g., ISI, FSS, ESS, SHI) were completed at baseline, 14 days following, and 3-month follow-up. Multiple linear regression models were conducted to test the impact of the intervention on sleep health outcomes.

**Results:** Participants reported an average two-point reduction in both ISI (p = 0.01) and SHI (p = 0.01) scores, as well as a significant improvement in sleep satisfaction (p = 0.01) at post-intervention measurement. All other measures remained unchanged. This may be due to limited intervention impact, insufficient participant numbers, a short intervention period, or a ceiling effect.

**Conclusion:** This study provides preliminary evidence supporting the use of Sleepfit as an intervention in improving measures of sleep health in some shiftworkers. Further investigations, including objective assessments of sleep, are needed to validate these self-report measures in larger cohorts of shiftworkers.

## O076
### CHANGES IN SLEEP AND PERCEIVED HEALTH RISK IN EARLY CAREER PARAMEDICS

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Shift work is associated with increased chronic disease risk and suboptimal health behaviours. However, our understanding of the impact of shift work on health behaviours is impacted by a lack of longitudinal studies that examine health behaviours in shift workers relative to behaviours prior to shift work commencement. To address this limitation, we examined sleep changes and perceived health risk (i.e., individual's perception of risk to their health) in intern paramedics during the first 12 months of shift work.

The current study examined self-report sleep quality and duration in 21 interns (15 Female, 6 Male, aged 23.0 [20.0, 36.0]) from one Australian Ambulance service. Data were collected quarterly for a year (pre-shift work, and then 3, 6, 9 and 12 months post recruitment training).

Linear mixed models, controlling for chronotype and baseline perceived health risk, showed that the first 12 months of shift work were associated with a significant decline in sleep quality (p=0.021) but no change in sleep duration (p=0.76). Linear mixed models also showed that perceived health risk significantly increased (p=0.036). Substantial between-subjects differences were observed, highlighting individual differences in response to shift work onset on sleep and perceived health risk.

This study demonstrates that commencement of shift work is associated with a decline in sleep quality and increase in perceived health risk in early career paramedics. The considerable individual differences observed in this study highlight a need for larger studies with more participants, and a focus on personalised strategies for workers commencing shift work.

## O077
### THE IMPACT OF BREAKING UP SITTING DURING SIMULATED NIGHTSHIFTS ON DRIVING PERFORMANCE DURING THE COMMUTE HOME

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**Introduction:** The commute home from a nightshift is associated with increased accident risk. Driving performance strategies typically occur immediately before or during the commute, such as napping and caffeine. It is unknown whether strategies that target alertness throughout the nightshift could impact the commute home. Breaking up sitting with walking is an effective strategy to improve alertness during dayshifts. This study investigated the impact of breaking up sitting during the nightshift on driving performance post-shift.

**Method:** 41 adults (age M±SD: 24.4±4.6 years; 21 females) participated in a 7-day laboratory study, with 5 nightshifts (2200-0630). Participants were randomly allocated to: Breaking up sitting (BUS; n=21) or Sedentary (SED; n=20). Every 30-min during the nightshift BUS participants completed 3-min bouts of light-intensity walking, while SED participants remained sitting. At 2130 (pre-shift) and 0700 (post-shift) participants completed a 20-min simulated drive and the Karolinska Sleepiness Scale.

**Results:** Linear mixed models revealed a significant interaction between time (pre- or post-shift) and nightshift on driving performance and sleepiness, such that there was increased lane variability (p=0.03), speed variability (p<0.05), and sleepiness (p<0.05) post-shift compared to pre-shift, with performance worse on the first nightshift. There were no significant 2-way or 3-way interactions between condition (BUS or SED), time, or nightshift.

**Discussion:** Breaking up sitting with light-intensity walking did not improve performance for the commute home. However, given that breaking up sitting did not increase risk on the commute home, and it has benefits for cardiovascular health, it is an important strategy to promote to nightshift workers.

## O078

### A COMPARISON OF SUBJECTIVE SLEEPINESS AND SUBJECTIVE DRIVING PERFORMANCE BETWEEN PEOPLE VULNERABLE VERSUS RESISTANT TO DRIVING IMPAIRMENT FOLLOWING EXTENDED WAKEFULNESS.

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**Introduction:** Subjective sleepiness and driving performance are generally associated but show inter-individual variability. Specifically, some people are more vulnerable, while others are more resistant to driving impairment during extended wakefulness. We examined the relationship between subjective sleepiness and driving performance in groups resistant versus vulnerable to driving impairment during extended wakefulness.

**Methods:** Thirty-two adults (female=18, mean age=33.0yrs, SD=14.6) completed five 60-minute driving simulator assessments across 29 hours of extended wakefulness. Perceived sleepiness (Karolinska sleepiness scale, KSS) and driving performance (nine-point Likert scale) were assessed at 10-minute intervals while driving. Through cluster analysis, participants were categorised as vulnerable (n=16) or resistant (n=16) using steering deviation and crash data. Correlations, stepwise regressions, and ROC curves were used to identify predictors of driving impairment.

**Results:** Perceived sleepiness and driving impairment increased across the drives during wakefulness and within drives, regardless of grouping (p<0.001). The exception was the drive at 25-hours into wakefulness, where the vulnerable group showed higher perceived driving impairment within the drive (p=0.001). Pre-drive KSS, total sleep time, age and gender were not significant predictors of crashes at drives undertaken at 1-hour, 7-hours, 13-hours, or 25-hours, but were significant at 19-hours into wakefulness, together explaining 44% of the variance in crashes.

**Discussion:** Self-reports are sensitive to driving impairment but not differential vulnerability to performance decrements during extended wakefulness. However, the findings support that both groups can perceive their sleepiness and ideally employ appropriate countermeasures (e.g., stop driving, nap, caffeine). Future studies should target more objective predictors of vulnerable versus resistant groups.

**Sleep Health**

## O079

### INVESTIGATING HYPERSOMNOLENCE DISORDERS IN SOUTH AUSTRALIA: A RETROSPECTIVE AUDIT OF MULTIPLE SLEEP LATENCY TESTS

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**Introduction:** This study aims to evaluate the characteristics of patients with Narcolepsy Type 1 (NT1), Narcolepsy Type 2 (NT2), and Idiopathic Hypersomnolence (IH) along with diagnostic outcomes in patients referred for a multiple sleep latency test (MSLT) at an Australian hospital.

**Methods:** A retrospective audit was performed of all patients who completed an MSLT between January 2018 to January 2023.

**Results:** 431 participants (62.4% female; mean±SD age $40.2 \pm 16.4$ years; BMI $28.6 \pm 7.4$ kg/m$^2$) who completed MSLTs were included. 95 participants (22%) had a positive MSLT of $\leq 8$ minutes, of which 87% (n=83) had a prior night total sleep time on polysomnography of $> 6$ hours. Gender, age, and BMI did not vary significantly between participants with a mean sleep latency (MSL) $\leq 8$ versus >8 minutes (p=0.9, p>0.9, p=0.1 0, respectively). Participants with an MSL $\leq 8$ minutes had higher Epworth Sleepiness Scale scores $14.6 \pm 5.1$ vs $12.5 \pm 5.0$ (p < 0.001), with more sleep onset REM periods (SOMREPs) $0.82 \pm 1.35$ vs $0.14 \pm 0.49$ compared to those with MSL >8 minutes. Further data collection is in progress, but to date, diagnoses were available for 34 participants with MSL $\leq 8$ minutes (6 NT1, 8 NT2, 8 IH, 12 Other [i.e., shiftwork disorder, sleep restriction, medication-induced]).

**Discussion:** This study seeks to estimate diagnostic frequency and characteristics of patients presenting for evaluation of hypersomnolence. The prevalence of MSL < 8 minutes (22.0%) is consistent with prior studies1,2. Analysis of diagnostic outcomes is pending further data collection in progress.

## O080

### THE ASSOCIATIONS BETWEEN SLEEP ENVIRONMENT FACTORS AND SLEEP HEALTH IN INDIVIDUALS LIVING WITH NEUROLOGICAL CONDITIONS

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**Introduction:** Accumulating evidence indicates that sleep health is worse in individuals living with a neurological condition and may hasten neurodegeneration. The extent to which the sleeping environment, particularly air temperature and light, influence sleep health has not been investigated in individuals living with a neurological condition. This research aimed to explore, for the first time, associations between air temperature and light in the sleeping environment and sleep health in individuals living with a neurological condition.

**Methods:** The sleep health, including the domains of sleep quality, duration, and disorders, of 46 individuals with a neurological condition was measured using the Sleep Health Index. Air temperature and light data were captured across seven days using a light/temperature data logger positioned next to the participant's bed. Data recorded during the participants' sleeping periods (determined using a sleep diary) were analysed. Linear regression models were used to assess the associations between air temperature and light and sleep health (including domains).

**Results:** This study showed that for every additional minute of low (10 to 50 lux) light exposure during sleep periods, sleep quality decreased by 9%.

**Discussion:** Our findings suggest that low light exposure during sleep periods may be detrimental to the sleep quality of individuals with neurological conditions.

## O081

### "MY PARTNER JUST WANTS TO SLEEP": A QUALITATIVE STUDY OF THE EXPERIENCE OF LIVING WITH A PARTNER WITH NARCOLEPSY OR IDIOPATHIC HYPERSOMNIA.

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**Introduction:** Narcolepsy and Idiopathic Hypersomnia (IH) are chronic sleep disorders that negatively impact sufferers' Health-Related Quality of Life (HRQoL) across physical, emotional, and social functioning. Narcolepsy and IH may also impact the HRQoL of those close to the patient (i.e., partners, parents). This project explored the experiences of partners of people with Narcolepsy or IH, including how living with someone with the diagnoses had impacted their own HRQoL.

**Methods:** In this qualitative study, a semi-structured interview was used to collect data from 8 partners of people with Narcolepsy T1, Narcolepsy T2 and IH. The data were analyzed using Reflexive Thematic Analysis to find common themes emerging from the participants' narratives.

**Results:** Five themes (and 2 sub-themes) were identified: 1) changes in dyadic identity; 2) negative impact on intimacy; 3) loneliness; 4) sacrifices to maintain the relationship, and 5) dissatisfaction at the lack of knowledge and information among (a) the general public, and (b) health professionals.

**Conclusions:** This novel, exploratory study identified several themes of social and emotional functioning most impacted by a partner's sleep disorder diagnosis; themes which correspond with the areas shown to be negatively affected in patients. Psychosocial interventions for Narcolepsy and IH should include patients' partners to reduce the impact of the diagnoses on the family system, and improve overall HRQoL.

## O082
### A SURVEY TO EXPLORE THE KNOWLEDGE AND EDUCATION NEEDS OF PERINATAL HEALTH PROFESSIONALS TO SUPPORT THE PROVISION OF INCLUSIVE CARE TO TRANSGENDER PEOPLE IN AOTEAROA NEW ZEALAND

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**Background:** International literature shows that transgender teens and young adults are more likely to report insomnia compared to cis-gendered individuals of the same age – often linked with discrimination or minority stress. Trans people often encounter health providers with limited knowledge of gender diversity.

**Objective:** to understand the education needs, knowledge, and attitudes of the perinatal health workforce in New Zealand when providing care for trans people.

**Methods:** Interviews with trans people who had engaged with perinatal services, informed the development of a workforce survey, alongside extensive consultation with Māori, health professionals and trans community groups. The survey was shared with perinatal care providers via their professional organisations and social media. It included questions about strategies utilised in their clinical practice towards trans inclusion, previous education opportunities and current needs, as well as attitudes towards gender diversity.

**Results:** Survey participants (n=476) reported using multiple strategies when providing inclusive practice for trans people. Gaps in knowledge to support inclusive practice were identified, along with support needs to ensure perinatal care providers are resourced to provide culturally safe and affirming care for trans people and whānau/families. Most respondents had not received education on gender-inclusive care but three quarters of them reported they would access this if available.

**Conclusions:** Survey results identified strategies for inclusive care as well as knowledge gaps, in relation to meeting trans people's perinatal care needs. Findings led to recommendations for education, practice and policy which could readily apply to those supporting trans people to improve their sleep health.

## O083
### MYOPIC, OR SHORT-SIGHTED, CHILDREN SHOW DELAYED MELATONIN CIRCADIAN TIMING, LOWER MELATONIN OUTPUT AND SLEEP DISRUPTIONS

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**Introduction:** Recent studies have reported poor and reduced sleep in myopic, or short-sighted, individuals. Here, we investigated differences in melatonin secretion timing and output and actigraphy-derived sleep in myopic and non-myopic (or emmetropic) children, aged 8-15 years.

**Methods:** 26 myopes [refractive error (mean ± standard error mean) -2.06 ± 0.23 dioptres] and 19 emmetropes (-0.06 ± 0.04 dioptres), aged 11.74 ± 2.31 years were recruited. Melatonin timing was assessed using salivary dim light melatonin onset (DLMO), collected half-hourly for 7 hours in a sleep laboratory, beginning 5 hours before and finishing 2 hours after habitual bedtime for the past week. Total melatonin production was assessed via aMT6s levels from urine voids collected from 05:30 pm and until 08:00 am the following morning. Actigraphy-derived sleep was acquired for one week prior to the sleep laboratory visit.

**Results:** Myopic children (21:07 ± 0.2 hrs) had a DLMO time 1.1 hrs later compared to emmetropes (19:59 ± 0.2 hrs), p=0.002. aMT6s melatonin levels were significantly lower among myopes (18.70 ± 2.38) than emmetropes (32.35 ± 6.93, p=0.001). Myopes also exhibited significantly delayed sleep onset (21:42 ± 0.2 vs 23:00 ± 0.2 hrs), delayed wake-up time (06:38 ± 0.2 vs 07:29 ± 0.1 hrs), shorter sleep duration (8.1 ± 0.2 vs 7.6 ± 0.1 hrs), and more evening-type diurnal preference than emmetropes (all p<0.05).

**Discussion:** These findings suggest a potential association between circadian rhythm dysfunction and myopia in children, supporting towards a shared mechanism of myopia and delayed sleep-wake phased disorder development during adolescence.

## O084
### Abstract Withdrawn

## O085
### "IT'S SATISFYING BUT DESTRUCTIVE": A MIXED METHODS APPROACH TO UNDERSTANDING THE IMPACT OF BEDTIME PROCRASTINATION AND PRE-SLEEP SCREEN TIME ON SLEEP IN IN NEW CAREER STARTERS.

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**Introduction:** Bedtime procrastination, the volitional delay of going to bed, is linked to multiple indicators of inadequate sleep. Intervening to reduce bedtime procrastination may be an avenue to improve sleep outcomes, yet the phenomenon remains poorly understood in populations at-risk for bedtime procrastination. New career starters, those who are transitioning from tertiary education to full-time employment, may be susceptible to problematic bedtime procrastination and are at an opportune time for a 'fresh start' to change behaviour.

**Methods and results:** Two studies were conducted: (1) a qualitative approach to understand how bedtime procrastination is experienced by new career starters, identify barriers to behaviour change and explore themes for future interventions; and (2) a 7-day repeated-measures design to test generalisability of findings. In Study 1, data were collected through in-depth semi-structured interviews (n = 28). Inductive thematic analyses were used to find seven themes: negative feelings before and during bedtime procrastination; wanting to vs. knowing I shouldn't; difficulty falling asleep; influence of automatic processes; consequences of bedtime procrastination; lack of self-control and

technology captures late-night attention. Participants emphasised the need for me-time, self-negotiation to continue procrastinating and knowledge of the value of sleep. Study 2 aimed to quantify the relationship amongst bedtime procrastination, habit and motivation on daily pre-sleep screen use and sleep outcomes. Data collection and analyses are ongoing, preliminary findings suggest that bedtime procrastination involves both reflective and automatic cognitive processes.

**Conclusion:** Future interventions would benefit from a dual-process approach, using cognitive and behavioural techniques to reduce bedtime procrastination.

## POSTER DISCUSSION PRESENTATIONS

### Paediatric

### O001

**REMOTE MONITORING PAEDIATRIC NON-INVASIVE VENTILATION ADHERENCE: UTILISING AIRVIEW TO SUPPORT PAEDIATRIC PATIENTS AND CLINICIANS**

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**Aim:** To determine if starting a remote non-invasive ventilation service improves adherence and process efficiency.

**Method:** Three time points were considered for comparison of the service for patients on NIV initiation:- pre-covid-19 (N-9,2019), during covid-19 (N=9,2021) and post-Airview implementation (N=7,2023). A comparison of the time from NIV initiation to first download, download adherence, percentage of patients from rural/remote areas, number and type of download. Anova test was used for statistical significance.

**Results:** Pre and post covid had longer time to download with mean 53 (std 49) and 63 days (std 51), respectively, compared to Airview downloads 21.5 days (std 8), though not significant. 44% of the pre-covid group had mean adherence >= 6hours by first download, 12.5% in covid group and 50% in Airview group. The percentage of the group in rural/remote were 40% (pre-covid), 55.5% (covid) and 50% (Airview). None of the pre-covid or Airview group sent data by post, only 55% of the covid group. For non-adherent patients within the first three months of use, the Airview group had median 2.5 downloads post first download, with the other groups only achieving median of one.

**Discussion:** The covid group of patients had the lowest adherence, possibly due to telehealth and lack of download data as the mean time to download was the longest. Implementing a remote NIV download service with Airview showed significant improvements in availability of adherence data earlier and identify patients with low adherence. Supporting patients with low adherence remains a priority for patients and clinicians.

### P002

**POSITIVE AIRWAY PRESSURE ADHERENCE IN CHILDREN WITH SLEEP APNEA MAY BE SIMILAR TO ADULTS**

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**Introduction:** Most pediatric patients with obstructive sleep apnea (OSA) are known to be treated with adenotonsillectomy (AT). However, in some of them, positive airway pressure (PAP) can be used for underlying diseases or in case of AT failure. Thus, PAP adherence and compliance were compared in pediatric OSA to adult OSA.

**Methods:** A retrospective study was conducted on 17 children and 167 adults who had performed polysomnography (PSG) and were prescribed PAP and followed up for more than 3 months from July 2018 to January 2023. Adherence was defined as the percentage of patients continuing to use PAP after prescription and compliance was defined as an average of more than 4 hours per night usage of 70% of the monitoring days.

**Results:** There were 11 males (64.7%) in pediatric and 141 males (84.4%) in adult patients. The mean age was 8.0 years (6.50-12.50) in pediatric and 50.0 years (41.00-58.00) in adult patients. The mean apnea hypopnea index (AHI) (37.0 vs 50.7) and Lowest O2 saturation (79.4% vs 75.5%) did not show any differences in the 2 groups. Longest apnea showed considerable differences (25.9 sec vs 50.8 sec) (p=0.000). After 18 months of PAP usage, AHI dropped from 37.0 to 5.1 vs 50.7 to 2.6, adherence decreased from 94.1% to 41.2% vs 90.4% to 38.9% (p=0.944), compliance reduced from 64.7% to 28.9% vs 67.0% vs 29.3% (p=0.268) in pediatric and adults groups.

**Conclusions:** There were no significant differences in adherence and compliance with PAP in children compared to adults.

### P003

**HOME-BASED SLEEP STUDY PAEDIATRIC MODEL OF CARE**

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**Introduction:** An innovative service that was developed within a tertiary paediatric centre, involved the use of a home-based sleep study model of care (MOC) between March 2022 to September 2022. This MOC allowed low risk children to be able to undergo a sleep study earlier than, when compared to the traditional in-house sleep studies conducted within the hospital setting.

**Methods:** The MOC involved a sleep technician travelling to the patients' home and then attaching sensors onto the child's body. The at home sleep system used is a full, portable polysomnography system that gently simplifies the task of performing a sleep study while delivery secure and precise measurements from the comfort of the patient's home. The system provides data collection via the use of electrocardiogram (ECG), electroencephalography (EEG), oximeter, plethsmography belts and facial electroculargraphs which are attached comfortably onto the patient's body.

An outpatient's service run by Clinical Nurse Consultants then provided 24 hour support to families for troubleshooting overnight.

**Results:** A total of 49 home based sleep studies were performed during this period. Almost 90% of children tested had an abnormal sleep study result and 1 in 3 had moderate to severe findings. Eight studies (19%) were below the expected quality. This is comparable to in-hospital poor quality sleep study rates.

**Discussion:** The MOC reduced hospital admission for a diagnostic sleep study, provided quicker assessment and in the comfort of the child's home.

### P004

**Abstract Withdrawn**

### P005

**DECOLONIZING MEASURES OF SLEEP AND WELLBEING TO ASSESS THE OUTCOMES OF A MĀORI-LED SLEEP INTERVENTION IN AOTEAROA WHĀNAU (NEW ZEALAND FAMILIES).**

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**Introduction:** The creation of culturally relevant questionnaires is an important step towards decolonizing research methodologies to

ensure that they are appropriate for use in diverse populations. Our team aimed to develop and test a new questionnaire about sleep, wellbeing and whānau connection for use in Aotearoa whānau with 0-2 year old infants.

**Methods:** Our ethnically diverse research team co-designed with relevant communities a new 56-item questionnaire. Some items were adapted from existing questionnaires, with others newly developed through a Māori worldview. The new questionnaire was disseminated online for testing by caregivers of 0-2 year old children. Quantitative and qualitative findings about, and associations between three dimensions of children's sleep health and caregiver and whānau wellbeing and connection, were examined to determine their acceptability as key outcome measurements for an upcoming trial.

**Results:** 957 caregivers completed the new questionnaire. Small, yet consistent positive associations were observed between children's sleep quality, and caregivers' perceptions of children's sleep, and caregiver wellbeing, whānau wellbeing, and connection. Conversely, children's nocturnal sleep duration was not related to caregiver or whānau wellbeing or connection. Only 14% of caregivers found questions about their perception of their children's sleep difficult to answer. Qualitative feedback indicated that questions about wellbeing and connection were culturally relevant and acceptable to diverse whānau.

**Discussion:** Caregiver perception of children's sleep, children's sleep quality, caregiver wellbeing, whānau wellbeing and connection can be measured in a culturally relevant manner when a collaborative team work together to create, and consciously decolonize, new and existing questionnaire items.

## P006
### THE IMPACT OF GROWTH HORMONE TREATMENT ON CARDIOVASCULAR CONTROL IN CHILDREN WITH PRADER-WILLI SYNDROME

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**Background:** Many children with Prader-Willi syndrome (PWS) are treated with growth hormone (GH), which may increase the risk of obstructive sleep apnoea. Children with PWS also have impaired cardiac autonomic control due to reduced parasympathetic activity, which may increase cardiovascular risk, however the impact of GH on autonomic control is yet to be elucidated.

**Methods:** Pre- and post-GH polysomnographic data in 38 children (aged 0-18 years) were retrospectively collected. Spectral analysis of heart rate variability (HRV) was used to determine total, low frequency (LF, sympathetic and parasympathetic activity), high frequency (HF, parasympathetic activity) power and LF/HF (sympathovagal balance). Data were compared with Wilcoxon Signed Rank Test and Spearman Rank Order Correlation analysis and are presented as median [interquartile range].

**Results:** HRV data were significantly correlated with age so children were grouped into those <2 years (n=22) and >2 years (n=16). There were no significant differences in the obstructive or central apnoea-hypopnoea indexes between pre- and post-GH studies in either group. In children <2 years, there were no significant differences in total power, LF, HF and LF/HF between studies. In children >2 years, total power (1912.2 ms2, [920.2, 4916.1] vs 1010.2 ms2 [416.0, 2828.7), LF (434.0 ms2 [247.0, 1340.7] vs 278.9 ms2 [83.4, 676.0]) and HF (986.0 ms2 [321.8, 2400.6] vs 414.4 ms2 [146.2, 1152.7]) were lower (p< 0.01 for all) post-GH.

**Conclusions:** Our results demonstrate that GH decreases both sympathetic and parasympathetic activity during sleep in children >2 years, which could further increase cardiovascular risk.

## P007
**NOT PUBLISHED**

## P008
### PILOT AND FEASIBILITY OF BRIGHT LIGHT THERAPY IN IMPROVING SLEEP AND QUALITY OF LIFE IN CHILDREN WITH ACUTE LYMPHOBLASTIC LEUKAEMIA

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**Introduction:** Bright light therapy (BLT) improves sleep and quality of life (QOL) in adults with cancer and adolescents with mood disorders. Children with acute lymphoblastic leukaemia (ALL) are vulnerable to poor sleep, related to their new cancer diagnosis and impaired sleep-wake cycles from dexamethasone treatment. To date no studies have investigated the feasibility and utility of BLT to improve sleep, daytime functioning and QOL in this population.

**Methods:** The intervention group (N=7) underwent BLT for 30 minutes each morning during dexamethasone treatment. Actigraphy and psychometric questionnaires measured at baseline, at the end of dexamethasone treatment and at six months post treatment, in addition to actigraphy following three dexamethasone treatments, were compared between the intervention and non-intervention groups (N=5). Feasibility measures included study acceptance, retention and limited efficacy testing.

**Results:** The Moods and Feelings questionnaire and both the child and parent reported PedsQL Multidimensional Fatigue Scale had the lowest completion rates both at the end of treatment or at follow up for BLT (57-67%) and in the non-intervention group (50-60%). Negligible differences were observed in sleep outcomes during dexamethasone treatment between the two groups. The largest effect sizes of BLT were seen for total sleep time, sleep efficiency and wake after sleep onset at the end of dexamethasone treatment and at follow up.

**Discussion:** This study demonstrates limited preliminary feasibility of BLT in children with ALL during dexamethasone treatment. A

successful future trial should consider modifications to the data collection periods and the type of questionnaires.

## P009
### TIME SPENT WITH SPO2 BELOW 90% DURING SLEEP IS GREATER IN CHILDREN WITH DOWN SYNDROME AND OSA THAN IN TYPICALLY DEVELOPING CHILDREN

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**Background:** Children with Down syndrome (DS) have a higher predisposition to obstructive sleep apnoea (OSA) compared to typically developing (TD) children. Children with DS have more frequent dips <90% compared with TD children matched for age, sex and OSA severity. Intermittent hypoxia with repeated desaturations and resaturations is associated with cognitive impairment in children. New methods which calculate the time spent with SpO2 <90% have identified an association with cardiac dysfunction in adults with OSA. We aimed to determine if children with DS and OSA spent longer with SpO2 <90% during sleep compared with TD children.

**Methods:** 44 children with DS (3-19 y) and age, sex and OSA severity matched TD children underwent overnight polysomnography. Time spent with SpO2 <90% as a percentage of total sleep time (%TST) was calculated. SpO2 nadir when <90% was recorded.

**Results:** SpO2 fell <90% in 32 (73%) children with DS and 15 (34%) TD children. The %TST spent with SpO2 <90% was higher in the DS group (median [IQR] 0.029% [0.004, 0.114]) compared with the TD group (0.000% [0.000, 0.020]; p<0.001). There was no difference in SpO2 nadir between the groups (DS mean±sem 84%±1.1%; TD 85%±1.1) when the SpO2 fell <90%.

**Conclusion:** Twice as many children with DS experienced periods of oxygen desaturation below 90% as did TD children matched for age, sex and OSA severity. Although as a %TST, the time spent <90% was small, different physiologically-based metrics to characterise OSA severity and the consequences of recurrent hypoxia in children may be merited.

## P010
### DELIVERY OF VOLUME ASSURED PRESSURE SUPPORT (VAPS) THROUGH TRACHEOSTOMY IN PAEDIATRIC PATIENTS

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**INTRODUCTION:** Volume assured pressure support (VAPS) allows the ventilator to deliver a constant pre-set tidal volume or alveolar ventilation by automatically adjusting the inspiratory pressures within a set range, providing targeted pressure support. Data on its use in children are limited. We describe a series of four children effectively and safely ventilated using VAPS mode through tracheostomy.

**METHODS:** Retrospective review of patient notes.

**PROGRESS TO DATE:** Four paediatric patients were identified in our cohort who were successfully and safely ventilated using the VAPS mode through tracheostomy. The patients were between 6-14 years of age inclusive, with four differing underlying disease processes – Prader-Willi syndrome, congenital central hypoventilation syndrome, Guillain-Barré syndrome and Moebius-type syndrome. **INTENDED OUTCOME AND IMPACT:** Whilst there have been previous paediatric case reports and case series which have demonstrated efficacy of VAPS mode used non-invasively, the use of VAPS mode to provide effective and safe ventilation through tracheostomy in children has been described in only one recent case series. The advantages of its use over conventional bilevel positive airway pressure support include its ability to compensate for changes in tidal volume, which can occur with changes in lung compliance and during different stages of sleep. This case series highlights safe and effective use of VAPS mode in children with tracheostomy.

**Sleep Health**

## P011
### HOW SEX AND AGE MODERATE THE EFFECT OF SLEEP LOSS ON PAIN PERCEPTION: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Females tend to exhibit increased sensitivity to pain and are more susceptible to developing chronic pain conditions. Sleep disturbances are comorbid with chronic pain and exacerbate pain symptoms. Sleep disturbances have been found to affect pain perception distinctly, but whether these effects are consistent in men and women is unclear. This systematic review investigated how sex and age moderate the sleep-pain interaction under various forms of sleep disturbances. We searched EBSCO, MEDLINE, Psych INFO, Science Direct, and Web of Science from January 2001 to November 2022. A total of 38 studies with 978 participants were included in the review. The meta-regression was conducted based on the predicted value of effect size and its estimated standard error at a significance level of 0.05. The results showed that sex moderated the effect of sleep disturbance on pain facilitation (SMD=.13; 95%CI:.004 to .022; p=.009) and pain inhibition (SMD=.033; 95%CI:.011 to .054; p=.005). Females exhibited increased pain facilitation and decreased pain inhibition, whereas males showed the opposite direction of effect. Further, age moderated the effects of total sleep deprivation (SMD=-.194; 95%CI -.328 to -.060; p=.008) on pain sensitivity and fragmented sleep (SMD=-.110; 95%CI: -.148 to -.072; p<.001) on pain threshold. Although the moderating effects of sex and age on the sleep-pain interaction were relatively small, these findings highlight the importance of considering these factors in future sleep-pain studies.

## P012
### HEAD POSITION DURING SLEEP: POTENTIAL IMPLICATIONS FOR PATIENTS WITH NEURODEGENERATIVE DISORDERS

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**Introduction:** In 2015, Lee et al. observed sleeping position influenced the efficiency of glymphatic clearance in rats. In 2018, Levendowski et al. reported supine sleep was independently associated with neurodegenerative disorders (NDD)(odds ratio=3.7). This update further evaluates the comparative frequency of the supine sleep position across a spectrum of cognitive impairment, including patients diagnosed with a Parkinsonian spectrum disorder (PSD), Alzheimer's disease dementia (AD) and mild cognitive impairment (MCI), compared with a control group (CG) of patients without a known cognitive disorder.

**Methods:** After ethics review and with informed consent, a control group (CG: n=170), PSD (n=36), AD (n=29) and MCI group (n=41) were studied in-home with the Sleep Profiler; 89% across two-nights. Between-group comparisons were assessed with Mann-Whitney U and Chi-square tests.

**Results:** The hours of supine sleep were greater in PSD=3.0 + 1.9, AD=3.2 + 2.0 and MCI=3.0 + 2.0 vs. CG=1.9 + 1.8 (all p<0.002). The proportion of patients with >2 hours of supine sleep were PSD=69%, AD=69% and MCI=59% vs. CG=39%, with odds ratios of PSD=3.6, AD=3.5 and MCI=2.2 (all p<0.001).

**Conclusions:** Here we provide further evidence for a relatively strong association between supine sleep and neurodegenerative disease including PSD, AD and MCI cohorts. The nature of this association remains unclear from cross sectional study designs. Future prospective studies should test if there is a causal link between supine sleep and subsequent development of neurodegeneration.

## P013
### THE EFFECT OF NOISE EXPOSURE DURING SLEEP ON THE CORTISOL AWAKENING RESPONSE

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**Introduction:** Environmental noise could negatively impact the sleep and well-being of nearby residents. This study tested for overnight noise exposure effects on the cortisol awakening response (CAR), a potential marker of noise-related stress responses, and for differences in CAR and hair cortisol between different prior noise exposure groups.

**Methods:** A randomised controlled laboratory trial was conducted in 68 individuals from four groups; including WFN-exposed residents n=14 with and n=18 without WFN-related complaints, n=18 quiet rural control and n=18 urban traffic-noise exposed residents. Across six nights, after an initial adaptation night, participants were exposed in random order to different noise conditions, which included intermittent WFN and road traffic noise (RTN), WFN at average exposure levels throughout wake, sleep or both and a quiet control night. Salivary CAR responses were evaluated from 5 serial saliva samples collected following awakening. Hair cortisol levels were also collected. Mixed effects models were used to examine group and night effects on CAR and group effects on hair cortisol.

**Results:** There was a significant main effect of condition on CAR (p=0.038), but no significant pairwise differences between the control night and noise exposure nights, and no further differences between nights or groups on CAR or hair cortisol concentrations.

**Conclusions:** Acute in-laboratory noise-related sleep disturbance at the levels used in this study do not appear to alter acute cortisol awakening responses. A better understanding of chronic noise exposure effects and stress responses is important to help clarify and mitigate potential environmental noise exposure effects on nearby residents.

## P014
### GO TO BED! A SYSTEMATIC REVIEW AND META-ANALYSIS OF BEDTIME PROCRASTINATION CORRELATES AND SLEEP OUTCOMES

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**Introduction:** Bedtime procrastination is defined as the volitional delay of going to bed, without any external circumstances causing the delay, and is associated with inadequate sleep. Alleviating bedtime procrastination may be an important target for interventions promoting adequate sleep, yet the correlates of bedtime procrastination are poorly understood. This study examined (1) correlates of bedtime procrastination, and (2) strength and direction of the association between bedtime procrastination and sleep outcomes.

**Methods:** Six databases (CINAHL, EMBASE, PsychINFO, PubMed, Scopus, Web of Science) were searched from inception to September 2021 against pre-determined eligibility criteria.

**Results:** Forty-three studies were included (GRADE = low). Meta-analysis revealed that bedtime procrastination had a moderate negative association with self-control ($z = -0.39$; CI: -0.45, -0.29) and a moderate positive association with evening chronotype ($z = 0.43$; CI: 0.32, 0.48). Furthermore, bedtime procrastination was moderately negatively associated with sleep duration ($z = -0.31$; CI: -0.37, -0.24), sleep quality ($z = -0.35$; CI: -0.42, -0.27) and moderately positively associated with daytime fatigue ($z = 0.32$; CI: 0.25, 0.38).

**Conclusion:** Further high-quality studies are needed to identify causal relationships between bedtime procrastination and correlates, as well as bedtime procrastination and sleep. Future work will guide the development of interventions targeting bedtime procrastination for improved sleep outcomes.

## P015
### DREAMS, NIGHTMARES AND THE RELATIONSHIP WITH DEATH ANXIETY AND SPIRITUAL PRACTICES

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**Introduction:** Dreams that evoke intense negative emotions and anxiety, called nightmares, are often linked to mental health conditions like trauma, anxiety disorders, and death anxiety. Historically, people turned to religious and spiritual practices to address anxieties about death, but there has been a decline in such practices in recent years. This study presents preliminary data investigating the relationship between dreams, nightmares, religious/spiritual practice, and death anxiety.

**Methods:** Participants >18 years completed a 20-minute survey via REDCap. The survey collected demographic data and validated questionnaires investigating dreams, nightmares, sleep, insomnia symptoms, religious/spiritual practice, mental health, and death anxiety.

**Results:** Preliminary data shows that 67% of the sample were married or in a de facto relationship, consisted of primarily female participants (66%), and only 11% had a diagnosed sleep disorder. 56% had a high engagement in the distinct forms of spiritual/religious practice; this was more evident in females (59% vs 48%). The most common dream for males and females was being chased or pursued. 19% of the sample have a potential nightmare disorder, consistent between the sexes. 25% of people have poor sleep quality (PSQI $\geq$5); this was more prevalent in males (43% vs 22%). 16% of people had clinical insomnia, which was consistent between the sexes. Finally, 16% of people have clinical death anxiety, with a higher prevalence in females (18% vs 10%).

**Discussion:** This study's data will help us understand how dreams and spirituality can help alleviate death anxiety, offering new insights for mental health interventions.

## P016
### EFFECTS OF AEROBIC EXERCISE VERSUS INSPIRATORY MUSCLE TRAINING ON APNEA-HYPOPNEA INDEX IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

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**Introduction:** There is some evidence indicating that exercise, such as aerobic training (AT) and inspiratory muscle training (IMT), improves Obstructive Sleep Apnea (OSA) symptoms. Nonetheless, no study compares the types of exercise in OSA patients.

**Objective:** To compare the effects of type of exercise on Apnea-Hypopnea Index (AHI) and respiratory muscle strength in OSA patients

**Methods:** Twenty-nine non-obese OSA patients aged 20-50 years with mild to moderate severity (Apnea-hypopnea index 5-30 events/hour) were randomized to the AT group (n=9), the IMT group (n=10) or the control (CON) group (n=10). Participants in the AT group received 60 minutes per day, 3 times per week, for 12 weeks. For the IMT group, participants received the Powerbreathe ® device for practicing 8 cycles of 30 breaths per day, 5 times per week, for 12 weeks. Participants in the CON group did not receive any intervention. Their AHI and respiratory muscle strength were analyzed during the pre- and post-tests. Dependent variables were compared between pre- and post-tests via paired t-test, and independent variables were compared between the groups using one-way analysis of variance (ANOVA). Differences were considered significant at $p<0.05$.

**Results:** AHI, maximal inspiratory pressure (MIP), and maximal expiratory pressure (MEP) changed significantly in the AT group and IMT group after 12 weeks of training. Therefore, AHI, MIP, and MEP in the AT group and the IMT group improved significantly compared to the CON group.

**Conclusions:** Aerobic training and inspiratory muscle training improve the apnea-hypopnea index and respiratory muscle strength in OSA patients.

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## P017
### THE SLEEP AND SLEEP ENVIRONMENT OF SHIFT WORKERS IN EXTRACTIVE INDUSTRIES: METHODOLOGY TO ASSESS THE ON-SITE AND AT-HOME SLEEP ENVIRONMENT

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Shift work in extractive industries, such as mining, oil and gas, harvesting, and quarrying industries, often involves long working hours, shifts scheduled opposite the biological rhythm, and a variety of roster designs. Initial studies indicate that shift workers in extractive industries experience poor sleep, including short sleep duration and poor sleep quality. Sleep loss may result in fatigue, increasing the risk of accidents and productivity loss. The sleep environment may be a crucial factor impacting sleep, therefore, warranting investigation and potential optimisation.

This study aims to 1) characterise the sleep environment of shift workers in extractive industries, and 2) determine sleep environment factors that negatively affect the sleep of shift workers in extractive industries. This study consists of a self-report and an objective assessment of sleep environment and sleep, utilising a large sample and a subsample, respectively. This study applies survey instruments, wearables, and data loggers to obtain data on sleep quantity and quality, and sleep environment, including light and temperature. Generalised linear modelling will be applied to examine the relationships between sleep environment factors and sleep metrics. Various covariates, known to influence sleep, will be included in the statistical models.

The results from this study will contribute to the understanding of the impact of the on-site and at-home sleep environments on the sleep of shift workers in extractive industries. Furthermore, the results will inform strategies for the development and improvement of on-site accommodation and at-home sleep environment.

Abstract citation ID: zpad035.103

## P018
### THE RELATIONSHIPS BETWEEN MULTIDIMENSIONAL SLEEP HEALTH AND WORK PRODUCTIVITY IN INDIVIDUALS WITH NEUROLOGICAL CONDITIONS

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Numerous studies have reported the negative impacts of poor sleep on work productivity in the general population. However, despite the known sleep issues individuals living with neurological conditions experience, no study has explored its impact on their work productivity. Sleep health is a concept that includes multiple domains of sleep, measured with a combination of objective and subjective measures. Therefore, this study aimed to ascertain the associations between sleep health and its domains and work productivity in individuals with neurological conditions. Sleep health domains were determined through actigraphy data collected over one week and sleep questionnaires. Work productivity was assessed via the Work Productivity and Activity Impairment Questionnaire. A comparison of sleep health scores between demographic variables was performed using Mann-Whitney U and Kruskal Wallis Tests. Associations between the sleep health domains and work productivity were performed using linear regression models. There were no significant differences in sleep health scores between sex, smoking status, education level, employment status or any work productivity domain. Individuals with extreme sleep timing had greater absenteeism (22.99%) than the non-extreme group. Individuals with extreme sleep quality had an increase in presenteeism (30.85%), work productivity loss (26.44%) and activity impairment (25.81%) compared to those in the non-extreme group. The findings from this study highlight that self-reported sleep quality has the largest impact on work productivity. Improving individuals' sleep quality through triage for potential sleep disorders or improving their sleep hygiene (sleep behaviour and environment) may positively impact work productivity.

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## P019
### SLEEP AND CIRCADIAN INTERVENTIONS FOR MENTAL HEALTH AND MOOD IN ATHLETES

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**Introduction:** There are only a small number of evidence-based interventions that address sleep and circadian rhythms in athletes despite it being well-recognized that sleep has a bidirectional relationship with mental health conditions, wellbeing, mood disorders and may be protective against concussions and injury risk. Athletes, both during and after their career, face unique stressors that, if not well managed and mitigated, could become a source of mental health issues. The aim of this review was to discuss the current evidence on sleep and circadian interventions to improve mental health and mood in athletes.

**Methods:** The following databases—PubMed, Scopus, EMBASE, SPORTDiscus, and Google Scholar—were searched for initial studies of interest from inception to July 2023.

**Results:** Very few sleep and circadian strategies have been implemented in sporting environments to improve the mental health and mood of athletes. The interventions that have been investigated are constrained by limited sample sizes, lack of female representation, low quality study design and inconsistent measurement of mental health and mood, making it difficult to draw definitive conclusions of the efficacy of these strategies. Overall, the evidence base for the effectiveness of the interventions was limited.

**Discussion:** There remains a need for larger, adequately powered interventions that are individually tailored, with considerations for the specific challenges of athletes at different levels of professionalism, season time and in particular sporting contexts.

## P020

**EXPLORING THE ROLES OF INDIVIDUAL RAPID EYE MOVEMENT SLEEP PARAMETERS IN EMOTIONAL MEMORY PROCESSING**

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**Background:** Maladaptive emotional memory processing is thought to underpin intrusion symptoms experienced by individuals with post-traumatic stress disorder (PTSD). Curtailment of rapid eye movement sleep (REMS) impairs emotional memory consolidation (EMC) and is proposed to contribute to the development of PTSD. However, the effects of altered REMS quality remain less explored. The present study aims to investigate the potential ability of REM percentage, REM latency, and REMS fragmentation to predict EMC.

**Methods:** The study forms part of a larger study investigating the effects of suvorexant and temazepam on REMS and EMC. Healthy participants view a series of emotionally positive, negative and neutral images, undergo overnight polysomnography with a study drug or placebo, and are assessed for recognition 48 hours after viewing the images. REMS architecture metrics are derived from polysomnographic data. EMC is calculated based on signal detection theory ($d' = z$(hit rate) $- z$(false alarm rate)).

**Results:** Data collection is ongoing with 11 participants' data being collected. A one-way ANOVA reveals a main effect of valence, with positive and negative images being recognised better than the neutral ($p$(positive-neutral) = .039, $p$(negative-neutral) = .039). REMS parameters do not significantly predict EMC when accounting for image valence, possibly due to low statistical power.

**Discussion:** Given existing literature supporting the contribution of REMS on emotional memory processing, promoting high-quality REMS may help facilitate adaptive EMC. Further data is required to examine this effect.

## Sleep in special populations

### P021

#### DAILY ASSOCIATION BETWEEN POST-TRAUMATIC STRESS SYMPTOMS AND SLEEP IN TRAUMA-EXPOSED YOUNG ADULTS

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Sleep disruptions and post-traumatic stress disorder (PTSD) are bi-directionally linked and have been found to mutually reinforce each other on a daily basis. However, most of the previous research has focused on subjective sleep measures only. In this study, we investigated the temporal relationship between sleep and PTSD symptoms using both subjective (sleep diary) and objective sleep measures (actigraphy) in 41 non-treatment seeking, trauma-exposed young adults (age M=24.68, SD=8.15) with a range of PTSD symptom severities (PTSS, 0-53 on PCL-5). Participants reported daily PTSS and number of intrusions as well as nightly sleep, while wearing an actigraphy watch over four weeks. Linear mixed models showed that subjectively reported sleep disruptions were associated with elevated next-day PTSS and more intrusions both within and between participants. Similar effects were found for PTSD symptoms influencing subsequent subjective sleep. However, these associations were not found in the objective sleep data. Exploratory moderator analyses including sex (male vs. female) suggested sex-specificity in these associations. While subjective sleep results were in line with previous research, objective sleep results differed. Several factors may underly the divergent findings, such as the COVID-19 pandemic and/ or sleep-wake state discrepancy. Although further research is required, these data suggest the relationship between sleep and PTSD symptoms differs between objective and subjective sleep measures and depending on sex.

### P022

#### SLEEP BIOMARKER PHENOTYPING OF NEURODEGENERATIVE DISORDERS USING ARTIFICIAL INTELLIGENCE – A PILOT STUDY

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**Introduction:** In this pilot study, we explored sleep biomarker risk probabilities for different neurodegenerative disorder (NDD) phenotypes across a spectrum of NDD patients, compared with controls. **Methods:** We analyzed a cohort of patients with different NDD phenotypes who underwent in-home recordings with Sleep Profiler, including Lewy body disease (LBD=20), Alzheimer's disease dementia (AD=29), and isolated REM sleep behavior disorder (iRBD=19). Controls with an MMSE>28 (CG=61) and patients with Parkinson disease (PD=16) and mild-cognitive-impairment (MCI=41) also participated.

We developed a machine-learning classifier that assigned NDD probabilities for LBD, AD, iRBD, and CG. The input variables included: time-REM, non-REM hypertonia, autonomic-activation index, spindle-duration, atypical-N3, time-supine, sleep-efficiency, relative-theta, and theta/alpha. Probabilities >50% were assigned "likely", and for CG>=50% and a NDD group probability 20-50%, the assignment was normal "plus". Probability assignments were then made for the NDD and CG groups, then further applied to the PD and MCI patient groups.
**Results:** The CG group participants were assigned Normal-Likely=74%, Normal+AD=11%, Normal+iRBD=5%, iRBD-Likely=5%, and AD-Likely=5%.
LBD patient distributions were LBD-Likely=70%, iRBD-Likely=5%, AD-Likely=5%, Normal+LBD=5%, Normal+iRBD=5%, Normal+AD=5%, and Normal-Likely=5%.
AD group distributions were AD-Likely=71%, LBD-Likely=4%, Normal+AD=14%, Normal+iRBD=4%, Normal-Likely=7%.
iRBD patients were characterized with iRBD-Likely=37%, LBD-Likely=5%, AD-Likely=5%, Normal+iRBD=27%, Normal-Likely=26%.
PD patients were assigned iRBD-Likely=29%, LBD-likely=14%, AD-Likely=14%, Normal+iRBD=21%, Normal+AD=7%, Normal-Likely=14%.
MCI distributions were AD-Likely=45%, LBD-Likely=8%, iRBD-Likely=5%, Normal+AD=21%, Normal-Likely=13%.
**Conclusions:** For LBD, AD and CG groups, correct risk assignments were >70% while gross misclassifications were <10%. Classification patterns for PD, MCI and iRBD were disbursed in a manner consistent with the range of severities expected in each group.

### P023

#### PATIENT EXPERIENCE AND CARE NEEDS WITHIN A MOTOR NEURONE DISEASE MULTIDISCIPLINARY CLINIC

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**Background:** The Sunshine Coast Hospital and Health Service (SCHHS) Motor Neurone Disease (MND) Multidisciplinary Clinic has been running since early 2020 and is the only one of its kind north of Brisbane. Patients with MND have complex care needs and are thought to benefit from the collaborative nature of such clinics. We seek to directly assess the patient experience of our MND Clinic through the use of a patient questionnaire, which addresses both access to appropriate health professionals at Clinic appointments as well as whether specific MND care needs are being addressed through the multidisciplinary team, with reference to the National Institute for Health and Care Excellence (NICE) MND Assessment and Management Guidelines.
**Methods:** This is a prospective quality assurance project designed to collect anonymous responses from patients currently attending the SCHHS MND Multidisciplinary Clinic. Questionnaires will be distributed to patients both via e-mail and when attending their clinic appointment, and the results will be collated into a password protected database for analysis.
**Progress to date:** Ethics approval is in progress and questionnaires are expected to be distributed in the next few months.
**Intended outcome and impact:** This quality assurance project will be used as part of an audit of the SCHHS MND Multidisciplinary

Clinic, in order to assess patient satisfaction and identify priority areas for expansion.

## P024

### THE OBSTRUCTIVE SLEEP APNOEA ENDOTYPES ARE SIMILAR IN ELDERLY VETERANS WITH AND WITHOUT PTSD.

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**Background:** Approximately 60% of veterans living with post-traumatic stress disorder (PTSD) experience obstructive sleep apnoea (OSA). Why OSA is so prevalent in individuals with PTSD remains unknown, though the presence of PTSD may influence the underlying endotypes known to cause OSA. We examined whether upper airway collapsibility, muscle compensation, loop gain, and the arousal threshold differ in trauma exposed elderly male veterans with OSA with and without comorbid PTSD.
**Methods:** Using the ventilatory flow pattern from diagnostic polysomnography, the four OSA endotypes were measured in a retrospective cohort of 21 OSA patients with PTSD and 27 OSA-only patients. All participants are male Vietnam War veterans with mild-to-severe OSA (AHI M=26.8, SD=18.6; range: 6.0-105.9 events/h). Age (M=71.3, SD=3.5) and BMI (M=27.4, SD=3.4 kg/m$^2$) were similar between groups.
**Results:** There were no statistically significant differences (p-values>0.3) in the OSA endotype traits between OSA-only and OSA+PTSD patients for upper airway collapsibility (78.35 [72.81-83.82] vs. 76.68 [71.53-83.56]‰eupnea), muscle compensation (5.41 [1.83-7.21] vs. 4.27 [0.34-9.18]‰eupnea), arousal threshold (146.95 [128.64-151.28] vs. 135.76 [126.59-147.54]‰eupnea), and loop gain (M=0.60, SD=0.14 vs. M=0.56, SD=0.17).
**Conclusion:** The endotypes underlying OSA in elderly male veterans with PTSD were similar to their trauma exposed OSA-only counterparts. PTSD may exert little influence on the OSA endotypes in elderly samples beyond the effect that age and trauma exposure may have in OSA patients. What underlies the increased prevalence of OSA in PTSD remains unclear and further work examining these endotypes using larger and more diverse samples is needed before robust conclusions can be made.

## P025

### ATYPICAL N3 SLEEP: A BIOMARKER FOR ALTERED MENTAL STATUS IN LEWY BODY DISEASE?

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**Introduction:** Atypical N3 sleep (AN3=delta waves with limited theta and sigma) has been associated with ICU delirium and sepsis and averaged 25% of sleep time in Japanese ICU patients. We were interested in exploring whether AN3 might be a marker of cerebral dysfunction in ambulatory patients across a range of neurodegenerative disorders, including those with a dementia diagnosis.
**Methods:** After ethics review and with informed consent, patients with Lewy body disease (DLB/PDD: n=20,male=90%,age=70 + 6.2), Alzheimers disease dementia (AD: n=29,male=79%,age=75 + 6.7), Parkinson disease (PD: n=16,male=69%,age=67 + 8.7), mild cognitive impairment (MCI: n=41,male=63%,age=70 + 8.5), isolated REM sleep behavior disorder (iRBD: n=19,male=74%,age=64 + 9.6) and a control group (CG: n=61,male=47%,age=65 + 8.3) were studied with the Sleep Profiler and auto-detected AN3 computed. Between-group comparisons were assessed with Mann-Whitney U and Chi-square tests.
**Results:** The mean percentages of sleep time with AN3 were significantly greater in DLB/PDD (8 + 12.3) vs. PD (4 + 10.8), AD (2 + 3.7), MCI (2 + 2.3), iRBD (1 + 1.6), and CG (1 + 2.4)(all p<0.02). The proportions of records with abnormal AN3 (>5% of sleep time) were significantly greater in those with DLB/PDD=35% vs. MCI=10%, iRBD=5% and CG=5% (all p<0.05), but not AD=17% and PD=13%.
**Conclusions:** Further investigations are needed to determine if abnormal AN3 may be a biomarker that distinguishes patients with Lewy body spectrum diseases from alternative pathologies and/or could be helpful in monitoring the side effects of CNS-acting medications

## P026

### SHOULD WE CONSIDER NEW MOTHERS AN AT-RISK GROUP FOR FATIGUED DRIVING?

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**Introduction:** New mothers typically experience a high level of sleep disruption during the first year of their child's life. Other populations who are likely to experience sleep disruption (e.g., shift workers) are considered at-risk for fatigued driving. As a result, significant educational resources and support are available to minimise risks for these groups. However, no similar resources are available for new mothers as it is unclear whether they should be considered an at-risk population. This study therefore aimed to identify the frequency of fatigued driving and fatigue-related near misses / vehicle crashes in new mothers.
**Methods:** A cross-sectional survey was undertaken with a sample of 187 Australian mothers who had a child aged under one year. Participants completed the Pittsburgh Sleep Quality Index and a series of questions addressing their driving behaviour and experiences of fatigued driving.
**Results:** Over 50% of participants who drove regularly did so while fatigued at least a few times per month. Of the participants who reported experiencing near misses while driving, >70% indicated that at least some were caused by fatigue. Furthermore, >55% of participants who had experienced a vehicle crash since the birth of their child reported that the crash was caused by fatigue.
**Discussion:** The reported rates of fatigued driving suggest that new mothers experience a similar degree of fatigue-related driving risk as other at-risk populations and are likely at greater risk than the

general population. It may therefore be appropriate to provide targeted educational resources and/or fatigue management strategies for new mothers.

## P027
### INSIGHTS FROM A 10-YEAR AUSTRALASIAN CONSUMER DATA REGISTRY STUDY.

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**Introduction:** Idiopathic hypersomnia (IH) is a disorder of central hypersomnolence that results in excessive daytime sleepiness in the absence of another identifying cause. Case studies from sleep clinic patients have guided current knowledge but may not be a fair representation of the wider population of IH diagnoses. This study aims to better characterize patients diagnosed with IH in Australasia using online survey data.

**Methods:** A retrospective analysis of 686 participants from the Hypersomnolence Australia Consumer Data Registry sleep physician diagnosed with either IH (n = 554) or narcolepsy (NC) (n = 132) between January 2013 and January 2023 was performed.

**Results:** IH participants (98.9% had MSLT) reported additional sleep disorders such as OSA (16.4%) and restless leg syndrome (7.9%) and notable comorbidities included depression (46.2%) and anxiety (50%). Forty-two percent of IH participants were diagnosed after turning 33 years of age (compared to NC participants, 31.8%). The IH group reported more unrefreshing sleep, sleep drunkenness and the NC group reported more excessive sleepiness, hallucinations, sleep paralysis and automatic behaviour (all p values < 0.001). The most frequently used medication in both groups was dexamphetamine (IH = 44.2%, NC = 47.7%) but participants from the IH group were prescribed more modafinil and less armodafinil and sodium oxybate (p values < 0.001) than patients with NC. Further analyses are in preparation.

**Discussion:** This study demonstrates the value of consumer registries to better characterize symptomatology and co-morbidities in IH and NC and further research in these conditions.

## P028
### TREATING SLEEP DISTURBANCES IN REFUGEES – PRELIMINARY RESULTS FROM A RANDOMIZED CONTROLLED PILOT TRIAL ON THE GROUP THERAPY PROGRAM SLEEP TRAINING ADAPTED FOR REFUGEES (STARS)

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Sleep disturbances are both highly prevalent and often persistent even after otherwise successful treatment in traumatized refugees. The need for scalable, adaptable, and easily disseminated interventions has been highlighted. Existing evidence-based treatments do not sufficiently account for the special needs of refugees and asylum seekers. The group therapy program STARS expands and complements evidence-based treatment approaches (e.g., CBT-I, IRT) with a culturally and context-sensitive approach.

The aim of this study was to examine the feasibility, acceptability, and effectiveness of the intervention.

A randomized-controlled study using a parallel group design (STARS vs. waitlist) with 47 young male Afghan refugees was conducted in a routine clinical setting (DRKS-ID: DRKS00024419) comparing pre- to post and a 3-month follow-up assessment. Insomnia symptoms (ISI) were defined as the primary outcome. Secondary outcomes included PCL-5, HSCL-25, NDI, FOSI-SF and EUROHIS-QOL. Acceptability was measured via client satisfaction and treatment adherence. The data are analyzed using mixed models.

Preliminary results indicate that dropout (18%) was comparable to other interventions with refugees. Participants who completed the intervention attended M = 7.93 out of 10 sessions (SD = 1.88). Results on the effectiveness are still pending.

STARS seems to be a feasible intervention for sleep disturbances in traumatized refugees in a routine clinical setting. Depending on its effectiveness it might be a promising intervention to enhance scalable treatment both as a low-threshold primary care intervention as well as a potential add-on to PTSD-focused treatment. To draw final conclusions replication in large-scale studies with active control groups will be necessary.

## P029
### COMPARING THE IMPACT OF GENERAL STRENGTH CONDITIONING AND MOTOR CONTROL MANUAL THERAPY ON SLEEP QUALITY IN ADULTS WITH CHRONIC LOW BACK PAIN: A RANDOMISED CONTROLLED TRIAL

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**Introduction:** There is strong evidence indicating interactions between sleep and chronic low back pain (CLBP). However, evidence on the effect of exercise training (first-line treatment for CLBP), especially of specific modes of exercise training, on sleep is limited. This study aimed to investigate the effect of two exercise-based interventions (general strength and conditioning [GSC] and motor control and manual therapy [MCMT]) on sleep quality in adults with CLBP.

**Methods:** We conducted a two-group parallel (1:1), randomised controlled trial. Forty adults (mean age [SD]: 34.7 [6.1] years) with CLBP were randomised to receive either GSC (n=20) or MCMT (n=20) for 6 months. Sleep quality and its sub-components (e.g., sleep disturbance, sleep duration) were measured by the Pittsburgh Sleep Quality Index (PSQI). Analysis employed an intention-to-treat approach and group-by-time effects were assessed with mixed linear effect models.

**Results:** Both GSC (PSQI mean change [95%CI]: -1.58 [-2.70, -0.46] points) and MCMT (-1.61 [ 2.79, -0.43]) improved sleep quality at 6 months, but no group-by-time effect was detected (β [95%CI]: 0.03 [-1.60, 1.65]). For sleep quality sub-components, GSC improved daytime dysfunction (-0.33 [-0.65, -.01]), but led to a small decline in sleep efficiency (0.06 [0.01, 0.10]). MCMT improved sleep disturbance ( 0.31 [-0.55, -0.07]).

**Conclusion:** Both GSC and MCMT improved sleep quality, although neither intervention appeared superior. Sleep disturbance was improved in the MCMT group and daytime dysfunction was

improved in the GSC group. Future studies would benefit from including a true control, objective sleep measures, and investigation of potential mediators.

## P030

**UNDERSTANDING THE RELATIONSHIPS BETWEEN SLEEP QUALITY, AND DEPRESSION AND ANXIETY IN NEUROTRAUMA: A SCOPING REVIEW.**

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**Introduction:** Sleep problems, depression, and anxiety are highly prevalent following a spinal cord injury (SCI) and traumatic brain injury (TBI) and may worsen functional outcomes and quality of life. This scoping review examined the existing literature to understand the relationships between sleep quality, depression, and anxiety in people with SCI and TBI, and to identify gaps in the literature.

**Methods:** A systematic search of seven databases was conducted. The findings of 30 eligible studies reporting associations between sleep quality and depression and/or anxiety following SCI or TBI were synthesised.

**Results:** The included studies were mostly cross-sectional and employed a range of subjective and objective measures of sleep quality. Poor subjective sleep quality and insomnia tended to be significantly associated with increased levels of depression and/or anxiety, but no such associations were reported when sleep quality was measured objectively. Two longitudinal studies observed worsening depressive symptoms over time were related to insomnia and persistent sleep complaints. Two interventional studies found that treating sleep problems improved symptoms of depression and anxiety.

**Discussion:** The findings of this review suggest that sleep and psychopathology are related in people with neurotraumatic injuries. This has important therapeutic implications, as individuals may benefit from therapy targeting both sleep and psychological issues. More longitudinal and interventional studies are warranted to further understand the direction and strength of the relationships, and how they impact patient outcomes.

## Sleep and breathing / other

### P031
### A NOVEL ORAL APPLIANCE IMPLEMENTATION PROTOCOL USING NIGHTLY PORTABLE MONITORING FOR OSA PATIENTS FAILING CPAP THERAPY

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**Introduction:** Oral Appliance Therapy (OAT) is an effective second line treatment for OSA. However, OAT devices do not have active efficacy monitoring, hence little is known about methods to best identify the optimal degree of mandibular advancement.

**Methods:** Consecutive OSA patients undergoing OAT at a sleep disorders service were recruited to participate in a novel titration protocol using nightly monitoring via a portable device (NightOwl®, Ectosense, Belgium). Demographic & sleep study (PSG) data, and key NightOwl® metrics were collected. A treatment PSG was conducted at conclusion of OAT implementation using identified optimal point of mandibular advancement.

**Results:** 80 subjects were recruited (52 male, 65%) with mean ($\pm$SD) age 49$\pm$12 years, BMI 28$\pm$4.4 kg/m2, Epworth score (ESS) 9.1$\pm$4.9. Baseline PSG showed mean AHI 28$\pm$20 events/hr, nadir SpO2 84$\pm$21%, time SpO2<90% 8.3$\pm$30 minutes. Blood pressure monitoring at baseline showed mean day BP 123/70mmHg and night BP 106/57mmHg. The mean mandibular advancement implemented was 2.9$\pm$1.7mm.

Post treatment mean ESS was 5.1$\pm$3.5 (p<0.001). 62/68 (91%) subjects reported perceived benefit on OAT, 49/53 (92%) reduced snoring, 51/62 (82%) improved sleep, 49/62 (79%) increased energy. Treatment PSG on completion of the protocol showed AHI 14$\pm$10 events/hr (p<0.001), nadir SpO2 82$\pm$33% (p>0.05), time SpO2<90% 1.2$\pm$21 minutes (p=0.04). 48/63 (76%) met the AHI definition of OAT success.

**Discussion:** This study demonstrates a novel OAT protocol which led to minimal degree of mandibular advancement, resulting in high rates of symptom benefit and effective treatment of OSA.

### P032
### PROSPECTIVE CROSSOVER TRIAL OF POSITIONAL AND CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY (PACT) FOR THE TREATMENT OF MILD-TO-MODERATE POSITIONAL OBSTRUCTIVE SLEEP APNOEA

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**Introduction:** Positional obstructive sleep apnoea (pOSA), defined by a supine-to-non-supine AHI ratio $\geq$2, is a phenotype present in a significant subset of patients with sleep-disordered breathing. CPAP has been the gold standard for OSA treatment since its first description in clinical use, although various practical and patient factors may preclude its use. Positional therapy (PT) provides an alternative for pOSA – shown to be effective in restricting supine sleep, thereby reducing the frequency of events and improving outcomes.

**Methods:** Prospective, single-centre crossover trial of consecutive, treatment-naïve participants with symptomatic, mild-to-moderate pOSA on diagnostic polysomnogram. Eligible participants were randomised to undergo paired treatment CPAP and PT polysomnography to assess efficacy. Participants thereafter received a two-month trial of each, according to randomisation. Adherence, symptom, quality of life (QoL) measures, and patient preference were assessed.

**Results:** 53 participants completed treatment and follow-up. Mean age was 55.1$\pm$12.7 years. 30 participants were male (56.6%). Median BMI was 30.1kg/m2 (27–34). Median baseline AHI was 14.4 (9.9–20.2). Median baseline Epworth Sleepiness Scale (ESS) was 12 (10–14) and improved after treatment with positional [8 (6–11); p=0.001] and CPAP [8 (6-11); p<0.001] therapies. There was no difference in ESS reduction between treatment groups (p=0.691). There was no significant difference in usage between therapies (p=0.877). QoL measures were also assessed.

**Discussion:** In this cohort with symptomatic mild-to-moderate pOSA, treatment with both PT and CPAP resulted in comparable, clinically significant symptomatic improvement with similar usage. Our findings suggest either therapy can be considered effective in appropriately selected patients.

### P033
### ASSESSMENT OF UPPER AIRWAY DILATOR MUSCLE FUNCTION AND COLLAPSIBILITY IN PEOPLE WITH MULTIPLE SCLEROSIS WITH VERSUS WITHOUT SLEEP APNEA

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**Introduction:** Upper airway reflex responses to negative pressure are important to prevent upper airway narrowing and closure. Recent evidence indicates ~30% of people with multiple sclerosis (MS) have an impaired upper airway dilator reflex response. Thus, the aims of this study were to compare genioglossus muscle reflex responses and upper airway collapsibility in non-obese people with MS, with and without OSA.

**Methods:** Non-obese adults with MS and OSA vs MS without OSA were instrumented with pressure sensors at the choanae and epiglottis. Bipolar fine wires were inserted into the genioglossus. A nasal mask and pneumotachograph were attached to a breathing circuit to deliver brief (~250ms) suction pressure (~-12cmH2O) during early inspiration every 2-10 breaths while awake. Genioglossus reflex onset latency, peak latency and peak amplitude were quantified. The upper airway collapsibility index was the percent difference between choanal and epiglottic airway pressures during negative pressure.

**Results:** 15 people with MS (6 males), aged 48$\pm$13years, BMI=25$\pm$3kg/m-2 and AHI=13$\pm$17events/h (mean$\pm$SD) were studied. 47% had OSA (AHI>10events/h). Genioglossus reflex excitation onset latency (22$\pm$2 vs. 24$\pm$19ms), peak excitation latency (37$\pm$11 vs. 38$\pm$23ms) and peak amplitude (258$\pm$125 vs. 205$\pm$95%) were not different between OSA vs. non-OSA. The upper airway was more collapsible in people with OSA (49$\pm$32 vs. 17$\pm$16%, p=0.04).

**Conclusions:** There is a high prevalence of OSA among non-obese people with MS. There was no systematic difference in upper

airway dilator muscle function. However, the upper airway is ~65% more collapsible in people with MS and OSA despite absence of obesity.

## P034

### AN ECONOMIC EVALUATION COMPARING THE PROVISION OF SLEEP DISORDER SERVICES VIA A REGIONAL HUB-AND-SPOKE MODEL OF CARE TO STANDARD CARE IN A METROPOLITAN TERTIARY HOSPITAL

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**Introduction:** A new hub-and-spoke model of care (New-MOC) was introduced in a very remote Queensland region for the management of Obstructive Sleep Apnoea. Standard Care required travel and admission to a major metropolitan hospital. The aims were to increase access to services and ensure the New-MOC was cost-effective for sustainability.

**Method:** A cost-utility evaluation was performed from the health service perspective. Administrative and clinical data was collected in the 2-years prior and 1-year post implementation of the New-MOC to compare costs and outcomes. Base-case was modelled using decision tree analysis for a hypothetical cohort of 100 patients over a time horizon that captured 12-months of treatment. One-way sensitivity analyses were performed to evaluate uncertainty of inputs in which a) all costs were adjusted to upper bound b) set up costs were added and c) QALYs were reduced in the New-MOC.

**Results:** Under base-case the New-MOC was dominant and projected to save \$226,511 of health service costs over 1.2 years and result 0.488 QALYs gained compared Standard Care. The New-MOC remained cost effective under all scenarios modelled.

**Discussion:** Whilst the New-MOC was cost effective, primary source data was only available up to diagnosis and therefore modelling relied on assumption around outcomes. Follow-up of patients in relation to treatment compliance would improve the accuracy of the model as would applying a lifetime horizon to capture all outcomes for a chronic condition. However, sufficient evidence exists to support the New-MOC as cost saving and cost-effective.

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## P035

### INVESTIGATING THE RELATIONSHIP BETWEEN DIETARY TIMING AND OBSTRUCTIVE SLEEP APNOEA.

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**Introduction:** Late night eating is associated with obstructive sleep apnoea (OSA) and may increase obesity risk. Time Restricted Eating (TRE) involves shifting the eating window to 8-12 continuous hours per day, prompting energy intake to earlier in the day without any complex dietary prescription, and has metabolic benefits. We aimed to investigate timing of food intake in patients with OSA and assess their openness to trial TRE.

**Methods:** Adults undergoing in-laboratory diagnostic polysomnography (PSG, n=138, 67 male) completed a dietary questionnaire outlining typical eating habits, including timing of meals, frequency of getting up overnight, and frequency of eating/drinking overnight. Questionnaire responses were reviewed with demographics and PSG variables. Proportions of responses were compared across categories of OSA severity using z-tests.

**Results:** Patients with moderate/severe OSA (AHI>15events/h, n=77) were more likely to report getting up at night "often" or "always" compared to patients with no/mild OSA (n=61) (63.6% v 47.5%, p=0.08), more likely to report getting up multiple times (66.2% v 47.5%, p=0.04), and more likely to report eating/drinking overnight (42.9% v 18.0%, p=0.003). 71.0% of all patients indicated they would consider trying a TRE diet, and 71.7% could incorporate a TRE diet into their lifestyle.

**Conclusion:** Moderate/severe OSA is associated with an increased likelihood of getting up multiple times overnight, and getting up to eat and drink. Patients in this clinical cohort reported a willingness to trial TRE. Future research should investigate the efficacy of implementing TRE in OSA and evaluating its effect on weight loss and sleep quality.

## P036

### A NOVEL APPROACH TO NURTURE SLEEP EDUCATION IN A CROWDED CURRICULUM

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**Aims:** To explore Year 6 medical students' perceptions of sleep education during medical school to inform the development of a sleep curriculum.

**Methods:** Year 6 medical students on their final general practice (GP) placement in 2020 (71/254 of the Year 6 cohort) were invited to complete an online survey regarding sleep education recalled during the medical programme.

**Results:** Sleep education survey responses were received from 51/71 of students in the final GP cohort (72%). Three areas were more frequently recalled - 83% recalled learning about sleep apnoea, 71% about sleep physiology, and 69% about snoring. Only 50% recalled learning about assessing sleep and 42% recalled receiving education about insomnia. More than 80% of students reported they received no education regarding preparing for, coping with, or recovering from night shifts. Students identified common sleep disorders, sleep assessment, and shift work as priority topics.

**Conclusions:** Whilst the majority of students recalled receiving education on select topics, most had no awareness of education relating to sleep assessment, insomnia, or shift work. Sleep education in the curriculum needs more emphasis and reinforcement given its relevance across many domains of health and morbidity. We propose that an identifiable sleep curriculum is necessary and useful to ensure medical students have the necessary core education regarding sleep and sleep disorders both for patients and themselves. Further, we believe this is possible to achieve within the constraints of the undergraduate curriculum and propose some creative solutions.

## P037

### THE BIG SLEEP ACT PROJECT: DEVELOPING A MODERN DATASET TO SUPPORT SLEEP RESEARCH

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**Background:** Limitations in scale, population diversity, technical quality, data curation methods and accessibility of existing data resources have been recognised as limiting factors for the advancement of sleep clinical research through big data approaches. To bridge this gap, this study introduces a new sleep dataset which seeks to capture a data-rich, longitudinal snapshot of a representative Australian clinical sleep cohort.

**Methods:** Retrospective collation of de-identified sleep clinical records from adult patients who underwent at least one in-lab Type-1 polysomnography between 2012 and 2018 at Canberra Sleep Clinic. We extracted polysomnography raw signals and annotations, as well as medical record information including basic demographics, comorbidities, medications, examination findings, diagnoses, therapy settings and follow-up observations throughout subjects' time in the Clinic's care. Records were organised according to a graph database structure, embedding SNOMED terminology encodings wherever possible.

**Results:** N=6,777 subjects were included. Gender split (M/F: 62%/38%) and age (51.7±15.3 years) distribution were consistent with typical clinical sleep cohorts. Polysomnography recordings included diagnostic (n=6,635) and non-invasive ventilation titration/therapy (n=2,834), as well as MSLT (n=270) and MWT (n=25) studies. Clinical subgroups featured healthy, Obstructive Sleep Apnea (OSA) and non-OSA dyssomnia patients, as well as small cohort of parasomnia cases. Follow-up duration varied among cases (<3 months to >5 years).

**Discussion:** Despite limitations associated with retrospective data extraction, the data-richness and scale of Big Sleep ACT compare favourably with world-leading sleep datasets. Careful data organisation makes this dataset well placed to support innovative data-driven research into precise diagnoses, personalised interventions, and automation in sleep medicine.

## P038
### CHARACTERISING PULSE WAVE AMPLITUDE DROPS IN PATIENTS WITH ACUTE CORONARY SYNDROME

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Pulse wave amplitude derived from photoplethysmography signals is a surrogate measure of autonomic function and vascular response. Recent studies have demonstrated low pulse wave amplitude drop(PWAD) index to be associated with increased cardiovascular risk in obstructive sleep apnoea(OSA). The nature of PWAD in patients with cardiovascular disease remains unknown. We aimed to characterize PWAD in patients with acute coronary syndrome(ACS) diagnosed with OSA in terms of cardiovascular measures.

We studied 70 patients with ACS (age:58[52,63]years, BMI:27[24,30] kg/m2). A level 2 polysomnogram was conducted to confirm OSA diagnosis within 6 months after discharge. Cardiovascular measures of heart rate variability(HRV), baroreflex sensitivity, pulse wave velocity (PWV) and endothelial function(FMD) were measured. PWAD was analysed using a validated algorithm. PWAD with an amplitude reduction of >30% from baseline and a duration >4 heartbeats were identified. PWAD frequency, duration, amplitude, area under the curve(AUC), descending and ascending slopes were calculated.

There was no relationship between PWAD frequency and AHI (r=0.057, p=0.642). PWAD amplitude (rs= 0.308, p=0.031) and duration (rs= -0.319, p= 0.025) correlated with baroreflex effectiveness index. After controlling for age, gender and BMI, baroreflex effectiveness index was associated with PWAD duration (β±SE: -0.009±0.003, p=0.009). Aortic augmentation index correlated with PWAD duration (rs= 0.3565, p=0.0041). HRV parameters, FMD and PWV did not correlate with PWAD parameters (data not shown).

These preliminary findings suggest PWAD duration and amplitude are not associated with OSA severity in patients with ACS. However PWAD may be appropriate markers of vascular and autonomic nervous system response in patients with cardiovascular disease.

## P039
### GENIOGLOSSUS MOTOR CONTROL DURING MANDIBULAR ADVANCEMENT.

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**Introduction:** High genioglossus muscle activity is thought to prevent/resolve upper airway collapse. Overall genioglossal activity results from the simultaneous firing of many motor units (MUs) which typically have one of 5 firing patterns: active only (IP) or at higher frequency (IT) during inspiration; active only (EP) or at higher frequency during expiration (ET); and constantly active without respiratory modulation (TT). To date, most experimental manipulations tested (e.g. hypoxia, hypercapnia, resistive loading) have influenced IP and IT MUs, with minimal changes in ET, EP and TT MUs. We hypothesized that IT/IP MUs respond to respiratory drive, whereas TT/EP/ET MUs will change in response to airway anatomical manipulations.

**Methods:** The number and firing frequencies of genioglossal MUs were assessed with intramuscular electrodes in healthy individuals during wakefulness, before and during mandibular advancement (MAD) to 80% of maximum with an myTAP device, to change airway anatomy but minimally alter respiratory drive.

**Results:** 201 MUs were identified from 55 trials in 14 participants. Ventilation did not differ between baseline and MAD. At baseline, 175 MUs were active: EP=0.6%, ET=12.6%, IP=14.9%, IT=48%, TT=24%. During MAD, 35 MUs ceased firing, but an additional 26 MUs began firing, with the resulting MUs proportions not differing from baseline: EP=0%, ET=10.2%, IP=21.1%, IT=36.7%, TT=31.9%, $\chi 2(9)$=12.0, p=.213. The mean firing frequency of MUs did not change during MAD (baseline=20.9±4.7Hz, MAD=21.9±5.4Hz).

**Discussion:** Contrary to the hypothesis, the firing patterns of genioglossal MUs did not differ from baseline during mandibular advancement. What controls the non-respiratory/expiratory MUs of the genioglossus remains unclear.

## P040

### COMPARISONS OF HEART RATE VARIABILITY INDICES DERIVED FROM THE SHEET-TYPE DEVICE BENEATH THE MATTRESS WITH THOSE FROM THE ELECTROCARDIOGRAM

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**Introduction:** A sheet-type device beneath the mattress was developed for non-invasive monitoring of cardiac rhythm during sleep and in bedridden end-of-life elderly patients, enabling the acquisition of ballistocardiography (BCG) signals. BCG represents minute vibrations in the body associated with cardiac ejection of blood and has recently been utilized to estimate heart rate variability (HRV) indices. This study aimed to compare HRV indices derived from BCG with those obtained from simultaneously measured electrocardiogram (ECG) and assess their agreement.

**Methods:** Healthy subjects (14 males, 11 females; age 40.6±12.8 yrs.) were recruited between August 2022 and April 2023. Subjects laid on a bed with the device placed under their pillow, while ECG was recorded for 20 minutes. Time-domain indices (mean normal-to-normal (NN) interval) and frequency-domain indices (low frequency (LF) and high frequency (HF)) were calculated, and linear associations were examined by correlation analysis. Bland-Altman analysis was employed to evaluate the agreement between the indices.

**Results:** Significant positive associations were observed between BCG and ECG indices in mean NN interval (r=0.994, p<0.001) and LF (r=0.685, p<0.001) and HF (r=0.687, p<0.001). Bland-Altman analysis demonstrated good agreement in mean NN (mean of pairwise difference (MPD): 1.07; limits of agreement (LA): -12.57-14.70; ratio: 0.01), but poor agreement in LF (MPD: -4.32; LA: -30.42-21.78; ratio: 0.63) and HF (MPD: 4.29; LA: -21.70-30.28; ratio: 0.45) based on the ratios (> 0.2).

**Conclusion:** The high correlation and good agreement between mean NN intervals suggest that the BCG device can serve as an alternative to HRV for estimating NN interval.

## P041
### AUDIT FINDINGS OF BILEVEL TITRATIONS PERFORMED IN 2022 AT A PUBLIC SLEEP LABORATORY

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**Introduction:** The aim of this audit was to benchmark and grade outcomes of NIV titrations for chronic hypercapnia as per the NPPV titration task force of the AASM.

**Methods:** All NIV studies performed in 2022 were included in the audit. Titration gradings of success were defined as per the NPPV titration task force. Each change in setting was reviewed for consistency with laboratory protocols based on task force guidelines.

**Results:** 50 of 72 NIV titrations have been audited to date. Patients were mean age (56.4 years +/-17.6), 59% male, with the following pathophysiology leading to chronic hypoventilation. 46% OHS, 35% neuromuscular disease, 16% lung disease, 2% brain or spinal injury. 81% of all setting changes were consistent with laboratory protocols. Protocols were most often not followed when adjusting rise (86.2%), EPAP (82%), and ti max/min (62%). Titration grading outcomes were optimal (43%), good (14%), adequate (0%) and unacceptable (43%). Suboptimal titrations were attributed to; lack of supine REM sleep (24%), lack of sleep or any REM sleep (18%), persistent asynchrony (10%), uncontrolled obstruction (10%), or tcCO2/SpO2 not responding to treatment (38%).

Patients with a primary condition of a neuromuscular disease had less suboptimal titrations (36%) compared with OHS (46%), lung disease (43%) and other conditions (50%) however were not statistically significant.

**Discussion:** Despite local titration protocols, a high number of unacceptable titrations were identified along with a high proportion of patients not responding to treatment. Further analysis to identify reasons for titration protocol deviations and treatment non-responders is required.

## P042
### LEAN SIX SIGMA APPROACH TO IMPROVE NON-INVASIVE VENTILATION PATIENT CARE

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**Introduction:** A lean six-sigma (LSS) approach to clinical redesign looks at aspects of patient flow, value to consumer and process inefficiencies. We used LSS quality management approach for clinical redesign of our non-invasive ventilation patient care.

Current recommendations suggest that patients using non-invasive ventilation (NIV) require therapy for a minimum of 4 hours per night for optimal health benefits, with less than this amount defined as low adherence. This information is collated for each patient at each clinic visit. The aims of this study were to improve the identification of patients on non-invasive ventilation that are poorly adherent to paediatric specialist support, decrease the time taken for entry of NIV adherence data for all patients and evaluate process/es for scalability for future growth.

**Methods:** A LSS approach was used with identification of variation, waste and patient flow concerns in diagnostic stage. Rapid improvement events, diagnostic and solution design workshops were conducted to determine root cause, key issues and possible solutions. A preferred solution was adopted through team collaboration.

**Results:** A diagnostic stage identified two key areas: a 45% increase in telehealth and 162 man-hours of manual data entry for patient care. The solution initiated was to extract NIV machine data remotely and automate data collection.

**Discussion:** Healthcare is well suited to using the lean six-sigma approach to facilitate team collaboration in all aspects of clinical redesign of a healthcare pathway. Automating aspects of patient care may improve patient health and staff satisfaction.

## P043
### COMPARISON OF SLEEP POSITION CLASSIFICATION BETWEEN NECK AND ABDOMINAL PLACEMENT IN LATE PREGNANCY

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**Background:** Going to sleep in the supine position during pregnancy is associated with an increased risk of stillbirth, however objective sleep position data are needed to verify the mechanisms of this relationship. Sleep position measurement devices are typically worn at the neck or chest, but abdomen position is more important for assessing impact of the gravid uterus on inferior vena cava compression. This study aimed to compare sleep position measured at the neck versus the abdomen in late pregnancy.

**Methods:** Twenty women in the third-trimester of pregnancy wore the Night Shift Sleep Positioner with both the neck band and abdominal band for one night. Position classified as left, supine, right, prone and upright was recorded in 30-second epochs and compared across device locations.

**Results:** There was substantial agreement between the neck and abdomen for determination of all sleep positions with 88% concordance on an epoch-by-epoch basis ($\kappa$ = .797 [SE .006], p<.001). However, agreement was only fair ($\kappa$ = .407 [SE .007], p < .001) for supine versus non-supine positioning, with a trend for more supine sleep using the neck device compared to the abdomen (47.5 [16.3,80.5] vs 19.0 [6.8,83.8] minutes, median difference =7.3 [0.5,39.3], p=.12). The average absolute supine difference across device locations was 30.8 minutes [4.0,65.3].

**Conclusion:** Position measurement at the neck and abdomen has considerable concordance on an epoch-by-epoch basis, however agreement was reduced when comparing supine position only. Site of sleep position measurement in pregnancy has implications for assessing supine positioning, intervention success and stillbirth risk.

## P044
### ASSESSING SP02 DATA RELIABILITY IN A PAEDIATRIC LABORATORY: A COMPARATIVE STUDY OF PULSE OXIMETRY AND TRANSCUTANEOUS OXYGEN MONITORING

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**Introduction:** Pulse oximetry is the primary method for measuring Sp02 in polysomnography studies to determine the presence of sleep apnoea. In paediatric studies where there is significant artefact in pulse oximetry, we investigate if transcutaneous oxygen monitoring (TcOM) can be used as a reliable alternative to measure blood oxygen concentration (Sp02).

**Methods:** A comparison of pulse oximetry (Nonin) and TcOM (Sentec) data was performed by a retrospective analysis of 16 diagnostic studies (Male=50%; Median age= 8±4.69SD). 6 studies were excluded due to: AHI >5/hr, missing data and artefact. A comparison was made between the two sampling methods for: Oxygen desaturation index (ODI) per hour, nadir and baseline. Statistical analysis run was a paired t-test.

**Results:** Poor test-retest reliability was observed for all parameters-mean(SD): ODI Nonin=1.13(1.24), ODI Sentec=50.74(29.13)*; Nadir Nonin=91.10(3.78), Nadir Sentec=69.10(10.62)*; Baseline Nonin=98.(0.57), baseline Sentec=99.50(0.71)*. These results strongly indicate a significant statistical difference between data groups. *indicates P=<0.05

**Discussion:** Our analysis demonstrated inconsistent data between the two methods, and unstable Tc0M readings, which if used could lead to misdiagnosis of sleep-disordered breathing. Further comparative analysis using different Tc0M skin sites could yield more reliable data. Two reliable sources of SpO2 data would provide an in-clinic verification tool in instances of significant artefact or troubleshooting, to improve quality of studies conducted.

## P045
### NOXTURNAL CRIP: A COMPARATIVE ANALYSIS OF SENSORS FOR THE IDENTIFICATION OF RESPIRATORY EVENTS IN POLYSOMNOGRAPHY

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**Introduction:** AASM recommends the use of nasal pressure (NP), oronasal thermal flow (TF), and respiratory inductance plethysmography (RIP) for detecting and characterising respiratory events in polysomnography. The use of both NP and TF sensors is reported to be more accurate in respiratory event identification than either alone. However, these sensors can be unreliable if dislodged and cause discomfort. Noxturnal calibrated RIP flow (cRIPflow), derived from RIP, may provide a non-invasive alternative method for flow measurement in identification of respiratory events.

**Method:** Respiratory scoring was performed manually by a single experienced scorer on 10 diagnostic sleep studies under AASM standards. Scoring was repeated using three different measurements for each study: cRIPflow only, Thermistor (Th) only and both Th+NP (AASM recommendation). Apnoea hypopnoea index (AHI), central apnoea index (CAI), obstructive apnoea index (OAI), mixed apnoea index (MAI) and hypopnoea index (HI) were calculated and paired t-test analysis utilised for comparison between measurements.

**Results:** No statistical differences were identified in comparison of cRIPflow with Th or Th+NP in respiratory event identification: CAI (cRIPflow 3.2/hr±7.1, Th 3.9/hr±8.9, Th+NP 3.1/hr±7.5), OAI (cRIPflow 6.1/hr±6.8, Th 5.3/hr±8.2, Th+NP 6.7/hr±8.9), MAI (cRIPflow 5.2/hr±9.7, Th 4.3/hr±8.7, Th+NP 4.7/hr±9.2), or HI (cRIPflow 12.5/hr±13.9, Th 11.1/hr±10.5, Th+NP 10.4/hr±10.7). There was a statistical difference for AHI (cRIPflow 26.9/hr±26.6, Th 24.5/hr±26.4, Th+NP 25.0/hr±26.5).

**Discussion:** This study suggests cRIPflow may provide an alternative measurement in the detection and characterisation of respiratory events, however further analysis with larger sample size would provide more insight into sensitivity and specificity of this method.

## P046
### KNOWLEDGE OF REM BEHAVIOUR DISORDER AMONG SLEEP TECHNICIANS IN AUSTRALIA

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**Abstract:** Rapid Eye Movement (REM) Behaviour Disorder (RBD) is a sleep disorder characterized by the absence of muscle paralysis during REM sleep, leading to the enactment of dream content. The accurate identification and management of RBD requires expertise and knowledge among sleep technicians. This study aims to assess the knowledge and awareness of RBD among sleep technicians in Australia.

A survey-based investigation was conducted among sleep technicians working in sleep clinics, hospitals, and research centres across Australia. The survey questionnaire consisted of multiple-choice and open-ended questions covering various aspects of RBD, including its definition and diagnostic criteria as well as their knowledge, training and lab practices. The survey was distributed electronically, and responses were collected anonymously.

Preliminary findings from a sample of 30 sleep technicians revealed a significant variability in knowledge regarding RBD. While 68% of participants demonstrated a solid understanding of RBD, 22% displayed limited knowledge, and 10% had minimal awareness of the disorder. Interestingly, the majority of participants reported that their workplace investigated patients with potential RBD symptoms but also the majority reported that they lacked the knowledge and resources to detect the condition appropriately. These findings emphasize the need for targeted educational interventions and training programs to enhance the knowledge and competence of sleep technicians in identifying and managing RBD. By addressing these knowledge gaps, sleep technicians can play a vital role in early detection, timely referral, and appropriate management of RBD, thereby improving patient outcomes and quality of life.

## P047
### SLOW WAVE DYNAMICS IN MILD COGNITIVE IMPAIRMENT COMPARED WITH AGE MATCHED CONTROLS: A HIGH DENSITY EEG STUDY.

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**Introduction:** Slow wave activity during non-rapid eye movement (NREM) sleep has been linked with memory consolidation in healthy older adults. To date, there has been limited research in mild cognitively impaired populations, particularly looking across the whole brain using high density EEG. We aimed to determine if the dynamics of slow wave activity (delta power) during the first

NREM sleep cycle differ between patients with mild cognitive impairment (MCI) and healthy older adults.

**Methods:** Participants were assessed for MCI by a panel of neuropsychologists and clinicians. They underwent full polysomnography including high-density EEG (256 electrodes). We computed the delta power (0.5-4.5Hz) for each NREM cycle and slope between sleep onset and the peak of delta in the first NREM sleep cycle (rise-rate) which were compared between groups using t-tests.

**Results:** 17 older adults with MCI and 21 older healthy controls were assessed. The mean delta power in the first NREM cycle did not differ between MCI and controls across the whole brain, but the global rise-rate (1/min) of MCI and controls was 0.0015 and 0.0032 respectively (t-value -2.35, p=0.025).

**Discussion:** Global slow wave dynamics in the first NREM period appear to be altered in patients with MCI compared with age-matched controls. The gentler slope of rise-rate to the first delta peak in MCI patients than in healthy controls may indicate the dysfunction of sleep homeostasis in MCI patients. Regional slow wave dynamics, ultra-low frequency delta (0.25-1Hz), and associations with sleep dependent memory consolidation will further be explored.

## P048
### DOES SLEEP REDUCE INTRUSIVE MEMORIES AFTER ANALOGUE TRAUMA? RECENT FINDINGS OF EXPERIMENTAL SLEEP MANIPULATIONS USING THE TRAUMA FILM PARADIGM

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**Introduction:** Intrusive memories are common in the aftermath of trauma, and these can develop into a pervasive, distressing symptom of posttraumatic stress disorder (PTSD). Sleep disturbances have also been shown to contribute to later development and maintenance of overall PTSD symptoms. Recent evidence suggests there is a relationship between sleep disturbance and intrusive memories following experimental analogue trauma. However there has been conflicting findings regarding the direction of the effect; whether sleep following analogue trauma results in increased or decreased frequency of later intrusive memories.

**Methods:** We conducted a narrative review summarising research examining the role of sleep in the development of trauma-related intrusive memories, using the trauma film paradigm. This included recent meta-analyses of experimental studies.

**Results:** While there have been initial conflicting results across a small number of studies, meta-analytic results suggest sleep following exposure to analogue trauma leads to a reduced number of intrusive memories in the following week.

**Discussion:** The relationship between sleep following experimental analogue trauma and reduction in intrusive memory frequency may be due to the role of sleep in the consolidation and integration of traumatic memories into existing autobiographical knowledge. However, more research is needed to investigate the mechanism of action for this relationship. Future studies should attempt to disentangle to what degree consolidation, executive control over spontaneous cognition, or other mechanisms are affected by sleep and contribute to the development of intrusive memories.

## P049
### ACTIGRAPHIC REST-ACTIVITY RHYTHMS IN OLDER ADULTS 'AT RISK' FOR DEMENTIA: ASSOCIATIONS WITH REDUCED CORTICAL THICKNESS IN FRONTAL, TEMPORAL AND OCCIPITAL CORTICES

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**Background:** Rest-activity rhythm disturbance is common in older adults 'at risk' for dementia. This may be an early marker of underlying disease pathology and risk of future decline. However, our understanding of how rest-activity rhythm relates to brain integrity remains unclear.

**Methods:** This study used vertex-wise analyses to examine the association between nonparametric actigraphy measures and cortical thickness in older adults 'at risk' for dementia. Primary measures of interest were intra-daily variability (IV), relative amplitude (RA), inter-daily stability (IS), and average activity during the least active 5-hour period (L5).

**Results:** 143 older adults 'at risk' for cognitive decline were included (mean age=67.41, SD=7.96). Higher IV was associated with lower cortical thickness in the right cuneus (CWP< 0.001), left middle frontal gyrus (CWP< 0.001) and lateral orbital frontal cortex (CWP=0.004). Higher L5 was linked with cortical thinning in the left superior temporal sulcus (CWP=0.004), superior middle temporal cortex (CWP=0.010) and middle temporal gyrus (CWP=0.013), as well as right inferior parietal lobe (CWP< 0.001). Lower IS was associated with cortical thinning in the left (CWP=0.002) and right (CWP< 0.001) superior frontal gyri, left superior temporal gyrus (CWP=0.043) and left post-central gyrus (CWP=0.033).

**Conclusions:** Markers of circadian rhythmicity are associated with reduced cortical thickness in frontal, temporal and occipital cortices in older adults 'at risk' for dementia. Future work is still required to delineate whether brain degeneration leads to altered daily rhythms and/or if circadian misalignment contributes to cognitive decline longitudinally.

## P050
### PROCESS O (ONSET/OFFSET) CAUSE OF THE 90-MIN SLEEP CYCLE

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The ubiquitous sleep cycles across a normal sleep of approximately 90 minute period length were originally suggested to be a reflection of a 90-minute basic rest-activity cycle (BRAC) operating across the full circadian cycle of wakefulness and sleep. The evidence for a BRAC during the wakeful period is sparce requiring other explanations for the prominent 90min cycles during sleep.

Recently another process, Process O (onset/offset), has been suggested in addition to Processes S (homeostatic) and C (circadian). It was hypothesised in order to account for the recuperative effects of a brief power nap, inexplicable by the other two processes.

Process O hypothesises a development of inhibition to any ongoing state (wake, NREM, REM). The inhibition develops rapidly over 1-2 hours to a plateaued limited level and then, following the cessation of that state, dissipates rapidly (5-15 minutes). Thus, a "power" nap brings improved alertness because of the short break from wakefulness allowing the dissipation of wakefulness Process O inhibition. It is suggested that Process O inhibition accumulates also to periods of NREM sleep and REM sleep.

The 'sleep switch' accounting for bi-stable states of sleep or awake is hypothesised to include REM and NREM as separate states accounting for stability and mutual inhibition between 3 rather than just 2 states. Thus Process O inhibition developing to an ongoing state tips the balance to other states (REM or NREM) resulting in the alternation between them of the sleep cycles and allowing longer sleep epochs after brief awakenings.

## Chronobiology / Insomnia

## P051
### ASSOCIATIONS BETWEEN CHRONOTYPE AND SYMPTOMS OF DEPRESSION IN PATIENTS ATTENDING AN OUTPATIENT SLEEP CLINIC

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**Introduction:** Chronotype (or morningness-eveningness), individuals' time-of-the-day preference for activity, has been associated with depressive symptoms. This cross-sectional study examined the association between chronotype and symptoms of depression in outpatients attending a sleep disorders clinic.

**Method:** The sample included individuals attending an outpatient sleep disorders clinic and provided opt-out consent for their data to be used for research purposes. Individuals included in the analyses provided demographic data, their typical weekly total sleep time (TST), and complete responses prior to treatment on the reduced Morningness-Eveningness Questionnaire (rMEQ; for chronotype), and the PROMIS depression scale.

**Results:** A total of 1641 (44.5% female, Mage = 45.20 years, SDage = 16.06 years) participants were included. On average, the sample scored intermediate chronotype (M = 14.73, SD = 4.35) and higher depressive symptom scores that were half a standard deviation higher compared to community norms (M = 55.80, SD = 10.01). Multiple linear regression controlling for age, sex, and TST showed that greater eveningness preferences predicted higher symptoms of depression, p<0.01, explaining 2.76% additional variance in depression scores above that of the covariates.

**Discussion:** Overall, sleep clinic outpatients had an intermediate chronotype and above average depressive symptoms. The findings are consistent with existing literature in other populations indicating that eveningness may be a risk factor for greater symptoms of depression. Future studies need to explore whether interventions to alter chronotype may benefit symptoms of depression in individuals with sleep complaints.

## P052
### IS CIRCADIAN ADAPTATION TO NIGHT WORK AFFECTED BY THE INTENSITY OF AMBIENT LIGHTING?

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**Introduction:** The aim of this study was to examine whether the intensity of ambient lighting affects the rate at which the human circadian system adapts to working at night.

Methods. The whole study will include 60 participants (50:50, F:M; aged 28–35yr; good sleep/health) randomised to one of three conditions. In each condition, participants work 14 x 12-hr simulated night shifts (19:00–07:00h) while living 24h/day in an accommodation suite. The only difference between conditions is in the light intensity during night shifts – dim (5–10lx), moderate (50–100lx), normal (300–350lx). Circadian adaptation is being assessed using the hourly rate of 6-sulphatoxymelatonin (aMT6s) production during sleep.

**Results:** The project is in progress, so these results are for the first 6–12 participants in each condition. For each day, circadian adaptation is assessed by expressing the rate of aMT6s excreted during the daytime sleep period as a percentage of the rate of aMT6s excreted during the night-time baseline sleep period (for an adaption score of 0–100%). On average, participants in the dim condition are adapted by 26%,37%,32% after nights 1,7,14; participants in the moderate condition are adapted by 23%,37%,60% after nights 1,7,14; and participants in the normal condition are adapted by 27%,117%,103% after nights 1,7,14.

**Discussion:** These data indicate that the rate, and degree, of circadian adaptation to night work is substantially affected by the intensity of ambient lighting. Therefore, lighting conditions should be incorporated into OHS guidelines related to managing the fatigue risks associated with night work.

## P053
### A CHRONONUTRITION QUESTIONNAIRE TO CAPTURE SLEEP, TEMPORAL PATTERNS OF EATING, AND CHRONOTYPE: RELIABILITY AND VALIDITY

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Chrononutrition investigates temporal patterns of eating. Irregular patterns in shift workers and evening chronotypes adversely affect cardiometabolic health. We investigated the test-retest reliability and convergent validity of a Chrononutrition Questionnaire that aims to capture temporal patterns of eating and chronotype in shift and non-shift workers. 58 non-shift and 47 shift workers completed the study. Outcomes include: 1) chronotype, 2) sleep: wake/sleep/mid-sleep time and sleep duration, 3) temporal eating patterns: meal/snack regularity and frequency, times of first/last/largest eating occasions (EO), main meal (MM) 1/2/3, and duration of eating window (DEW) on work and work-free days (non-shift) and morning/afternoon/night/work-free days (shift workers). Test-retest reliability (intraclass correlation coefficients and weighted kappa), and convergent validity was determined against food and sleep diaries (Spearman Rank Coefficients). Reliability was acceptable for chronotype, sleep, and all temporal eating patterns except morning (last EO) and night shifts (last EO, DEW). Convergent validity was good for chronotype and sleep except for wake times and/or sleep duration on work-free days after morning and afternoon shifts. Meal/snack regularity and frequency showed good validity for non-shift but not shift workers. Times of first/last EO, MM1/2/3 and DEW generally showed good validity except for on work-free days, morning shifts, and night shifts. Time of largest EO was poorly correlated except for night shifts. The Chrononutrition Questionnaire has good test-retest reliability and acceptable convergent validity.

## P054
### NEUROTRANSMITTERS OF SLEEP AND WAKE IN FLATWORMS

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**Introduction:** Sleep is something that we all do, regardless of how much or how little. But why we sleep, and how sleep evolved is still something of a mystery. This research investigated how neurotransmitters and pharmaceuticals commonly seen in mammalian sleep and wake, play a role in the sleep of free-living flatworms.

**Methods:** Using behavioural methods, I observed the behaviour of flatworms under a 12:12 LD lighting condition. Using seven neurotransmitters and one pharmaceutical, I used a novel "yolk and soak" method – feeding the animals the neurotransmitter via hard-boiled egg yolk, as well as bathing them in the same concentration of neurotransmitter, to modulate their behaviour to either induce sleep, or wakefulness.

**Results:** We found that GABA, dopamine and histamine appear to be evolutionarily conserved. By dosing the flatworms with these neurotransmitters, we saw that the behaviour changed toward sleep (GABA) or wakefulness (dopamine and histamine) as it does in more recently evolved mammals. We also saw that the H1 antagonist Pyrilamine induced sleep, as it does in other animals.

**Discussion:** Understanding how neurotransmitters involved in sleep and wake in humans, and other mammals, may work in animals that are neurologically simple, and older in evolution can lead to many opportunities. We now know that GABA, dopamine and histamine promote sleep and wake in animals that have lost most of their complex systems through secondary simplification, suggesting that these neurotransmitters might be key to the origin of sleep, and may help to understand sleep disorders in humans.

## P055
### MAINTAINING EFFECTIVENESS AND MITIGATING SLEEPINESS: A TAILORED DIGITAL CBT-I APPROACH.

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**Background:** Bedtime restriction therapy, a core component of cognitive behavioural therapy for insomnia (CBT-i), often leads to an acute increase in daytime sleepiness. To mitigate the effect of bedtime restriction on accident-risk, we aimed to develop and test a 5-session self-guided digital CBT-i program that incorporates self-reported sleepiness into personalised treatment algorithms.

**Methods:** We recruited people with insomnia symptoms (ISI≥15) reporting no excessive daytime sleepiness (ESS<16) to a clinical trial. We assessed weekly self-reported sleepiness (ESS), nocturnal insomnia severity (Range: 0 [no symptoms] to 12 [worst symptoms]), and self-reported sleep/wake parameters during each digital CBT-i session. Intention-to-treat mixed models were used to investigate changes in weekly symptoms.

**Results:** Peri-treatment data from 52 people were used (Age M [sd] = 54.2 [15.7]; 81% female). Average ESS scores did not change from session one (M [±95%CI] = 5.9 [1.1]) to sessions two (6.2 [1.1]), three (6.2 [1.2]), four (5.4 [1.2]), or five (5.2 [1.2]). Improvements from sessions one to five were observed in; nocturnal insomnia severity (M [±95%CI] reduction = 4.0 [1.1], d = 2.3), and self-reported sleep onset latency (M reduction = 26.1 minutes [16.5], d = 0.6), wake after sleep onset (M reduction = 73.6 minutes [29.2], d = 1.0), sleep duration (M increase = 36.2 minutes [31.0], d = 0.5), and sleep efficiency (M increase = 17.9% [6.6], d = 1.2).

**Conclusion:** This digital CBT-i program improved insomnia symptoms without increasing average daytime sleepiness during any session. Further research is required in people commencing treatment with excessive daytime sleepiness.

## P056
### IMPROVEMENTS IN DAYTIME FUNCTION ITEMS OF THE INSOMNIA SEVERITY INDEX ARE CORRELATED WITH A POSITIVE IMPACT OF TREATMENT ON THE PATIENT GLOBAL IMPRESSION INSOMNIA SCALE

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**Introduction:** Items 4-7 (daytime function [DF]) of the 7-item Insomnia Severity Index (ISI) can assess daytime impairment. In Study E2006-G000-303 (Study 303; NCT02952820), lemborexant (LEM), a dual-orexin receptor antagonist, was associated at 6 months (6mo) with both significant improvement in ISI-DF items and significantly more subjects reporting positive effects on sleep, as assessed by the Patient Global Impression–Insomnia version (PGI-I), versus placebo (PBO). This analysis looked at the correlation between ISI-DF improvement and patient ratings on the PGI-I.

**Methods:** Study 303 was a 12-month, randomized, double-blind PBO-controlled (first 6mo) phase-3 study in adults with insomnia disorder. Subjects were randomized to PBO, LEM 5mg or 10mg for 6mo (2nd 6mo not reported here). ISI items are rated from 0 (no problem) to 4 (very severe problem). ISI-DF includes sleep satisfaction, extent symptoms are noticeable to others, cause worry/distress, and interfere with daily function. On the PGI-I, subjects assess positive, neutral or negative treatment impact on falling asleep, overall benefit on sleep, and total sleep time.

**Results:** A total of 739 subjects completed the ISI and PGI-I and were included in these analyses. At 6mo in all treatment groups, there were significant correlations (all P<0.001) between improvement in both ISI-DF items and PGI-I ratings regarding falling asleep, overall benefit on sleep, and total sleep time.

**Discussion:** These data suggest that the PGI-I may be a useful, quick tool to use in clinical practice, since an improvement in its score reflects improvements in daytime function.

**Sponsor:** Funded by Eisai Inc.

## P057
### EXPLORING THE 'PHARMACIST ROLE' IN INSOMNIA MANAGEMENT AND CARE PROVISION: A SCOPING REVIEW

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**Background:** Insomnia is a highly burdensome sleep disorder, with a global prevalence of approximately thirty percent in adults. Given its impact on daily functioning and the role it plays in the development/progression of comorbid mental/physical disease, appropriate and timely management is essential. Pharmacists are at the forefront of the primary care workforce and given their expanding roles in healthcare, could aid in alleviating the burden of insomnia in the community by delivering adequate care.

**Objectives:** To describe the current and potential roles of pharmacists in insomnia care.

**Methods:** An extensive search of five databases (MEDLINE, EMBASE, SCOPUS, IPA, CINAHL) was conducted. Titles, abstracts, and full text articles were screened to identify relevant studies for review inclusion. Articles were reviewed and data extracted, analysed, and grouped categorically based on nature of care provided.

**Results:** Thirty studies met inclusion criteria. Insomnia management provision across these studies was divided categorically into 1) Screening/Assessment, 2) Pharmacological and non-pharmacological management provision, and 3) Deprescribing services. Regarding treatment provision, it was evident that pharmacological approaches remain the most common treatment modality adopted despite guidelines recommending behavioural therapy as first line. Overall, the results highlighted that provided with the adequate training and education, pharmacists have the potential to engage in insomnia screening, behavioural therapy and deprescribing services, improving overall insomnia management in primary care.

**Conclusion:** The outcomes of this review highlight a current gap in insomnia management practices carried out by pharmacists and provide evidence for improved roles when pharmacists are upskilled with specialised insomnia management education/training.

## P058
### DISSECTING SLEEP RESTRICTION: DEFINING AND EMPIRICALLY TESTING A TWO-STAGE BUILD-MAINTAIN MODEL OF SLEEP RESTRICTION THERAPY FOR INSOMNIA

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**Introduction:** Sleep Restriction Therapy (SRT) is one of the core components of CBT for Insomnia (CBT-I). However, there is little empirical evidence regarding how SRT implementation evolves over the course of therapy. Here, we propose a conceptual model for defining stages of SRT and assess the applicability of the model in a recently completed clinical trial.

**Methods:** Our proposed two-stage Build-Maintain model of SRT is: 1) The Build stage starts with SRT implementation. The primary goal is building homeostatic pressure until average weekly sleep efficiency (SE) is high enough to increase time-in-bed (e.g., 85% or 90%). 2) The Maintain stage starts with the first increase of time-in-bed after the target SE is reached. The goal is to maintain sleep pressure sufficiently high that one can maintain SE in the desired range.

We assessed the model in 83 adults (age=48.3±14.8 years; 50F) undergoing CBT-I in a RCT. SRT was introduced in week 2. We explored the extent to which age, sex, psychiatric comorbidities, use of hypnotics, and baseline insomnia severity predicted progression through the SRT stages.

**Results:** Participants were in the Build stage 2.1±1.3 weeks (41.8% were in Build for only one week; 84% for ≤3 weeks). Higher baseline ISI (r=.238,p=.036) and lower baseline SE (r=-.365,p=.001) predicted spending more weeks in the Build stage before transitioning to the Maintain stage.

**Discussion:** The two-stage Build-Maintain model of SRT may inform: a) setting empirically-based expectations for client progress; b) examining adherence to CBT-I; c) evaluating shortened versions of CBT-I.

## P059
### SLEEP AND FIBROMYALGIA: IDENTIFYING AND MANAGING SLEEP DISORDERS.

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**Introduction:** Little is known about the presentation and management of sleep problems in patients with fibromyalgia [FMS]. This pilot study aims to 1) characterise sleep/wake patterns and sleep disorders in participants with FMS, and 2) assess changes in sleep and FMS symptoms with individualised sleep disorder treatment.

**Methods:** Women with FMS were recruited from the Rheumatology Unit at The Queen Elizabeth Hospital, South Australia. Participants recorded their sleep and activity for two-weeks using an under-mattress sleep sensor (Withings), sleep diaries and a wrist accelerometer. Questionnaires included Berlin Sleep Questionnaire (OSA); Epworth Sleepiness Scale; Flinders Fatigue Scale; Restless Legs Syndrome (RLS) Screener, Sleep Condition Indicator, and Fibromyalgia Impact Questionnaire.

**Results:** Preliminary data from 7 women (aged 49.3±12.8years, BMI 30.9±7.8kg/m2, average pain duration 14.1±9.4 years) were investigated. Sleep efficiency was low (65.9%±11.9). Five women were 'high-risk' for a sleep disorder (3 RLS, 3 OSA, 3 insomnia, 3 circadian rhythm disorders). Two were 'high-risk' for >2 sleep disorders. Two women had delayed, and one had advanced, circadian rhythms. Average self-reported sleep time in 'high-risk' women was shorter than the two women not at risk (6.2±1.1 vs 7.8±0.4hours). (6.2±1.1 vs 7.8±0.4hours). Fatigue Scores exceeded those commonly observed for respondents living with a medical condition (25.2±2.4 vs. 20.4 + 6.2). Participants are currently undergoing sleep disorder treatments and preliminary results will be reported.

**Conclusion:** Identifying and managing sleep disorders, using cognitive behavioural therapy for insomnia and chronotherapeutic approaches may be an important therapeutic target for FMS patients to improve sleep quality, daytime functioning, and FMS symptoms.

## P060
### EFFECTIVENESS OF CURRENT DIGITAL INTERVENTIONS FOR CHILDREN AND ADOLESCENTS WITH SLEEP PROBLEMS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Introduction:** Sleep problems occur in up to 50% of typically developing children. Sleep problems include difficulty initiating sleep, frequent night waking, daytime sleepiness, or frequent nightmares, which lead to poor quality sleep. We conducted a systematic review and meta-analysis to examine the effectiveness of digital sleep interventions for children and adolescents.

**Method:** Databases (MEDLINE, PubMed, PsycINFO, Scopus, EMBASE, CENTRAL and Web of Science) were searched for studies published from January 2012 to April 2023. Within-subject studies or randomised controlled trials reporting the effects of a digital sleep-based intervention were included. Random-effects meta-analyses estimated pooled standardised mean difference to assess effectiveness. Nine studies involving 484 children/adolescents were included in this review.

**Results:** Digital sleep interventions were effective in reducing insomnia symptoms, decreasing subjective sleep onset latency and wake after sleep onset, and increasing subjective sleep efficiency. Objective measures of SOL, WASO and SE were all unchanged following digital sleep intervention. However, objective but not subjective increases in TST were identified.

**Discussion:** These results suggest that digital sleep interventions are effective in improving children and adolescent's perceptions of their sleep but are less effective at improving some objective measures of sleep. Further, uptake of current digital sleep interventions was low, therefore future interventions should aim to address this, potentially through co-design, and integrating treatment components to enhance young people's motivation. In order to achieve a clear understanding of how digital sleep interventions compare to other behavioural interventions, additional high-quality randomised controlled trials comparing digital interventions to traditional in person modalities are needed.

## Sleep and breathing

## P061

### CPAP INVESTIGATION RESULTS: PHYSICIAN VS SCIENTIST DELIVERED. IS THERE A DIFFERENCE IN CPAP COMPLIANCE AND UPTAKE?

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**Introduction:** As standard practice in a tertiary public hospital, CPAP titration outcomes and recommendations are provided to patients by Sleep Physicians in a follow up consultation. To free up physician time, a new model of care was introduced where senior scientific staff would provide the results and recommendations after Sleep Physician reporting. The aim of this retrospective review was to determine if there were any differences in CPAP uptake and compliance between results and recommendations provided by Scientists, or Sleep Physicians.

**Method:** Retrospective review of uncomplicated CPAP naïve patients attending CPAP titration between 1/07/20 to 30/06/21. CPAP uptake, compliance, and Epworth at 2 and 12 months were compared between the groups receiving physician or scientist recommendations, using Student's T-Tests for continuous or Chi-Square tests for categorical variables.

**Results:** 446 patients (55% Male) received titration outcomes and recommendations, 57% from Scientists and 43% from Physicians. Mean age was 57.6+/-14.5 years, BMI=37.6+/-8.8 kg/m2, Baseline Epworth=10.5+/-5.9 and AHI=37.6+/-26.8 events/hr with no significant differences between groups. CPAP uptake for Scientists=72% and Physician=68% (p=0.403). There was also no difference in either compliance or ESS at 2 month and 12 month follow up.

**Discussion:** In this retrospective audit, no differences in CPAP uptake, compliance or ESS were observed between CPAP titration results and recommendations provided by Scientist compared to Sleep Physicians. However patient selection was not randomised and may have influenced results. More robust evidence requires a randomised controlled trial design to confirm findings.

## P062

### VALIDATION OF UNATTENDED POLYSOMNOGRAPHY USING SOMTE FOR DIAGNOSIS OF OSA IN PREGNANT WOMEN DURING EARLY GESTATION.

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**Introduction:** The detection of obstructive sleep apnoea (OSA) in pregnant women in early gestation using polysomnography (PSG) was logistically difficult during covid-19 lockdowns. Reliable alternates to PSG haven't been well validated in early pregnancy. We compared the agreement between self-applied, unattended Somte and attended PSG, in pregnant women by 24 weeks gestation.

**Methods:** Women were recruited to undergo self-applied, unattended Somte and attended Grael PSG, by 24 weeks gestation. Tests were scored by a single experienced scorer (blinded to PSG result). An apnoea-hypopnea index (AHI) 5 or above at PSG was considered diagnostic of OSA. Diagnostic test analysis was undertaken (sensitivity, specificity, positive and negative predictive value (PPV/NPV)), by creating receiver operating characteristic (ROC) curves. The calculated AHI was compared and Bland-Altman plot used to plot agreement.

**Results:** Twenty-Four participants were included for analysis, median age 33.5(29.0, 37.0) years, gestation at PSG 14.1(13.4, 15.7) weeks and median BMI 31.2(26.3, 36.5). Five (20.8%) women had OSA. Median AHI were similar, 1.75 (0.50, 4.53) and 1.6 (0.58, 4.25) for Somte and PSG respectively. Somte demonstrated reasonable diagnostic test accuracy (area under the ROC curve 0.94 (95%CI 0.81-1.0)), sensitivity 80% (cut off AHI 5) and specificity 89.5%. The PPV and NPV were 80.0% and 94.7% respectively. Bland-Altman plot upper and lower confidence intervals of 6.37, -8.89, demonstrated lower and higher AHI scores slightly underestimated and overestimated, respectively.

**Discussion:** Somte provided reasonable accuracy compared to PSG in identifying OSA in early gestation in this sample. Larger studies will be helpful to confirm this finding.

## P063

### LONG-TERM NON-INVASIVE VENTILATION IN PATIENTS WITH COPD: A RETROSPECTIVE COHORT STUDY.

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**Introduction:** Domiciliary long-term non-invasive ventilation (LT-NIV) is an accepted therapy for patients with severe chronic obstructive pulmonary disease (COPD) and chronic hypercapnia. This study aimed to characterise patients with COPD who were commenced on LT-NIV.

**Methods:** A retrospective analysis was performed of all patients prescribed LT-NIV with a primary physician-diagnosis of COPD, between June 2016 and March 2022 at an Australian tertiary hospital.

**Results:** 333 patients were commenced on LT-NIV, of whom 67 (20%) had COPD.

Inpatient LT-NIV Initiation: 53/67 (79%) were commenced on LT-NIV during an inpatient admission with acute exacerbation of COPD. Patients were elderly (age, mean 69± SD 9.5 years), predominantly female (60%) with moderate-severe COPD (FEV1 37±18%) and mild-moderate comorbidity burden (Charlson Comorbidity Index Score 2.1±1.4).

Prior to LT-NIV, 64% patients had a sleep study with 15% having severe OSA (AHI≥30 or ODI≥30). 30% previously required acute NIV. Pre-admission non-exacerbated PaCO2 was 58±7.3mmHg

During admission, all inpatients demonstrated hypercapnia (PaCO2≥45mmHg). Peak inpatient PaCO2 was 87±20mmHg, with persistent hypercapnia on discharge 58±9.0mmHg. On discharge, IPAP and EPAP settings were 17±3.8 and 7.7cm±2.7cmH2O respectively.

There was a non-significant reduction in respiratory-related and all-cause hospitalizations in the 12-months following LT-NIV initiation (p=0.66 and 0.53 respectively).

Outpatient LT-NIV Initiation: [Further data collection in progress]

**Discussion:** This study illustrates the real-world prescription of LT-NIV for COPD at our centre, with the majority being initiated in the inpatient setting, rather than early outpatient reassessment. A prospective multi-centre analysis is required to better understand the nuances of LT-NIV prescription in patients with COPD.

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## P064

### PREDICTIVE VALUE OF AWAKE SUPINE PULSE OXYGEN SATURATION IN DETECTING RESTING HYPERCAPNOEA PRIOR TO POLYSOMNOGRAPHY

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**Introduction:** Arterial blood gases (ABG) are used during polysomnography (PSG) to assess gas exchange abnormalities in patients at risk of hypercapnoea. ABG sampling may cause discomfort and can be difficult to obtain. Normal, awake, supine finger pulse oxygen saturation (SpO2) immediately prior to PSG may reduce the need for ABG sampling.

**Aim:** To determine if an awake supine evening SpO2 cutoff value can exclude awake hypercapnoea measured with ABG testing.

Methods : Prospective observational study of all patients referred for diagnostic or treatment PSGs with ABG at Westmead Sleep Laboratory between January 2019 and December 2021. ABGs were requested to exclude hypercapnoea and were collected awake, supine and breathing room air prior to PSG with simultaneous SpO2 measurement. We defined resting hypercapnoea as PaCO2 > 45mmHg. We used 2x2 tables for SpO2 values of 93% to 98% to determine the negative predictive values (NPV) for SpO2 cutoffs and construct a receiver operating characteristic (ROC) curve.

**Results:** We analysed 146 patients (60±17 years; 68% male; Body-mass Index 32.7±12.0 kg/m2; mean±SD) and 36 patients (25%) had hypercapnoea. The NPVs for hypercapnoea on the ABG with cut off SpO2 values of 96%, 95%, 94% and 93% were 92%, 92%, 89% and 83%, respectively. The ROC area under curve was 0.75.

**Conclusion:** Resting supine oxygen saturation of ≥95% was able to exclude hypercapnoea in 92% of subjects within this sleep population at high risk of hypercapnoea. Thus, an accurate, awake, supine SpO2 ≥95% will fail to diagnose hypercapnoea in ~8% of high risk patients.

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## P065

### A COMPARISON OF TWO OBESITY RELATED HYPOVENTILATION DISORDERS – IMPACT ON SLEEP, QUALITY OF LIFE AND NEUROCOGNITIVE OUTCOMES AND THE EFFECTS OF PAP THERAPY

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**Introduction:** Symptom burden and neurocognitive function have not been previous compared between patients with obesity-associated hypoventilation disorders (obesity hypoventilation syndrome, OHS), and hypoventilation in the setting of obesity and obstructive airways disease (OHAD). The aim of this study is to compare baseline sleep-related symptoms, health-related quality of life and neurocognitive function between OHS and OHAD and the impact of PAP therapy on these outcomes.

**Methods:** ESS, PSQI, SF36, and various neurocognitive tests, in addition to anthropometric, polysomnography, lung function and blood gas data from 45 patients with OHS and 32 patients with OHAD, were included in the analysis. Between groups (OHS vs OHAD), pre- and post-treatment (with 3 months of positive airway pressure) comparisons were made using linear mixed modelling.

**Results:** Both OHS and OHAD had similar baseline ESS (14(5.6) vs. 12(5.4)), Global PSQI (10(3.2) vs 11(4.8)), SF36 and neurocognitive test performances (other than OHAD had lower digit symbol substitution test performance). Treatment with PAP therapy resulted in similar improvements in ESS, Global PSQI, and SF36 in both groups. Neurocognitive performance did not significantly improve after PAP therapy in either group.

**Discussion:** The symptom burden between two separate hypoventilation disorders (OHS and OHAD), in terms of sleepiness, sleep quality, quality of life and cognitive function, were similar. OHS and OHAD had similar treatment responses in these parameters after 3 months of PAP therapy.

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## P066

### THE RELATIONSHIP BETWEEN CHRONIC BREATHLESSNESS AND PERCEIVED SLEEP QUALITY IN ADULT AUSTRALIAN

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**Introduction:** This study aimed to explore the relationship between breathlessness (severity and chronicity) and poor sleep quality.

**Methods:** Analysis of an Australia-wide, online cross-sectional survey carried out between 12 July - 2 August 2021. Community-dwelling adults were recruited from a web-based survey panel, with recruitment based on age, gender, and state of residence quotas to match the Australian 2016 census population data. Participants self-reported breathlessness using the modified Medical Research Council (mMRC) scale, as well as their

perceived sleep quality and other demographic and health measures.

**Results:** Sleep quality was available for 9,877 responders (52% females, mean age 46, SD=19 years, BMI 27 SD=7 kg/m2). Sleep quality in the previous month was reported as "very good", "fairly good", "fairly bad" and "very bad" by 16, 49, 25%, and 10% of participants respectively. Breathlessness (mMRC 1–4), chronic breathlessness (mMRC 1–4 for longer than 3 months) and severe breathlessness (mMRC 2–4) were 42, 29 and 11% respectively. Respondents with perceived poor sleep quality were more likely to be breathless, younger, with a higher BMI, and higher likelihood of identifying as female. All measures of breathlessness were associated with increased odds of poor sleep quality [adjusted models with gender, age and BMI, OR (95% confidence interval): 2.6 (2.4 to 2.9), 3.1 (2.8 to 3.5) and 3.4 (2.9 to 3.9) for breathlessness, chronic and severe breathlessness respectively]. There were no significant interactions between any breathlessness measure and age.

**Discussion:** There is a strong association between breathlessness and perceived poor sleep quality.

## P067
### PATIENT PERCEIVED SLEEP QUALITY AT CPAP TITRATION STUDY AS AN EARLY INDICATION OF SHORT AND LONG-TERM ADHERENCE TO CPAP THERAPY.

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**Background:** Untreated obstructive sleep apnoea is associated with morbidity and diminished quality of life. Despite this, adherence to continuous positive airway pressure (CPAP) remains poor. Few studies have examined which factors from CPAP titration study affect adherence, with a paucity that evaluated perceived sleep quality and adherence.

**Methods:** We hypothesise that patients with better perceived sleep quality, at the time of their CPAP titration study will have greater uptake and adherence to CPAP. We aim to:

1. Compare the change in patients' perceived sleep quality between diagnostic and CPAP titration studies, and future CPAP adherence at 3 and 12 months.

2. Evaluate the association between patients' perceived sleep quality at the time of their CPAP titration study with future CPAP adherence at 3 and 12 months.

3. Evaluate factors relating to sleep architecture, and sleep disturbance that affect patients' perceived sleep quality.

Sleep studies were obtained prospectively between 2018 and 2019. Patients completed two questionnaires grading sleep quality post study.

**Progress to Date:** This study was approved as a quality activity through the Metro North Quality and Safety Unit (ID 3929). Sleep study and questionnaire data were collated and merged with adherence data. Analysis will begin shortly.

**Intended Outcome and Impact:** We intend to publish the results of this study in an international sleep journal. Positive findings may improve management of those at risk of poor adherence. Subsequent studies may evaluate the effect of early patient follow up or early motivational interviewing on uptake and adherence to CPAP.

## P068
### FACTORS AFFECTING SLEEP QUALITY IN HOSPITALISED RESPIRATORY MEDICINE PATIENTS

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Background & Aim: Hospitalised patients are at increased risk of poor sleep which can negatively impact on recovery and quality of life. This study aimed to assess sleep quality in hospitalised patients and explore the factors associated with poorer sleep.

**Methods:** A hospital-wide questionnaire completed at discharge as asked patients to rate their sleep quality during their admission. Results were compared between respiratory and non-respiratory inpatients. A more detailed questionnaire rating sleep quality and factors disrupting sleep was completed by respiratory ward inpatients at discharge and combined with medical record review of co-morbidities that may impact on sleep.

**Results:** The hospital-wide questionnaire was completed by 619 patients.28% of respiratory ward inpatients reported poor or very poor quality sleep compared to 20% of patients in a general medicine or other subspecialty ward. 83 respiratory inpatients have completed the more detailed questionnaire to date with recruitment ongoing. Sixteen patients (19.3%) reported poor or very poor sleep. These patients were compared to those who reported fair, good, or very good sleep. Age, gender distribution and BMI were similar between both groups. Noise rating was a significantly different between the groups and may predict sleep quality.

**Conclusion:** A high proportion of hospitalised patients reported poor sleep quality at our tertiary centre particularly on the respiratory inpatient ward where noise was a significant factor. Further research is needed to determine whether strategies to reduce noise will improved sleep quality and clinical outcomes.

## P069
### ASSESSING THE PREVALENCE OF ANATOMICAL ABNORMALITIES AMONGST PATIENTS WITH SLEEP DISORDERED BREATHING AND HIGH NON-INVASIVE VENTILATION PRESSURE REQUIREMENTS.

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**Background:** Adherence and tolerance of positive airway pressure (PAP) therapy is thought to be lower in individuals with sleep-disordered breathing and high pressure requirements. Patients occasionally have physical anatomical abnormalities that can contribute to these high pressure requirements. These anatomical abnormalities may have reversible contributors, which may reduce pressure requirements and thus improve tolerance of positive airway pressure.

**Methods:** A retrospective single centre cohort study of patients with sleep-disordered breathing was performed. Inclusion criteria was prescription of non-invasive ventilation with inspiratory pressure IPAP >25 cmH2O between 01/01/2013-01/01/2023. All

indications for PAP were included. Patient demographics, indications for PAP, sleep study results and anthropomorphic details were assessed. Primary outcome will be the proportion of patients assessed for anatomical abnormalities of the upper airway.

**Progress to date:** To date, 116 patients with high pressure requirements have been identified and data collection is in progress.

**Intended outcome and impact:** Amongst our local cohort, we aim to describe the proportion, demographic and clinical features of patients with sleep-disordered breathing on bilevel positive airway pressure therapy with high pressure requirements. Ultimately, we hope to use this research to inform decision-making with regards to referral to ENT.

## P070

### EFFICACY OF THE EXVENT ACCESSORY WITH THE O2VENT OPTIMA ORAL APPLIANCE IN THE TREATMENT OF OBSTRUCTIVE SLEEP APNEA – A CLINICAL TRIAL

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**Introduction:** The study assessed the efficacy of oral appliance device O2Vent Optima and ExVent, an oral Expiratory Positive Airway Pressure (EPAP) accessory in the treatment of OSA.

**Methods:** A prospective, open-label study conducted at 3 sites in mild to moderate OSA (AHI $\geq$ 5 and $\leq$ 30).

Screening Phase

A diagnostic in-lab PSG study confirmed a diagnosis of mild to moderate OSA.

Treatment I

Subjects used O2Vent Optima for 6 weeks and underwent a PSG sleep night while using the O2Vent Optima.

Treatment II

Subjects used O2Vent Optima + ExVent for 6 weeks and underwent a PSG sleep night while using the O2Vent Optima + ExVent

Primary Effectiveness Measure: Change in AHI between baseline vs. O2Vent Optima MAD vs. O2Vent Optima + ExVent

**Results:** Treatment with Optima, Optima + ExVent reduced AHI from 22.5±6.4/hr to 12.6±4.5/hr to 5.9±2.7 (p< 0.005 baseline vs. Optima and Optima + ExVent; p<0.05 Optima MAD vs. Optima + ExVent). Average reduction in AHI with Optima was 43% and with Optima + ExVent was 72%. The lowest oxygen during sleep increased from 84.6±2.7% to 88.6±2.9% to 91.6±3.2% (p< 0.005 baseline vs. Optima and Optima + ExVent; p<0.05 Optima vs. Optima + ExVent). During the trial patients on treatment with Optima and Optima + ExVent demonstrated no excessive adverse events or device malfunction.

**Conclusion:** Treatment with O2Vent Optima and O2Vent Optima + ExVent significantly improved OSA compared to the baseline. Even greater benefit was observed with addition of ExVent to the Optima in mild to moderate OSA.

## Occupational health safety and performance

### P071

### SIMPLE VESTIBULAR-OCCULAR MOTOR ASSESSMENT AS A PREDICTOR OF DRIVING PERFORMANCE VULNERABILITY FOLLOWING EXTENDED WAKEFULNESS

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**Introduction:** Driver fatigue is a significant contributor to road crashes, but identifying individuals at driving risk is challenging. We examined the potential of simple baseline vestibular ocular motor system (VOMS) assessment via virtual reality goggles to predict subsequent vulnerability to driving simulator impairment following extended wakefulness.

**Methods:** 49 individuals (Mean±SD Age 32.6±12.9, 45% Males) underwent 9hr baseline sleep opportunity followed by approximately ~29hrs extended wakefulness with five 60min driving assessments. Cluster analysis classified drivers into vulnerable (n=17) or resistant (n=32) groups based on their worst steering deviation and number of crashes from driving tests. Baseline VOMS were performed ~10mins prior to the first three drives (1, 7 and 13hrs of wakefulness). XGBoost machine learning model was trained using baseline VOMs features to predict vulnerable vs resistant groups from driving tests 4 and 5 (19 and 25hrs of wakefulness) Model performance was evaluated using 5-fold cross-validation approach using ROC analysis.

**Results:** XGBoost machine learning ranked all 70 VOMS metrics on their importance in predicting vulnerable vs resistant groups. Top 10 VOMs metrics assessed during baseline non-sleep deprived tests demonstrated a strong ability to predict the driver's performance following extended wakefulness, differentiating between the vulnerable vs resistant groups (AUC 0.73 [95%CI 0.61-0.83, p<0.001]).

**Conclusion:** VOMs tests conducted at baseline holds promise for predicting future driving impairment. This approach has the potential to be highly valuable in determining an individual's fitness to drive. Future validation in independent samples, sleep disordered population and in-field on-road testing are needed to confirm these promising findings.

### P072

### SLEEP, SHIFT WORK PATTERNS AND WORK-RELATED ACCIDENTS IN REGIONAL/RURAL VERSUS METROPOLITAN HEALTHCARE SHIFT WORKERS.

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**Introduction:** Sleep impairment can decline alertness and performance and increase the risk of occupational injuries such as medical errors, workplace injuries and car accidents. Australia has a shortage of healthcare shift workers, particularly in regional/rural areas. The consequence of this is that rural healthcare shift workers potentially have to work longer hours, be more on-call and/or have to commute longer distances to/from work. These factors could impact the worker's sleep and recovery. The aim was to explore the differences in sleep and shift work patterns in regional/rural and metropolitan healthcare shift workers and the risk of workplace accidents, medical error, and car accidents.

**Method:** An anonymous online survey was distributed targeting nurses, midwives and paramedics.

**Results:** 403 healthcare shift workers completed the survey. Those in regional/rural locations were significantly older, had more experience, worked significantly more hours per week, more night shifts and on-call shifts in the previous two weeks. However, metropolitan shift workers took significantly longer (in minutes) to travel to work, reported more feelings of sleepiness while driving to/from work, having a car accident or near accident while commuting home, and having a workplace accident in the last 12 months. There was however no differences in sleep quality between the groups but poor sleep quality was the main contributing factor related to workplace incidents, medical errors and car accidents.

**Conclusion:** There were differences in shift work patterns between metropolitan and regional/rural healthcare shift workers. More exploration is needed to understand the components that contribute to increased OH&S risks.

### P073

### EXAMINING THE COMPLEX RELATIONSHIPS AMONG INSOMNIA, PTSD, PSYCHOLOGICAL DISTRESS, AND SUICIDAL IDEATION IN FIREFIGHTERS.

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**Introduction:** Firefighters endure sleep disruption and exposure to traumatic events - inherent occupational stressors that may contribute to insomnia, psychological distress, and PTSD. These factors are interrelated, with around 70% of individuals with PTSD experiencing co-occurring sleep problems but it remains unclear if insomnia has a unique effect on the risk of suicidality. The aim of this study was to investigate if there was an association between insomnia and suicidal ideation, above and beyond PTSD symptom severity and psychological distress.

**Methods:** Firefighters (n=578) self-reported their sleep problems, PTSD symptom severity, psychological distress, and suicidal ideation and attempts. Logistic regression was used to estimate the association between insomnia and suicidality and whether insomnia was associated with suicidality, above and beyond PTSD symptom severity and psychological distress.

**Results:** Insomnia was positively associated with suicidal ideation; with every one unit increase in insomnia, the odds of suicidal ideation increased by 1.42. However, the significance of the association between insomnia and suicidal ideation did not remain when accounting for PTSD symptom severity and psychological distress.

**Conclusion:** These findings suggest an association between insomnia and suicidal ideation in firefighters, as part of the impact

of PTSD and psychological distress, rather than unique to these risk factors. Although interventions to target sleep problems in firefighters may have benefits for reducing risk of suicidality, our findings suggest a more holistic mental health approach may be more successful.

## P074
### SLEEP-RELATED PREDICTORS OF ROAD AND WORKPLACE SAFETY IN YOUNG ADULTS: RESULTS FROM A COMMUNITY REPRESENTATIVE SAMPLE

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Young adults are at increased risk of road and workplace incidents. Sleep-related predictors of increased risk include short sleep duration, sleep disorders and shift work. It is unknown which predictors are the most impactful, or whether they are interrelated. To address this, sleep-related predictors were concurrently examined in young adults. Participants were young adults (22 years) from the Raine Study, who were employed, assessed for common sleep disorders (obstructive sleep apnoea by polysomnography, insomnia and restless legs syndrome symptoms by validated questionnaires), provided information on shift work status and habitual sleep duration. Two sub-groups were analysed: participants with a driver's licence and self-reported information on road incidents (n=519) and those with information on workplace incidents, regardless of driver's license status (n=575). Poisson regression models adjusted for sex and comorbidities were used to examine sleep-related predictors of road and workplace incidents. A total of 15% reported ever falling asleep behind the wheel and 23% reported ever having at least one near-miss road accident due to sleepiness. Diagnosis of a sleep disorder predicted near-miss road accidents (risk ratio, 3.0; 95%CI 1.7–5.3), independent of sleep duration and shift work. A total of 11% reported ever falling asleep on the job and 12% reported ever having an accident at work that required seeing a doctor or nurse, neither of these were associated with sleep duration, sleep disorders or shift work status. Sleep disorder diagnosis may be important in young adults given road incidents are strongly associated with the presence of a sleep disorder.

## P075
### STRATEGIES TO IMPROVE SLEEP DISORDER DIAGNOSIS AND MANAGEMENT IN THE WORKPLACE: PERSPECTIVES OF FUTURE SHIFT WORKERS LIVING WITH SLEEP DISORDERS

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Shift workers with untreated sleep disorders face greater risk of negative health and safety outcomes. A population of particular concern is early-career shift workers, as 20% of young adults live with, largely undiagnosed, sleep disorders.

This study aimed to explore what structures and qualities future shift workers would value in prospective workplaces regarding sleep disorder support and management. The study aims to inform the development of interventions that are acceptable to workers.

Undergraduate paramedicine students were invited to complete an online survey and participate in a health services trial. The survey included validated sleep disorder screening questionnaires, with those identified at risk of a sleep disorder being offered further diagnostic testing or treatment. Participants completed a qualitative interview upon completion of the trial to discuss their experience and recommendations to improve screening and management of sleep disorders for shift workers.

Seventeen paramedicine students (mean age 22.5±8.3 years, 59% female) with an undiagnosed sleep disorder were recruited into the trial. Early thematic analysis identified two key themes: Increasing education and awareness of sleep disorders and supporting access to health services. Almost half of the participants discussed the importance of increased awareness of sleep and sleep disorders during pre-employment training and in the workplace. Participants also identified convenience as an important factor in facilitating the management of sleep disorders.

Facilitating access to sleep health services before workers are exposed to shift work and during early employment were suggested to improve sleep disorder identification and management for early-career shift workers.

## P076
### COMPARING FOUR DIFFERENT SIMULATED SHIFTWORK SCHEDULES ON HIGHER ORDER COGNITIVE FUNCTION

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**Introduction:** Changes in cognitive performance during shiftwork due to fatigue and circadian misalignment are well-documented. However experimental evaluations of shiftwork schedules are often limited to basic tasks such as vigilance and attention. The current study evaluated several higher order cognitive functions such as memory and task switching during four simulated shiftwork schedules.

**Methods:** N=27 completed a 10-day laboratory shiftwork simulation. They were randomly assigned to one of four shiftwork conditions: Condition A, 4h-on/4h-off/8h-on/8h-off schedule; Condition B, 6h-on/6h-off schedule; Conditions C and D represented to different sections of a 4h-on/4h-on call/4h-off/4h-on/4h-on call/4h-off schedule. The Automated Neuropsychological Assessment Metrics (ANAM) was used to assess cognitive function. The tasks included in this analysis were Code Substitution (CDS/CDD), Pursuit Tracking (PUR), Matching to Sample (M2S), and Switching Task (SWT). Stability of performance during waking was compared between the conditions using Kruskal-Wallis tests.

**Results:** The analysis of cognitive performance tasks yielded mixed findings. Performance on all tasks was ranked from best to worst: Condition D (>Conditions A, B, C; all p < .05), Condition A (>Conditions B, C; p < .05 and p <.001, respectively), Condition B, Condition C. Regarding stability of higher order cognitive function across the waking day, Condition A exhibited the worst stability, and was the only condition whereby performance degraded across the wake period.

**Discussion:** These findings highlight the variability in cognitive capacities during different shiftwork schedules. It is important

to examine higher order cognitive function, and other cognitive abilities during shiftwork, when evaluating different shiftwork schedules.

## P077

### ASSOCIATIONS OF SEX, SLEEP, AND CIRCADIAN RHYTHMS WITH PERFORMANCE IN ELITE AUSTRALIAN RULES FOOTBALLERS

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**Introduction:** Poor sleep and circadian misalignment are associated with poorer performance. In elite Australian Rules football (ARF), both sex and professionalism could alter or exacerbate these associations. This study provides preliminary insights on how the relationships of sleep and circadian alignment with cognitive performance differ between male full-professional and female semi-professional elite ARF athletes.

**Methods:** Participants were 72 elite ARF athletes (42% female; M-age = 24.1±4.4 years). During pre-season, participants completed two weeks of sleep/wake monitoring via actigraphy, and a circadian phase assessment (dim light melatonin onset; DLMO) after one week. Cognitive performance testing (psychomotor vigilance task, PVT; and the balloon analogue risk task; BART) was conducted five times throughout this period.

**Results:** Preliminary findings suggest average total sleep time and sleep efficiency, sleep regularity, DLMO, and phase angle (interval between average sleep onset and DLMO) did not predict reaction time on the PVT, nor did sex moderate these relationships. After controlling for sex, longer sleepers demonstrated greater risk taking on the BART. Only among male athletes did larger angles predict greater risk taking.

**Discussion:** Elite ARF athletes, regardless of sex, sleep, or circadian alignment, have similar reaction times. Risk taking is greater among longer sleepers and in male athletes experiencing relatively delayed circadian phases. Where risk-taking has negative implications (e.g., injury and sporting errors), these findings identify at-risk groups. Few sex-specific findings may suggest that the semi-professional status of female ARF (and associated lifestyle factors such as scheduling and income) is not altering elite performance in controlled settings.

## P078

### "IT'S VERY GOOD BUT IT NEEDS TO BE BETTER": USABILITY AND ACCEPTANCE OF FATIGUE DETECTION TECHNOLOGY IN AUSTRALIA.

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**Introduction:** Fatigue detection technology (FDT) is commonly used in the Australian road transport industry to monitor and/or detect driver fatigue. These devices typically provide alerts to drivers and their organisation if fatigue is detected and aim to reduce incidences of fatigue-related vehicle crashes and/or improve driver behaviour. The rise of these technologies is generating debate about how their relative design and merit might be evaluated.

However, little is known about the experiences of individuals who use FDTs, including perceptions of use, acceptance, and effects on driver behaviour. The Australian Automobile Association funded the research into FDTs from which this presentation draws.

**Methods:** Semi-structured interviews were conducted with a range of existing users of FDT (n = 28) between November 2022 and June 2023. Participant groups included drivers (n = 17), middle managers and data users (n = 7), and executives (n = 4) from different commercial organisations that were trialling or had adopted FDT.

**Results:** Preliminary thematic analysis has identified a range of factors underlying driver and organisational acceptance of FDTs. These include: data privacy, vendor support, technical merit, training load, intrusiveness, and cost. Drivers perceived their behaviour to be moderately impacted by FDT in positive and negative ways. This included impacts on sleep/wake behaviour, in-cab activities, and driving performance. Certain types of FDT were considered highly contentious by all existing user groups.

**Discussion:** FDT adds further complexity to the contentious topic of fatigue management for professional drivers. Findings highlight a range of implications for FDT adoption and effective evaluation.

## P079

### SHIFTING THE PARADIGM: IMPLEMENTATION SCIENCE IN ENHANCING SLEEP HEALTH AMONG SHIFTWORKERS

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**Introduction:** Addressing the urgent public health concern of sleep health among shiftworkers, our study examined the application and effectiveness of a tailored sleep intervention, the Sleepfit app. We assessed reach, effectiveness, adoption, and maintenance, while identifying potential implementation barriers across diverse shiftwork industries.

**Methods:** The two-phase study commenced with the Sleepfit app's optimisation, originally developed for day workers, by integrating sleep improvement strategies specifically for shiftworkers. The feasibility of large-scale implementation was then evaluated based on the RE-AIM framework, considering reach, effectiveness, adoption, implementation, and maintenance. The study involved existing shiftworkers (current sample, n=29; anticipated final sample n=90). Validated sleep health measures and RE-AIM metrics were used, with data analysed through a mixed-methods approach.

**Results:** Preliminary results indicate significant improvement in sleep satisfaction and reduction in insomnia severity, indicating the potential of the intervention in enhancing sleep outcomes. We also observed increased engagement with healthy sleep practices, demonstrated by a significant decrease in poor sleep behaviours. Interestingly, our preliminary findings propose specific benefits for younger shiftworkers who typically engage in problematic sleep practices. Preliminary data suggests 71% of shiftworkers engaged with the app at 2-weeks post intervention, with 23% continuing to use the app during long-term maintenance evaluation. As data collection is ongoing, a detailed analysis incorporating feasibility and all RE-AIM dimensions will be subsequently presented.

**Conclusion:** Preliminary findings suggest the Sleepfit app may serve as an effective sleep health intervention among shiftworkers, with further analyses needed to fully understand its feasibility and long-term adoption.

## P080

**USING YOUR MOBILE/TABLET DEVICE AT BEDTIME FOR WORK: IMPLICATIONS FOR ADULT SLEEP AND JOB PERFORMANCE**

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**Introduction:** A substantial number of workers post-COVID-19 now work at home. Remote work allows for greater flexibility in work timing including the preference to work at bedtime. Thus, increasing the likelihood of digital device use at bedtime with possible negative consequences for sleep, job recovery and, in turn, job performance. This interplay remains to be tested.

**Methods:** 202 university workers (54M, 144F; mean age (SD) = 48.38 ± 10.23y) completed a 10 day diary over two working weeks (Oct/Nov 2021) assessing digital device use, sleep, workload, worksite location, job recovery in the evening and job performance.

**Results:** Linear mixed model analyses revealed when comparing between individuals that greater digital device at bedtime was associated with greater wakefulness after sleep onset and shorter sleep and, in particular, if they worked from home compared to the office. By contrast, when comparing within individuals it was not the case if an individual used their digital device more on one night than another that this was associated with worse sleep nor was sleep worse on those nights when an individual had worked at home rather than the office. Analyses examining job recovery and job performance are currently under review.

**Discussion:** The present findings suggest that individuals who habitually use their digital device at bedtime are at a greater risk for poor sleep and supports the need for workplace implementations to discourage workers taking work to bed.

## POSTER VIEWING PRESENTATIONS

## Paediatric

## P081
### EXPERIENCES OF MEN WHO HAVE HAD BARIATRIC SURGERY IN NEW ZEALAND

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**Introduction:** Bariatric or weight loss surgery is currently the most effective method of long-term weight loss, and as obesity is a major risk factor for obstructive sleep apnoea, a potential treatment option. Approximately 80% of people who have bariatric surgery are women, however there is limited research regarding men, and none from New Zealand. This project aimed to investigate the experiences of men who have had bariatric surgery in New Zealand.

**Methods:** This study took a constructivist qualitative approach, collecting data using semi-structured interviews with six men who had bariatric surgery in New Zealand. Interviews were conducted in person and over Zoom. Interviews were transcribed, then thematic analysis used to develop themes.

**Results:** Participants were aged between 31 and 63 when they had surgery, with half having surgery in the public, and half in the private sector. Five identified as New Zealand European/Pākehā, and one as Māori. The main themes developed from the data were: attaining control of their weight, and surgery as life changing. A significant sub-theme was support, with that of health care professionals vital.

**Discussion:** Participants had regular interactions with health care professionals due to multiple comorbidities, including sleep apnoea, however, the topic of surgery was rarely broached. All the men were satisfied with their decision to have surgery, with an improved quality of life and most comorbidities resolved. With a high number of sleep apnoea patients also morbidly obese, sleep professionals are well placed to encourage or to refer their morbidly obese patients for bariatric surgery.

## P082
### NEURAL APERIODIC ACTIVITY AS A NOVEL BIOMARKER OF SLEEPINESS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA

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**Background:** Obstructive sleep apnoea (OSA) is characterised by repetitive collapse of the upper airway causing intermittent episodes of hypoxia and apnoeas during sleep. Excessive daytime sleepiness (EDS) is the cardinal symptom of OSA and presents in between 40.5 to 58% of patients. Currently, the diagnosis of OSA requires demonstration of an elevated apnoea hypopnea index (AHI) on a polysomnogram (PSG). Higher AHI scores denote increased OSA disease severity. The correlation between objective AHI scores and subjective sleepiness reporting tools such as the Epworth Sleepiness Scale (ESS) is less clear.

Electroencephalogram (EEG) readings form an important component of PSG testing. Traditionally, the periodic oscillatory waves captured on EEG are examined to accurately identify stages of sleep. EEG aperiodic activity is a measure of neural excitation/inhibition ratios and has emerged as a novel objective measure of sleepiness.

**Methods:** Intended data collection from 500 patients who have undergone ambulatory PSG testing at the Royal Adelaide Hospital between January 1st 2021 and December 31st 2022 as part of their routine care. Data collection will include patient demographics, cardiorespiratory comorbidities, medications, body mass index (BMI), Epworth Sleepiness Scale (ESS) and PSG EEG data including sleep parameters [Total sleep time (TST), stage of sleep, periodic limb movement limb index (PLMI), AHI scores].

**Progress to date:** Research proposal is currently under review by the CALHN HREC.

**Intended outcome and impact:** In this study we will assess the utility of aperiodic neural activity as a predictor of sleepiness in patients with elevated AHI and ESS scores.

## P083
### EVALUATION OF OSA IN CHILDREN: DEFINING THE SCOPE OF A PAEDIATRIC SLEEP SERVICE

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**Introduction:** The sleep unit runs as a diagnostic paediatric service, and does not provide titrations as part of its scope. This study evaluates the requirement for titration studies for our patient cohort to better understand the scope of service. Obstructive sleep apnoea (OSA) affects 0.7%-13% of the general paediatric population, where a normal AHI is <1, mild >1-4.99, moderate >5-9.9 and severe OSA >10.

**Method:** A retrospective audit was undertaken of patients who attended between January and April 2022. Patients <2 years old and oxygen titration studies were excluded. Data was obtained by collating information from electronic medical records and physician reports. Parameters analysed: study indication, gender, AHI, desaturations, and BMI percentile.

**Results:** Preliminary data (n=101) (males 59.6%, age 8.6 ±4.3SD) shows that 12.9% (Male n=7; age 8.9 ±4.9SD) of our paediatric patients have OSA. 61.5% were mild, 7.7% were moderate and 30.8% of those had severe OSA. Patients had an average oximetry of 96% (±1.3SD) at baseline and an average Nadir of 83% (±10.1SD). It was also found that 53.8% of patients with OSA had a BMI percentile well above the healthy range. Other preliminary findings show 58% of the patients were snorers, and 8.9% of the patients were diagnosed with periodic limb movements.

**Discussion:** Only patients with severe OSA were referred externally for bi-level studies. Of the remaining OSA positive patients, adenotonsillectomy was recommended for three subjects, and the rest received no bi-level intervention. The data suggests a diagnostic only laboratory is sufficient to service our paediatric population.

## P084
### CHARACTERISTICS OF SLEEP HYPOVENTILATION DURING POLYSOMNOGRAPHY IN A LARGE AUSTRALIAN CLINICAL SLEEP LABORATORY COHORT.

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**BACKGROUND:** Sleep hypoventilation complicates a range of neurological and respiratory conditions. However, robust definitions are based mainly on expert consensus, and clinically significant thresholds remain unclear. This study thus aims to provide a descriptive analysis of capnography results in a large clinical cohort of patients referred for overnight polysomnography (PSG).

**METHODS:** Retrospective clinical audit of overnight in-lab PSGs, between Jan 2015 and June 2023, at a tertiary hospital housing the State-wide referral centre for chronic domiciliary ventilation. Diagnostic PSGs with transcutaneous $CO_2$ (PTcCO2) monitoring and without supplemental oxygen were included.

The following data will be extracted from each PSG:

Patient demographics:

-Primary and secondary clinical diagnoses

-PTcCO2 values (e.g. Mean, Minimum and Maximum PTcCO2 in Wake, Sleep, NREM and REM)

-Sleep fragmentation measures

-Sleep macro-architecture measures

-AHI

-SpO2 values

Data analysis will be performed with IBM SPSS Statistics software, version 26 (Armonk, NY: IBM Corp)

**PROGRESS TO DATE:** 525 PSGs meeting initial criteria have been identified. Currently processing PSG data files to extract parameters and complete exploratory data cleaning and analysis.

**INTENDED OUTCOME AND IMPACT:** We aim to explore and clarify:

-Differences in patterns of hypoventilation between different diagnostic groups.

-Relationships between awake hypoventilation, sleep hypoventilation and REM-isolated hypoventilation.

-Effects of applying differing criteria for hypoventilation available in the literature.

-Relationships between measures of sleep fragmentation, AHI, SpO2 and hypoventilation parameters.

The results of this study will also support and inform future research into associations between severity, duration and patterns of hypoventilation and clinically significant outcomes including morbidity and mortality.

## P085

### EARLY CHILDHOOD AND ADOLESCENT PREDICTORS OF SLEEP PROBLEMS AND SLEEP DISORDERS IN ADULTHOOD: A SYSTEMATIC REVIEW OF LONGITUDINAL OBSERVATIONAL STUDIES

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**Background:** By middle-age, 43% of Australian adults live with a clinical sleep disorder. Sleep disorders are linked to chronic illnesses which are a leading cause of premature mortality. The aim of this review was to identify, appraise and synthesise evidence from longitudinal observational studies to clarify childhood and adolescence risk factors associated with sleep disorders in adulthood.

**Method:** Four databases (Web of Science, Medline, SCOPUS, and PSYCINFO) were searched using predefined inclusion and exclusion criteria for studies which were longitudinal, including at least one risk factor measured before 18 years of age, and an assessment of sleep problems or disorders in adulthood. This study was registered with PROSPERO (CRD42022301342).

**Result:** A total of 13,712 studies were screened, with 51 studies meeting criteria for data extraction. Sleep problems in childhood (n=9), childhood mental health (n=7), family environment (n= 2), adverse childhood experience (n=5), and lifestyle factors (n=9) were reported to be associated with sleep problems in adulthood. However most studies (n=30) only considered one or two measurements time points in childhood or adolescence as a predictor of adult sleep problems, and the age of sleep problem measurement in adulthood varied considerably (18 – 42 years). Further, heterogeneous sleep outcomes were reported across the studies, making quantitative synthesis of the data extremely challenging.

**Discussion:** Sleep problems in adulthood may be a result of cumulative risk factors in early childhood and adolescence. Consideration of childhood and adolescent trajectories are needed to better understand the biopsychosocial predictors of sleep problems in adulthood.

## P086

### MEASUREMENT OF ENVIRONMENTAL FACTORS AFFECTING SLEEP WITHIN REHABILITATION WARDS, SUB-ACUTE CARE WARDS, AND AGED CARE FACILITIES: A SCOPING REVIEW

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**Introduction:** Unfamiliar environments are often poorly conducive to adequate sleep, especially for patients within different care settings, where proper sleep is vital for recovery and overall health. This scoping review thus aims to synthesise the evidence around which aspects of the sleep environment are measured within rehabilitation, sub-acute and aged care settings, how they are being measured, and to identify if there are any 'gold standards' against which the environmental factor measurements are compared.

**Method:** A search was conducted from inception to May 2023 within PubMed, EMBASE, Cochrane Library, Cumulated Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, and Web of Science. Eligibility criteria included full length original studies of any design reporting on the measurement properties of environmental factors affecting sleep of adult patients admitted to rehabilitation/sub-acute wards and aged care facilities.

**Results:** This scoping review identified 2185 studies after duplicate removal, of which 82 studies have been admitted for data extraction following review from two authors. Data will be sought for the following variables: publication year, country, study aim, study design, care setting, population characteristics, environmental factors studied, unit of measurement, specific measure, measurement method, gold standard comparators (if any).

**Discussion:** It is anticipated that this review will be completed by August 2023 and will identify the most common methods used to measure environmental factors affecting sleep outcomes within the literature. This study will thereby inform and aid researchers and clinicians with developing future environmental interventions and

measuring their impact within rehabilitation, subacute and aged care settings.

## P087
### EXPLORING ASSOCIATIONS BETWEEN, AND TEMPORAL CHANGES IN, THE SLEEP, PSYCHOLOGICAL AFFECT, AND EXERCISE PERFORMANCE OF ELITE CYCLISTS DURING A PERIOD CONTAINING THE TOUR DE FRANCE

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The effects of partial sleep restriction and minimal sleep impediment on endurance exercise performance remain incompletely understood. Moreover, the suggested role of psychological factors in the relationship, or lack thereof, between sleep and endurance performance is yet to be rigorously investigated in naturalistic settings. This study investigates the relationships between sleep, psychological affect, and exercise performance in elite cyclists during the Tour de France (TDF).

Data from eight male professional cyclists were collected over a 6-week period, including the 3-week TDF. Sleep, exercise performance, and affect (e.g., motivation) data were collected through smartwatches, bicycle-based instruments, and smartphone-administered questionnaires. Relationships between, and temporal changes in, sleep, affect, and performance metrics were explored through correlation and ANOVA analyses.

Participants were ~30±4 years old. Over the 6-weeks, average sleep duration was 08:11±00:58, with mean sleep onset and wakeup times of 23:46±00:44 and 07:57±00:52, respectively. Wakeup time (r = -0.40) and sleep quality (r = -0.32) were negatively associated with Performance Index. Compared to pre-race, sleep onset and wakeup time were delayed, sleep duration increased, and sleep quality and subjective mood declined, during the race (00:26±00:14[95%CI]; 00:48±00:16; 00:22±00:20; -6.4±5.2, -9.5%; -5.7±4.4, -9.1%, respectively). All p <.05.

Findings suggest temporal change in, and inter-relationships between, sleep, affect, and performance during real-world endurance competition. Increased psychophysiological strain and event-related factors (e.g., travel) likely explain the greater sleep duration, delayed sleep timing, and reduced sleep quality observed during the race. Further research into the temporal interplay between sleep, psychological affect, and performance during real-world competition is necessary.

## P088
### THE RELATIONSHIP BETWEEN SCREEN TIME, SLEEP, AND LANGUAGE DEVELOPMENT IN PRE-SCHOOL AGED CHILDREN

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An increasingly prevalent factor in the preschool years is screen time, with possible implications for sleep and development. Few studies have simultaneously assessed screen time, sleep, and development. I aim to investigate preschoolers' screen time, sleep, and language development, alongside predictors of screen time, social behaviours, and how sleep supports long-term memory for new words.

Screen time durations for educational, entertaining, and relaxing content types, will be recorded over three days. This is to assess whether content types have differing relationships with sleep. If sleep quality and duration are impeded, this may create a cyclical pattern between sedentary behaviour, sleep, and screen time. I will also measure screen times at differing times of the day, and the percentage of time spent interacting with another person or the screen content. Children will be exposed to new words at the beginning of the study and their memory will be tested after three nights. Importantly, assessing the interaction between screen time and sleep, in relation to children's memory for the new words. Sleep will be measured using actigraphy watches and a sleep diary. Standardised measures of vocabulary and communication will be used to assess children's language development.

As language development is a multifaceted process, assessing predictors, social behaviours, and memory for new words, allows assessment of factors that may benefit or hinder sleep and language development. This comprehensive study will contribute to the understanding of the relationships between screen time, sleep, and language development, and the nuanced factors that relate to its success.

## P089
### THE PREDICTIVE VALUE OF AN OMEGOID EPIGLOTTIS IN UPPER AIRWAY RECONSTRUCTION SURGERY FOR OBSTRUCTIVE SLEEP APNEA

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**Background:** Obstructive sleep apnea is a serious medical issue with significant cardiovascular health associated complications. Surgical intervention is indicated for patients who are refractory to medical management. It's efficacy was demonstrated in SAMS Trial in 2019. Surgery in this trial predominantly widened the airway in an anterior-posterior plane. An omegoid epiglottis has been hypothesized to be indicative of chronic lateral airway collapse, which hypothetically would be less responsive to the surgical protocol used in SAMS trial.. Our aim is to determine whether an omegoid epiglottis is therefore a poor predictor of surgical success.

**Method:** Following ethics approval, 53 OSA patients MRI images, Apnoea-hypopnea index's (AHI) and Epworth sleepiness scale's (ESS) who fell into the surgical arm of the SAMS trial were de-identified and retrospectively analyzed. Two independent researchers measured the width: depth ratio and alpha angle of patient epiglottises on MRI and used this data to separate patients into omegoid and non-omegoid epiglottis cohorts. The difference between pre-operative and post-operative AHI and ESS scores were tabulated and statistically analyzed between the 2 cohorts to determine the effectiveness of surgery. Intra-rater measurement assessments were undertaken to ensure reliability of data-collection.

Result: Epiglottis shape will be correlated with the effectiveness of multilevel OSA surgery based on qualitative, Epworth Sleepiness Scale (ESS), and quantitative, apnoea-hypoapnoea index (AHI) data collection prior and post-surgery (On going).

**Conclusions:** This study aims to determine whether an omegoid epiglottis acts as a predictor of poor outcome following SAM trial soft tissue reconstructive protocol.

## P090
### HOW DO AUSTRALIAN SHIFTWORKERS AND NON-SHIFTWORKERS PRIORITISE SLEEP, DIET, AND PHYSICAL ACTIVITY?

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**Background:** Increasing engagement with sleep, diet, and physical activity (PA) is critical for populations who are at higher risk of poor health, such as shiftworkers. To increase engagement in sleep, diet and PA, it is critical to first understand which of these behaviours Australians currently prioritise and whether this prioritisation relates to actual behaviour. Therefore, this study aimed to investigate how Australians prioritise sleep, diet and PA.
**Methods:** A cohort of 1151 Australian adults (54% female, aged 18-65 years) completed a phone interview, and a cohort of 588 Australian shiftwork-only adults (76% female, 18-72 years) completed an online survey. All participants were asked which health behaviour (sleep, diet or PA) they prioritised. Behavioural correlates of sleep, diet, and PA, and questions on shiftwork experience were also collected.
**Results:** Diet was prioritised by the adults (49%), whereas sleep was prioritised by the shiftwork-only sample (68%). Multinomial logistic regressions revealed that adults who prioritised diet were significantly more likely to report less fast-food consumption (p<0.002) and more fruit consumption (p<0.002) compared to those that prioritised sleep. For the shiftwork-only sample, those with 16-30 years of shiftwork experience were significantly more likely to prioritise sleep compared to diet (p<0.05).
**Conclusions:** While prioritising diet was associated with healthier diet behaviour in Australian adults, overall, across both cohorts, behaviour prioritisation did not relate to actual behaviour. This suggests that there are factors other than behaviour prioritisation that influence engagement in healthy behaviours. These factors, such as workplace barriers, should be the focus of future research.

## P091
### TIMING EFFICIENCIES IN TERTIARY CARE OF PATIENTS ON NON-INVASIVE VENTILATION

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**Introduction:** A lean six-sigma (LSS) approach to clinical redesign looks at aspects of patient flow, value to consumer and any areas that may be considered wasted time. This LSS approach was used to find areas of improvement in a tertiary care hospital for patients on non-invasive ventilation. The solution developed was to implement a remote download service.
**Methods:** Root cause analysis, current state process and effects analysis, staff surveys and time and motion work sampling studies were conducted. There was a post implementation time and motion work sampling study for the remote download service introduced in 2023.
**Results:** Motion, transportation, inventory and waiting time and reporting software were found to impact workflow. Time

efficiencies were found for non-invasive ventilation download reports with a mean time of 14.8 mins (std 6.7min) pre-implementation down to 2.5 mins (std 0.6min) with remote software. There was an additional time saving due to batch processing prior to clinics of 2.5 mins (std 0.4mins) per patient. Staff reported workload capacity and documentation as two key barriers to effective processes.
**Discussion:** LSS identified areas to improve value and flow for staff in sleep clinics and patients on non-invasive ventilation.

## P092
### AUTOMATION IN EQUIPMENT ASSET MANAGEMENT FOR LABORATORY EFFICIENCIES

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**Introduction:** Asset management of laboratory equipment is essential to patient safety. Traceability enables any patient affected by equipment that has been recalled, or subsequently been found faulty, to be retested. Sleep equipment in home, ward or laboratory needs to be clearly documented but this paperwork is tedious and manual.
**Methods:** A portable barcode scanner with software was added to the laboratory asset management and the time efficiencies were evaluated.
**Results:** The time reduction of using a barcode scanner to manual data entry was found to decrease time approximately fourfold, from 8 mins (std 1.5mins) to 2.2 mins (std 0.5mins). This is for each sleep laboratory testing bed and can equate to 35 minutes in a six-bed sleep laboratory. Accuracy of data is assured with a barcode scanner, compared to manual input.
**Discussion:** Using automation to replace manual tasks in a sleep laboratory saves time and ensures data accuracy. Further advances in automation for tagging medical devices would improve this in areas with high use of home or ward devices.

## P093
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## P094
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## P095
### FACTORS ASSOCIATED WITH SLEEP AND MENTAL HEALTH PROBLEMS FOLLOWING ATHLETIC RETIREMENT

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**Introduction:** Despite growing research on the sleep and mental health of athletes, there is limited literature on their sleep health

following retirement from sport. The aim of this study was to investigate potential factors associated with symptoms of sleep and mental health disorders in former athletes.

**Methods:** Former athletes (N=173, 50% women) who retired from any sport or competition level ≤20 years ago completed an online survey, consisting of the Athlete Sleep Screening Questionnaire (ASSQ), Personal Wellbeing Index-Adult (PWI-A), Center for Epidemiologic Studies Depression Scale-Revised (CESD-R), and Generalised Anxiety Disorder Assessment (GAD-7).

**Results:** Self-disclosed lifetime diagnosis of sleep disorder(s) and mental health disorder(s) was reported by 28.3% and 45.1% of former athletes, respectively. Binary logistic regressions showed that age (OR=0.95[95% CI:0.92, 0.99], p=.007) and gender (OR=2.28[95% CI:1.09, 4.79], p=.029) were associated with anxiety symptoms, with women and younger ex-athletes presenting greater risk. Increased BMI was associated with risk for sleep disordered breathing (OR=1.20[95% CI:1.10, 1.30], p<.001), sleep difficulty (OR=1.13[95% CI:1.03, 1.23], p=.008), and poor wellbeing (OR=0.91[95% CI:0.85, 0.98], p=.010). Those who placed a lower priority on sport whilst competing had greater risk for sleep disordered breathing (OR=2.00[95% CI:1.05, 3.80], p=.035). Recency of retirement was not associated with any measures.

**Discussion:** Findings indicate that former athletes are not exempt from poor sleep and mental ill-health. Results provide preliminary insight into predictive factors for difficulty transitioning out of sport. Future longitudinal research should consider the interplay between sport reintegration and the timing of sleep and mental health problems.

## P096
### THE EFFECT OF MODERATE-INTENSITY EXERCISE ON SLEEP QUALITY AND QUANTITY IN HEALTHY ADULT MALES

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**Introduction:** Acute exercise may have the ability to disrupt sleep in healthy adults. Given the popularity of afternoon exercise, it is important to determine how this affects sleep. Therefore, the aim of this study was to investigate the effect of afternoon moderate-intensity cycling exercise on objective and subjective sleep in healthy adult males.

**Methods:** To assess the effect of moderate-intensity afternoon exercise on sleep quality and quantity, 12 healthy adult males who were identified as good sleepers completed a repeated-measures, counter-balanced, crossover study design with two conditions (moderate-intensity aerobic exercise or no exercise). The exercise task involved cycling for 40 minutes at 70%HRmax and was completed ~15:30h. Polysomnography was used to measure sleep during a 9-h sleep opportunity (23:00h to 08:00h).

**Results:** There were no statistically significant differences in objective or subjective sleep between conditions. Exercise had a medium-sized effect on reducing total sleep time (mean ± SD;

control 493.71 ± 12.59 mins vs exercise: 471.46 ± 55.19 mins; Cohen's d: 0.56), sleep efficiency (mean ± SD; control 91.43 ± 2.33 % vs exercise: 87.31 ± 10.22 %; Cohen's d: 0.56), and increasing REM onset latency (mean ± SD; control: 76.13 ± 45.10 mins vs exercise: 102.75 ± 46.85 mins; r: -0.33) (all p > 0.05).

**Discussion:** Healthy adult males can complete afternoon moderate-intensity exercise without compromising subsequent sleep. Individual responses in objective sleep outcomes may vary after exercise.

## P097
### THE FATE OF OBSTRUCTIVE SLEEP APNEA IN LONG-TERM

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**Objective:** This study aims to investigate the relationships of the severity of OSA and the long-term results of OSA in untreated patients and to compare them with the results of OSA patients who were operated.

**Materials and Methods:** The study retrospectively analyzed medical records of 79 individuals who were diagnosed with OSA, who either underwent surgical treatment or received no treatment from 2009 to 2022. Among the patients who underwent polysomnography (PSG) twice, the patients were subdivided by mild, moderate, severe groups according to apnea-hypopnea index (AHI) and the changes in OSA severity over time were compared.

**Results:** This study included 43 patients (54%) who received no treatment and 36 patients (46%) who had undergone surgery including tonsillectomy with or without uvula or palatopharyngeal procedures. Among the untreated patients, there was no significant changes in AHI values over time for the overall group, the mild and severe subgroups, but the moderate group showed a significant increase in AHI values (p=0.017). Surgical treatment, specifically tonsillectomy, resulted in a significant decrease in AHI values compared to untreated patients, particularly within 36 months after the procedure (p=0.000). However, for patients with a follow-up period of more than 36 months, the difference in AHI values was not statistically significant between those who underwent tonsillectomy and those who did not.

**Conclusions:** Untreated moderate OSA patients show worsening of AHI values over time, highlighting the need for proactive treatment. Surgical intervention can reduce AHI values within 36 months but may lead to worsening of symptoms afterwards.

## P098
### RISK STRATIFICATION TOOL FOR GASTROSTOMY INSERTION IN MOTOR NEURONE DISEASE

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**Introduction:** An FVC<50% has traditionally been used to quantify the risk of respiratory compromise in patients with motor neurone disease(MND) undergoing gastrostomy insertion. More recently, a Risk Stratifying Tool(RST) has been developed to better identify those patients who might be at higher risk for the procedure. We set out to evaluate whether there were any differences in the outcomes of high-risk MND patients undergoing gastrostomy insertion as determined by the FVC or RST.

**Methods:** A retrospective review of MND patients undergoing gastrostomy insertion was performed between June 2018 and June 2023. Data was collected on demographics, RST variables (orthopnoea, elevated serum bicarbonate or pCO2, or use of NIV), complications, and mortality.

**Results:** 42 patients were referred for gastrostomy insertion, only 1 procedure was unsuccessful due to anatomical difficulties. 17 patients (n=8 PEG,n=9 RIG) were classified as high-risk based on FVC<50%, while 30 patients (n=17 PEG,n=13 RIG) were classified as high-risk using the RST. No direct procedure-related complications were recorded in either group. Length of stay(3 vs 3.04 days), 30-day morbidity(23.5% vs 30%), 30-day mortality(0% vs 0%), 6-month mortality(23.5% vs 20%), and median survival(271 days vs 309 day) were comparable between the FVC and RST groups respectively. The RST was more sensitive at identifying patient mortality at 6 months (4/6 vs 6/6 patients).

**Conclusion:** Gastrostomy insertion was safe in this cohort of high-risk MND patients, independent of the tool used. Similar morbidity, mortality and length of stay were observed between the two groups. RST was more sensitive for identifying 6-month mortality.

## P099

### USE OF DIGITAL TECHNOLOGY DURING CHILD BEDTIME ROUTINES: A QUALITATIVE INVESTIGATION

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**Introduction:** The Child Bedtime Routines Study (CBRT) sets out to examine patterns and attitudes towards sleep in daily life in a novel and detailed way, by constructing personal timelines of 5–8-year-old children's sleep routines in their homes, their digital technology use, and parental attitudes and behaviours surrounding sleep and digital technology use.

**Methods:** This project involved individual semi-structured interviews with 30 parents of 5–8-year-old children via zoom. During the interview parents completed a novel visualisation of their home environment and the visual diagramming tasks for afternoon and evening, sleep and wake routines at home via the online interactive platform Mural.

**Results:** Thirty parents (Female = 86.7%) of 30 children (66.7% boys) aged between 5 and 8 years participated in the study. The most common description of their child using technology was watching shows or videos via tv or tablet. Over 76% of parents identified having rules or regulations regarding digital technology use. There was little technology use reported around bed-time routines, however, the use of apps to listen to bedtime stories was reported by some.

**Discussion:** The interviews allowed for greater description and nuance regarding the parenting decisions around technology use in the home. Household rules around the use of digital technology by children were not specifically oriented around bedtime or the potential impact of technology on sleep quality, duration, or timing. The use of technology-based sleep aids may increase, and a better understanding of the potential benefits and costs of those technologies needs to be understood.

## P100

### ACCEPTANCE, COMPLIANCE AND EFFICACY OF ORAL APPLIANCE THERAPY BY PATIENTS SUFFERING FROM SLEEP APNOEA.

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**Background:** Obstructive Sleep Apnoea (OSA) represents an established risk factor for several medical conditions. The evidence demonstrates that OSA can be effectively treated by an oral appliance. However, there less information about the role of an oral appliance in a clinical care model in terms of uptake and efficacy. This study aimed at examining the efficacy of an intervention in dental public health settings in Melbourne, Australia.

**Methods:** Data were collected from the 2018-2021. Participants who fitted inclusions criteria completed two instruments. The Epworth Sleepiness Score (ESS) was used to assess the Subjective daytime sleepiness, and the Apnoea Hypopnea Index (AHI) objectively evaluated the severity of OSA. Participants were further asked to self-report felt improvements post intervention. Paired t-tests were used to compare pre-test and the post-test results.

**Results:** 34 participants had complete before and after data recorded. The mean age of the final samples of 66.4 (s.d., 14.2), the majority were female (67.7%). Participants unanimously acknowledged improvements after the intervention. Findings also indicated that after the intervention, participants had significantly lower EES scores compared to their baseline scores (6.9 vs 12.7; p<0.001). Regarding the AHI, at post-test, participants had significantly lower AHI scores compared to their baseline scores (13.8 vs. 19.2; p<0.001).

**Conclusions:** Present results indicate the use of oral appliance will ultimately benefit public patients who suffer from OSA. After the intervention, there were both objective and subjective improvements in OSA. Thus, findings provide valuable inputs and guidance for the design and implementation for larger efficacy trial.

## P101

### BRAIN AMYLOID BURDEN AND AUTOBIOGRAPHICAL MEMORY IN OBSTRUCTIVE SLEEP APNOEA: A CROSS-SECTIONAL STUDY.

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**Introduction:** Emerging literature reports an increased risk of Alzheimer's disease in individuals with obstructive sleep apnoea (OSA). Established characteristics of Alzheimer's disease include increased brain amyloid burden and impairment to episodic and autobiographical memory. Investigating these constructs in individuals with clinically confirmed OSA will contribute to understanding of OSA and neuronal implications.

**Aim:** The aim of the study was to explore the relationship between brain amyloid burden and autobiographical memory in cognitively-healthy individuals with OSA.

**Methods:** Thirty-four participants with OSA (mean age=57.7, SD=8.5, 19 males), and 12 controls (mean age=57.1, SD=8.1, 6 males)

participated in the study. Participants underwent a 11C-PiB positron emission tomography (PET) scan to quantify amyloid burden, and an assessment of autobiographical memory. Brain amyloid burden was quantified using the standardised uptake value ratio (SUVR), and the Autobiographical Memory Test (AMT) was used to assess the ability of participants to recall specific memories from their life.

**Results:** Individuals with OSA recalled significantly fewer specific autobiographical memories (M=6.66, SD=2.91) compared to controls (M=10.25, SD=2.09, t(45)=-3.930, p<.001). There was no significant difference in SUVR between groups, t(44)=1.465, p=.150. Recall of non-specific memories was significantly positively correlated with SUVR, r=.331, p=.026.

**Discussion:** Levels of brain amyloid burden did not differ significantly between groups however the results support existing literature suggesting amyloid burden is associated with autobiographical memory in individuals with OSA. Longitudinal studies investigating the trajectory of these constructs in the context of disease development should be conducted to further explore the impacts of OSA.

### P102
### SLEEP QUALITY, DEPRESSION, AND ANXIETY IN PEOPLE WITH SPINAL CORD INJURY AND TRAUMATIC BRAIN INJURY UNDERGOING INPATIENT REHABILITATION.

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**Introduction:** Poor sleep, depression, and anxiety are prevalent secondary complications of spinal cord injury (SCI) and traumatic brain injury (TBI), and may interfere with recovery. This observational, exploratory study aimed to describe subjective and objective sleep quality, and levels of depression and anxiety in people with SCI and TBI undergoing inpatient rehabilitation; and to explore associations between sleep quality, depression, and anxiety.

**Methods:** Twenty-four patients admitted to two neurorehabilitation facilities following SCI (n =18) or TBI (n = 6) completed the Pittsburgh Sleep Quality Index, the Depression, Anxiety, and Stress Scale-21, and one week of actigraphy monitoring.

**Results:** Most participants reported poor subjective sleep quality (83%). Average depression and anxiety scores were within normal levels. Higher anxiety scores correlated with lower subjective sleep quality, longer sleep onset latency, and lower subjective total sleep time.

**Discussion:** The findings suggest that targeting anxiety may improve sleep quality in inpatients with SCI or TBI, and vice-versa. Longitudinal and interventional studies are required to understand whether these relationships are reciprocal, and whether therapies targeting both sleep and mental health during inpatient rehabilitation can improve patient outcomes.

### P103
### UTILITY OF CAPILLARY BLOOD GASES (CBGS) FOR MEASURING GAS EXCHANGE IN THE SLEEP LABORATORY.

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**Introduction:** Arterial Blood Gases (ABGs) are used for assessing respiratory failure in clinical practice. ABGs also provide a useful verification tool for nocturnal Transcutaneous Carbon Dioxide (TcCO2) measurements. However, there are known complications to collecting ABGs. Conversely, CBG is less invasive and more accessible to clinical practice. We assessed CBGs as an alternative to ABGs to measure pCO2 and pO2, and its suitability for verifying TcCO2. We hypothesised that CBG sampling would be suitable for TcCO2 verification and would be a suitable ABG surrogate.

**Methods:** ABGs were sampled by Resident Medical Officers (RMOs) and CBGs were sampled by Sleep Scientists to validate TcCO2 at awake. Correlation between measures was assessed via Pearson and Spearman coefficients. $\rho > 0.6$ demonstrate a moderate positive correlation, with strengthening correlation as $\rho$ approaches 1. Agreement between measurements was assessed via Bland-Altman plots.

**Results:** There was a moderately strong correlation between CBG vs TcCO2 (n=125) ($\rho = 0.694$, p < 0.001) and CBG vs ABG (pCO2) (n=29) ($\rho = 0.725$, p < 0.001), with a strong correlation for ABG vs TcCO2 (n=81) ($\rho = 0.847$, p < 0.001). Bland-Altman plots showed agreement between CBG, ABG and TcCO2.

**Conclusions:** There were strong positive correlations observed, with agreement seen across all measures of pCO2. This analysis demonstrates both the accuracy of nocturnal TcCO2 and the utility of CBG to verify TcCO2. Surrogate CO2 measures support positive patient outcomes and verification of gas exchange.

### P104
### THE IMPACT OF TOTAL SLEEP DEPRIVATION ON PERFORMANCE IN THE ESPORT 'ROCKET LEAGUE'.

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Preliminary findings from this study were presented as a poster (P376) at Sleep Europe 2022 (https://doi.org/10.1111/jsr.13740).

**Introduction:** Sleep loss is presumed by academics and esport (organised competitive video-game play) athletes to be an in-game esport performance hindrance, primarily due to its well understood effects on multiple domains of cognitive performance. However, the effects of acute sleep loss specifically on esports performance have not been explored. We aimed to elucidate whether total sleep deprivation degrades in-game performance in the popular esport 'Rocket League'.

**Methods:** Forty habitual Rocket League players were paired according to in-game ability level (twenty pairs), with one assigned to a control group (CON) and the other assigned to an intervention group (TSD). Two test sessions took place, in which paired players completed subjective and cognitive performance measures, and played seven Rocket League matches against one another. In one session, both players in a pair were well rested, while in the other, CON was rested while TSD was sleep deprived.

**Results:** Acute total sleep deprivation resulted in higher self-reported sleepiness, lower alertness and motivation, poorer performance on the Psychomotor Vigilance Task (PVT) and two-choice component of the Category Switch Task (CST). Despite this, overall in-game esport performance did not worsen due to sleep deprivation, although exploratory analysis suggests potential in-game strategy change.

**Discussion:** Our findings do not suggest that sleep loss is inconsequential for esport athletes, but rather suggest that acute bouts of sleep loss of similar/lesser severity may not be a primary concern for in-game esports performance.

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## P107
### OPTIMIZING OBSTRUCTIVE SLEEP APNEA THERAPY IN PATIENTS WITH ACUTE CORONARY SYNDROME: A PILOT RANDOMISED CONTROLLED TRIAL

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Continuous positive airway pressure (CPAP) therapy and oral appliance therapy (OAT) are recommended therapies for obstructive sleep apnoea (OSA). Recent clinical trials, limited by suboptimal implementation of OSA therapy, have demonstrated neutral cardiovascular benefit. It remains unclear if optimised OSA therapy will improve cardiovascular health. Thus, we have designed a pilot interventional study to inform a future RCT with the aim to evaluate the effectiveness of optimised and personalised OSA therapy in patients with acute coronary syndrome(ACS).

Patients diagnosed with ACS and OSA (ODI4≥10 events/h) were randomised to personalised OSA treatment (CPAP and/or OAT) versus usual medical care (UC). Patients receiving OSA therapy were allowed to acclimatise to therapy for 1-2 months, with the aim of optimising therapy. Patients were followed up monthly for 6 months to assess treatment effectiveness. Polysomnography and cardiovascular measures were conducted at baseline and 6 months post-therapy or usual care.

To date, 9 patients (CPAP=4, OAT=1, UC=4) have completed the study. OSA severity reduced in both treatment groups (CPAP: 53±14 vs. 17±18events/h, OAT: 22.4 vs. 14.7events/h). CPAP compliance was 6.8±0.9hours/day, 90±6‰days >4h. OAT subjective compliance was 7 hours/day daily. At completion, 3 patients on CPAP therapy reported they were 'extremely-comfortable' using CPAP for OSA treatment. The patient on OAT reported OAT was 'very effective in reducing OSA symptoms' and will continue therapy.

This preliminary data suggests that it is feasible to personalise and optimise OSA therapy in patients with ACS. Whether this positively impacts on cardiovascular risk remains to be determined.

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## P108
### OBSTRUCTIVE SLEEP APNOEA IN ACUTE CORONARY SYNDROME: AN OBSERVATIONAL STUDY

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Obstructive sleep apnoea (OSA) is a risk factor for cardiovascular disease. CPAP therapy is the primary treatment for OSA and is known to improve long term cardiovascular health outcomes. Recent neutral findings of randomised clinical trials have created uncertainty about whether effective CPAP therapy can improve cardiovascular health in patients with OSA. We conducted a cross-sectional observational study in patients with acute coronary syndrome (ACS) diagnosed with OSA. We aimed to characterise key surrogate markers of cardiovascular health in this cohort to inform a future intervention study of personalised OSA therapy.

70 patients with ACS (age (IQR):58[52,63]years, BMI:27[24,30]kg/m2) were recruited. A level 2 sleep study was conducted to confirm OSA diagnosis within 6 months after discharge. Carotid femoral pulse wave velocity(cfPWV), pulse wave analysis, endothelial function, heart rate variability, and baroreflex sensitivity were measured. Patients were categorised as no-mild OSA(AHI<15events/h) and moderate-severe OSA(AHI≥15events/h) for analysis.

67% of patients were found to have moderate-severe OSA(AHI≥15events/h) and 40% of patients had severe (AHI≥30events/h). cfPWV was elevated in moderate-severe OSA compared to no-mild OSA (7.4[6.6,8.5] vs. 6.1[4.7,7.1]m/s, p=0.003). This was no longer significant after adjusting for age (p=0.296) and BMI (p=0.053). cfPWV correlated with AHI (rs = 0.35, P=0.0069). Measures of pulse wave analysis, flow mediated dilatation, heart rate variability, and baroreflex sensitivity did not differ between patient groups (data not shown).

OSA is highly prevalent in patients with ACS. Arterial stiffness measured by cfPWV appears to show best promise as an outcome measure for a future intervention trial of personalised OSA therapy.

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## P109
### PAEDIATRIC LIMITED CHANNEL SLEEP MONITORING ALTERNATE SLEEP SCORING COMPARED WITH TYPE 1 PSG

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**Introduction:** Obstructive sleep apnoea (OSA) has deleterious effects on children's cognition, behaviour and cardiovascular system. Early diagnosis and treatment may improve long-term outcomes.

Attended polysomnography (PSG) is the gold standard for OSA diagnosis, however access is limited with prolonged wait times. Home based limited channel sleep monitoring (LCSM) offers a more accessible alternative but may result in inaccurate sleep staging. We aimed to evaluate sleep scoring using a single channel combined EEG/EOG compared with full PSG.

**Methods:** Sample size calculations indicated 1000 epochs would be sufficient to demonstrate a kappa statistic of at least 0.7 for sleep stage comparison. Four patients undergoing in-laboratory PSG for suspected OSA gave consent for placement of an additional combined EEG/EOG simulating our LCSM montage. A single senior scientist scored sleep using full PSG montage, and after a minimum of 2 weeks, using the abbreviated montage.

**Results:** Epoch-by-epoch comparisons were made for 3,930 epochs. When comparing awake, N1, N2, N3 and REM, kappa=0.77 (p<0.001). Using the abbreviated montage, N1 was mostly misclassified as awake (28% of epochs) or REM (32% of epochs). When comparing awake, NREM and REM, kappa = 0.79 (p<0.001). When comparing awake and sleep, kappa = 0.82 (p<0.001).

**Discussion:** Accurate total sleep time is important for accurate respiratory index calculation. The abbreviated montage was reliable compared with PSG for scoring sleep versus awake (kappa >0.8). The addition of an EMG signal may correct misclassification of N1 as wake or REM and improve intra-rater agreement. EMG will be included in future studies.

## P110

### HOW DO NIGHT-TIME AWAKENINGS, ASSISTIVE TECHNOLOGIES, AND HELP-SEEKING BEHAVIOURS IMPACT AUSTRALIAN CARERS SLEEP? A CROSS-SECTIONAL STUDY

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**Introduction:** Carers who provide support for those living with a disability or long-term health conditions have been recognised as being at increased risk of negative health outcomes due to the demands of caregiving. In particular, carers are much more likely than their non-carer counterparts to experience poor sleep outcomes such as lower sleep quality and inadequate sleep duration. The aim of this study is to examine how nighttime awakenings, assistive technology use and help-seeking behaviours impact sleep quality among Australian adult carers.

**Methods:** A cross-sectional online survey was conducted with a sample of Australian carers aged 18 to 64 years. Participants were required to answer questions regarding their sleep, caregiving duties, night-time-awakenings and completed the 9-item self-report Pittsburgh Sleep Quality Index (PSQI). They also answered questions regarding their use of assistive technologies and help-seeking behaviours. Participants were eligible if they reported sleep time <7 h or dissatisfaction with their sleep.

**Results:** Participants (n=352) completed the online survey. Analyses of these data have just begun and will be presented in full at the conference.

**Conclusion:** The results of this study aim to extend current literature and provide valuable information in the formulation of sleep recommendations and interventions for Australian carers.

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### VALIDITY AND RELIABILITY OF SLEEP QUESTIONNAIRES IN ADULTS: A SYSTEMATIC REVIEW

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**Introduction:** Sleep plays an important role in maintaining overall health and well-being. It has been well-established that poor sleep is linked to several negative health consequences. Therefore, the use of appropriate sleep measures in national surveillance systems is essential to understand the impact that poor sleep has on population health. The aim of this systematic review is to evaluate the validity and reliability of self-reported sleep questionnaires.

**Method:** Electronic database searches were performed on PubMed, EMBASE, and PsycINFO, focusing on studies of adults aged 18 and above that validated sleep questionnaires against objective sleep measurements or compared them with other subjective sleep instruments. Search terms were grouped into three categories: sleep health, assessment instrument type, and psychometric properties.

**Progress to Date:** A total of 5,071 abstracts across the three electronic databases were retrieved from the general search and screening is currently being undertaken. Relevant studies meeting the inclusion criteria will be analysed, and data will be extracted using a predefined form, which includes study characteristics, sleep measures, validated objective and/or subjective instruments, and psychometric properties.

**Intended Outcome and Impact:** The systematic review is expected to provide a summary of the psychometric properties of sleep questionnaires that have potential use in population health surveys as part of routine health monitoring. The findings will contribute to the identification of any gaps in the current sleep questionnaires to help enable more comprehensive monitoring and understanding of population sleep habits and associated health outcomes.

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