

PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

Bedtime Reading

Inquiry into Sleep Health Awareness in Australia

House of Representatives Standing Committee on Health, Aged Care and Sport

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CANBERRA

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Chair's Foreword

Bedtime Reading is a report that we hope will give you a good night's sleep.

Sleep is a fundamental human need and, along with nutrition and physical exercise, it is one of the three pillars of good health.

We have known the importance of sleep for decades yet for many reasons, sleep health has not received the attention it deserves within our community and in the health programs run by state and federal governments. In part this is because there are still many who think that it's a sign of 'toughness' and a badge of honour to be able to get by on less sleep. The reality is that such an approach does harm — in some cases with very serious consequences.

In reality very few people are able to operate optimally on minimal sleep. In addition to the health impacts, fatigue results in decreased productivity and is the cause of more road accidents than alcohol and drug use combined.

My hope is that this report will help bring attention to the central function of sleep to overall health and wellbeing and increase the focus placed on sleep among policy makers and in the broader community.

Four in every ten Australians are not getting the sleep they need. The direct financial cost of this inadequate sleep is currently estimated to be \$26.2 billion annually. If health and wellbeing costs are considered the cost rises to \$66.3 billion annually. Of even greater concern, in 2016-17 inadequate sleep was estimated to contribute to 3017 deaths in Australia.

Some people are not gaining adequate sleep due to experiencing a sleep disorder such as Obstructive Sleep Apnoea (OSA), insomnia, or narcolepsy; while for others work patterns or lifestyle pressures are restricting their ability to get sufficient sleep. In both cases the health impacts of long-term inadequate sleep are significant.

One of the most commonly diagnosed sleep disorders is OSA, which is linked to age and weight and is more prevalent in men than women. In addition, there is likely to be a high rate of undiagnosed OSA as it occurs during sleep and many people may not be aware that they have the condition. It is estimated that as many as 80 per cent of people experiencing OSA may be undiagnosed. In response, the Committee has recommended the Australian Government consider whether extending Medicare coverage to simpler and more affordable diagnostic tests for sleep disorders may reduce the level of undiagnosed OSA in the community.

Without treatment OSA can have serious health impacts. Untreated OSA (apart from the associated weight gain) can contribute to the possible development of type II diabetes and can increase the risk that a person will develop cardiovascular health problems including high blood pressure, stroke, and heart disease.

Currently, there is considerable variation across Australia in the support provided for the treatment of OSA using Continuous Positive Airway Pressure (CPAP) therapy. The Committee has therefore recommended that all Pensioners and Health Care Card holders with moderate to severe OSA, regardless of their location, should have access to free CPAP therapy. In addition, the Committee has recommended the Australian Government review the benefits of extending subsidised CPAP therapy across the broader community.

While not as prevalent as OSA, narcolepsy and associated conditions such as idiopathic hypersomnolence can have a debilitating impact on a person's quality of life. There is a need to improve the awareness of these conditions both within the community and among medical practitioners. Further consideration should be given to emerging treatment options that may provide some people experiencing these conditions the opportunity to improve their quality of life.

Sleep health is not merely a question of the treatment and management of sleep disorders, as there are also many people who do not have a sleep disorder but who are not currently getting enough sleep. Insufficient sleep can be caused by a range of lifestyle pressures including shift work, and the increased use of the internet and electronic media.

Shift work, especially when it involves night shift, can be extremely disruptive to sleep patterns and often results in shift workers regularly not getting sufficient sleep. In the longer term this disrupted sleep can have serious health impacts and shift work has been linked to the increased risk of obesity, sleep disorders, mental health conditions, and cancer.

Additionally, many shift workers are employed in safety critical occupations such as healthcare, road transport, and mining. In each of these industries the fatigue

caused by disrupted sleep can result in serious workplace accidents. To address the health risks faced by shift workers the Committee has recommended the development of a nationally consistent approach to working hours and rest breaks for shift workers and guidelines on how organisations should optimise rosters to minimise the potential for disruption to employee's sleep patterns.

In addition, the potential for smartphones and internet usage to impact sleep patterns is an emerging area of concern. People are increasingly engaging in activities such as watching streaming services, internet gaming, and using social media late into the evening, potentially at the expense of sleep. Of particular concern is that many children are having their sleep continually disrupted by their smartphones or other devices. This regular sleep disturbance can negatively impact childhood development, behaviour, and performance at school.

The Committee has recommended the development of a national education and awareness campaign to help address these barriers to improved sleep health. This campaign should emphasise the important role of sleep in a healthy lifestyle as well as the health and wellbeing risks that are associated with inadequate sleep. In addition, the awareness campaign should provide people with practical advice on how they can improve their sleep health.

Some of the great leaps in public health have happened because of successful national campaigns — be it in fitness (for example the Life. Be In It campaign), smoking prevention or our efforts to halt the spread of HIV.

I would like to thank the many organisations and individuals who contributed to this inquiry, including those individuals who provided the Committee with a personal account of their experience of sleep disorders. In addition, I would like to thank representatives of the University of Western Australia and the Sir Charles Gairdner Hospital, who provided the Committee with a tour of their sleep medicine facilities and put me through a sleep lab experience.

I would also like to thank my fellow Committee members for their engagement with this important topic and contributions throughout the inquiry. This is a Committee that has worked well during the 45th Parliament because of the constructive contribution all members make. Finally, I extend the Committee's thanks to the Committee staff who continue to provide such professional and skilled support.

Sleep well!

Mr Trent Zimmerman MP
Chair

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Abbreviations

AASM	American Academy of Sleep Medicine
ACCM	Australian Council on Children and the Media
ACT	Australian Capital Territory
ADA	Australian Dental Association
AEA	Australasian Epidemiological Association
AHPRA	Australian Health Practitioner Regulation Agency
AH-IBS	Austin Health and the Institute for Breathing and Sleep
AISH	Adelaide Institute for Sleep Health
ALHA	Air Liquide Healthcare Australia
ALSWH	Australian Longitudinal Study on Women's Health
ASA	Australasian Sleep Association
ASTA	Australasian Sleep Technologists Association
ATSB	Australian Transport Safety Bureau
BMC	Brain and Mind Centre
CBT-I	Cognitive Behaviour Therapy for Insomnia
CEO	Chief Executive Officer
CPAP	Continuous Positive Airway Pressure
CPC	Charles Perkins Centre
CRC	Cooperative Research Centre
CSC	Canberra Sleep Clinic

CSS	Centre for Sleep Science
CVD	Cardiovascular Disease
DALY	Disability Adjusted Life Year
DSP	Disability Support Pension
EDS	Excessive Daytime Sleepiness
EU	European Union
GP	General Practitioner
HBS	Health Business Solutions
ISSR	Institute for Social Science Research
LED	Light Emitting Diode
LSIC	Longitudinal Study of Indigenous Children
MAS	Mandibular Advancement Splint
MBS	Medicare Benefits Schedule
MSDC	Melbourne Sleep Disorders Centre
NeuRA	Neuroscience Research Australia
NHMRC	National Health and Medical Research Council
NMHC	National Mental Health Commission
NSW	New South Wales
NT	Northern Territory
N24	Non 24 Hour Sleep Wake Disorder
ONRSR	Office of the National Rail Safety Regulator
OSA	Obstructive Sleep Apnoea
PBS	Pharmaceutical Benefits Scheme
PSA	Pharmaceutical Society of Australia
QNMU	Queensland Nurses and Midwives' Union
RACGP	Royal Australian College of General Practitioners
RACP	Royal Australasian College of Physicians
RAH	Royal Adelaide Hospital
RLS	Restless Legs Syndrome

RTBU	Rail, Tram and Bus Union
SA	South Australia
SCGH	Sir Charles Gairdner Hospital
SDA-HA	Sleep Disorders Australia and Hypersomnolence Australia
SHF	Sleep Health Foundation
SIDS	Sudden Infant Death Syndrome
SMG	Sleep Management Group
SPS	School of Psychological Science
SSMA	Stop Smart Meters Australia
SWSD	Shift Work Sleep Disorder
Tas	Tasmania
TGA	Therapeutic Goods Administration
TSANZ	Thoracic Society of Australia and New Zealand
US	United States of America
USyd	University of Sydney
UWA	University of Western Australia
Vic	Victoria
WA	Western Australia
WIMR	Woolcock Institute of Medical Research
WISA	Wellbeing in Schools Australia
WS	Well Spoken
WWRNAG	Waverton Wollstonecraft Rail Noise Action Group

Terms of Reference

The Standing Committee on Health, Aged Care and Sport will inquire into and report on sleep health awareness in Australia, in particular:

1. The potential and known causes, impacts and costs (economic and social) of inadequate sleep and sleep disorders on the community;
2. Access to, support and treatment available for individuals experiencing inadequate sleep and sleep disorders, including those who are: children and adolescents, from culturally and linguistically diverse backgrounds, living in rural, regional and remote areas, Aboriginal and Torres Strait Islander;
3. Education, training and professional development available to healthcare workers in the diagnosis, treatment and management of individuals experiencing inadequate sleep and sleep disorders;
4. Workplace awareness, practices and assistance available to those who may be impacted by inadequate sleep or sleep disorders, with a focus on: rostering practices for shift workers, heavy-work requirements, and the transport industry as compared to international best practice; and
5. Current national research and investment into sleep health and sleeping disorders.

List of Recommendations

Recommendation 1

2.77 The Committee recommends that the Australian Government prioritise sleep health as a national priority and recognise its importance to health and wellbeing alongside fitness and nutrition.

Recommendation 2

4.88 The Committee recommends Safe Work Australia and the Alertness CRC provide updated guidelines (based on current research and science) for industries using shift work, regarding optimal shift structures and other workplace practices that promote alertness, productivity and ensure worker safety.

Recommendation 3

4.89 The Committee recommends the Australian Government work with the states and territories to:

- Develop a nationally consistent approach to working hours and rest breaks for shift workers; and
- Consider whether there is a need for sleep health screenings for shift workers; and
- That this approach be based on guidelines recommended by Safe Work Australia and the Alertness CRC.

Recommendation 4

5.126 The Committee recommends that the Department of Health undertake a review of the Medicare Benefits Schedule as it relates to sleep health services in Australia. The review should include, but not be limited to, the following:

- Simple diagnostic sleep studies (Level 3 and Level 4) that do not currently attract Medicare rebates;
- Ensuring recent changes to enable general practitioners to directly refer patients to diagnostic sleep studies are effective; and
- Barriers to accessing Cognitive Behavioural Therapy for Insomnia via telehealth for patients in regional, rural, and remote areas.

Recommendation 5

5.127 The Committee recommends that the Australian Government work with the states and territories, and provides funding where necessary, to:

- Ensure that all Pensioner or Health Care Card holders with moderate to severe obstructive sleep apnoea, regardless of their location, have access to a free trial of Continuous Positive Airway Pressure (CPAP) therapy and if the trial is successful free ongoing CPAP treatment; and
- Undertake a review to assess the potential benefits of providing subsidised CPAP therapy across the broader Australian community.

Recommendation 6

5.128 The Committee recommends that the Australian Government and the Australian Competition and Consumer Commission monitor the Continuous Positive Airway Pressure industry to ensure that vertical integration in the industry does not result in actions that:

- Limit the quality of care or clinical advice provided to patients; or
- Result in anti-competitive behaviour in the industry.

Recommendation 7

5.129 The Committee recommends that if there is no distributor willing to put forward a submission, the Australian Government work with patient advocacy groups such as Narcolepsy Australia or the Sleep Health Foundation to make a submission for the listing or registration of Sodium Oxybate under the Orphan Drug Program.

Recommendation 8

6.95 The Committee recommends that the Australian Government, in partnership with the states, territories and key stakeholder groups, work to develop and implement a national sleep health awareness campaign. The campaign should:

- Promote sleep as the foundation of ensuring positive health and wellbeing outcomes in combination with nutrition and exercise;
- Provide practical information in relation to sleep hygiene and measures an individual can use to improve their sleep;
- Provide information on the symptoms, causes, and health impacts of sleep disorders and available medical support for sleep disorders; and
- Communicate that improved sleep health can reduce the risk of: developing a serious health condition, impaired judgement and mental functioning, and decreased productivity and performance.
- Consider the proposed education campaign developed by the Australasian Sleep Association and the Sleep Health Foundation as part of their 2019 budget submission as a solid basis and estimate of costs for such a campaign.

Recommendation 9

6.96 The Committee recommends that the Australian Government in consultation with the Royal Australian College of General Practitioners and other key stakeholders:

- Assess the current knowledge levels of general practitioners, nurses and psychologists in relation to sleep health, and

- Develop effective training mechanisms to improve the knowledge of primary healthcare practitioners in diagnosing and managing sleep health problems.

Recommendation 10

6.97 The Committee recommends that the Australian Government investigate options to separate the existing 'Respiratory and Sleep Medicine' speciality into independent 'Respiratory' and 'Sleep Medicine' specialities under the Australian Health Practitioners Regulation Agency framework.

Recommendation 11

6.98 The Committee recommends that the Australian Government fund research focussed on:

- The prevalence of sleep disorders with a particular focus on under-researched population groups such as women and Aboriginal and Torres Strait Islander peoples;
- The prevalence, causes, and mechanisms of rare or not well understood sleep disorders, including narcolepsy and idiopathic hypersomnia;
- Further analysis of existing population health and longitudinal studies that have collected data relating to sleep;
- The impact of long-term shift work on sleep health and potential measures to minimise the associated health risks; and
- The effects of digital devices and electronic media on sleep health, especially among children and adolescents.

1. Introduction

Overview

- 1.1 In Australia, almost four in every ten Australians are regularly not having enough quality sleep.¹ For some people this is due to a clinical sleep disorder, however, for others it is due to work patterns or lifestyle pressures. While people may understand that sleep is necessary, it is not always prioritised and the effects of insufficient sleep are not always considered.
- 1.2 In his book *Why We Sleep*, Professor Matthew Walker suggested that ‘society’s apathy towards sleep has, in part, been caused by the historic failure of science to explain why we need it—sleep has remained one of the last great biological mysteries.’²
- 1.3 While the purpose of sleep may have been a mystery, Dr Allan Rechtschaffen, a pioneer in sleep medicine, stated that ‘if sleep does not serve an absolutely vital function, then it is the biggest mistake the evolutionary process has ever made.’³ The mistake, as Professor Walker describes it, did not lie with evolution but instead with scientists who were searching for a single explanation for the purpose of sleep.⁴

¹ Deloitte Access Economics (Deloitte), *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. i.

² Professor Matthew Walker, *Why We Sleep: The New Science of Sleep and Dreams*, Penguin Books, 2017, p. 5.

³ Dr Sadasivam Suresh, *Submission 31*, p. 1.

⁴ Professor Matthew Walker, *Why We Sleep: The New Science of Sleep and Dreams*, pp 6.

- 1.4 The evidence from more recent research is that the functions of sleep are many and varied. Professor Walker suggests ‘there does not seem to be one major organ in the body, or process within the brain that is not optimally enhanced by sleep (and detrimentally impaired when we do not get enough).’⁵
- 1.5 Sufficient, quality sleep is therefore an essential requirement for a person’s wellbeing. For adults, between seven and nine hours of quality sleep is the generally accepted amount for healthy cognitive and physical health.⁶
- 1.6 It is estimated that 7.4 million Australians are regularly not gaining the recommended amount of sleep. In 2016-17, it was estimated that this inadequate sleep was costing the Australian economy \$26.2 billion, mostly due to reduced productivity. If the impact of lost health and wellbeing is included the estimated cost rises to \$66.3 billion.⁷
- 1.7 Regular inadequate sleep has significant health impacts and has been associated with an increased risk of developing conditions including obesity, diabetes, cardiovascular disease and cancer.⁸ In particular, Obstructive Sleep Apnoea (OSA), a prevalent sleep disorder, appears to increase the risk of a number of serious conditions including high blood pressure, heart disease, and stroke.⁹
- 1.8 In addition, adequate sleep is essential for mental health and wellbeing and inadequate sleep has been associated with increased rates of depression and the development of dementia.¹⁰ Chronic insomnia in particular regularly co-occurs with other mental health conditions such as depression and anxiety.¹¹
- 1.9 There are a number of lifestyle factors that are linked with increased risk of inadequate sleep. The use of digital devices and electronic media late in the

⁵ Professor Matthew Walker, *Why We Sleep: The New Science of Sleep and Dreams*, 2017, pp 6-7.

⁶ Dr Yu Sun Bin, Member, Australasian Epidemiological Association, *Official Committee Hansard*, Sydney, 5 February 2019, p. 31.

⁷ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, pp i-iii.

⁸ Australasian Sleep Association, *Submission 118*, p. 2.

⁹ Charles Perkins Centre, *Submission 46*, p. 7.

¹⁰ Sleep Health Foundation, *Submission 54*, p. 3; University of Sydney, Brain and Mind Centre, *Submission 105*, p. 2..

¹¹ Dr Melissa Ree, Director, Sleep Matters, *Official Committee Hansard*, Perth, 29 January 2019, p. 11.

evening is linked to disrupted sleep and is increasingly an issue of concern in relation to the sleep health of children and young adults.¹²

- 1.10 In addition, some workplace practises can influence a person's sleep health. In particular, shift work, with shifts changing between the day and night, may have a negative impact on a person's quality of sleep.¹³ This may have serious immediate and long-term consequences, particularly in industries that involve driving, heavy machinery, and/or medical procedures.

About the Inquiry

Objectives and Scope

- 1.11 On 13 September 2018, the Minister for Health, the Hon Greg Hunt MP, referred the *Inquiry into Sleep Health Awareness in Australia* (the inquiry) to the Standing Committee on Health, Aged Care and Sport (the Committee).
- 1.12 The Committee considered issues related to inadequate sleep and sleep disorders as part of the inquiry. These included:
- The prevalence and causes of inadequate sleep and sleep disorders, as well as diagnosis, management and treatment options;
 - The links between sleep health and physical and mental health conditions;
 - Impacts of fatigue in the workplace and on the road, as well as how shift work and other workplace practices can effect sleep quality and duration; and
 - Community awareness of sleep health issues, and further research into sleep that may be needed.

Inquiry Conduct

- 1.13 The inquiry was launched via a media release on 13 September 2018, with submissions to be received by 18 October 2018.
- 1.14 The Committee also invited submissions from relevant federal, state and territory ministers, and public health organisations, peak bodies, sleep centres and academics.

¹² Australian Council on Children and the Media, *Submission 123*, p. 2; Professor Robert Adams, Professor of Sleep Medicine, Adelaide Institute for Sleep Health, *Official Committee Hansard*, Sydney, 5 February 2019, p. 35.

¹³ Ms Crystal Grant and Associate Professor Siobhan Banks, *Submission 82*, p. [2].

- 1.15 The inquiry received 138 submissions and 30 exhibits. These are listed at Appendix A and B respectively.
- 1.16 The Committee also held four public hearings, which are listed in Table 1.1. The names of individuals and organisations which appeared at these public hearings is listed at Appendix C.
- 1.17 Members of the Committee also conducted a site inspection of a sleep centre at the Sir Charles Gairdner Hospital in Perth and participated in a sleep study at the Centre for Sleep Science at the University of Western Australia.

Table 1.1 Public Hearings Held

Date	Place
29 January 2019	Perth, WA
5 February 2019	Sydney, NSW
6 February 2019	Melbourne, Vic
11 February 2019	Canberra, ACT

Previous Reports on Sleep Health

Deloitte Access Economics ‘Asleep on the Job’ Report

- 1.18 In August 2017, Deloitte Access Economics released its report *Asleep on the Job: Costs of Inadequate Sleep in Australia* (Asleep on the Job report), which had been prepared for the Sleep Health Foundation.
- 1.19 The *Asleep on the Job* report estimated that there are 7.4 million Australian adults who do not regularly get enough sleep. The financial costs associated with inadequate sleep were estimated to be \$26.2 billion in 2016-17 and included health system costs, productivity losses, informal care costs and other financial costs. In addition, the cost of lost wellbeing due to inadequate sleep was estimated to be \$40.1 billion in 2016-17.¹⁴
- 1.20 In addition to financial costs, the *Asleep on the Job* report outlined other consequences associated with inadequate sleep in Australia. These consequences included deaths (due to falling asleep at the wheel or from an industrial accident due to lack of sleep); reduced workplace productivity

¹⁴ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, pp i-ii.

(due to reduced working days and reduced productivity while at work); and a loss of wellbeing.¹⁵

- 1.21 The tightening of regulations in sectors where ‘sleep is irregular but responsibility is high, such as defence, transport and health’ was put forward as a policy recommendation. In addition, the *Asleep on the Job* report recommended changes to shift work; greater attention by police to tired and fatigued drivers; the provision of software that filters blue light for government agency employees; and education and awareness campaigns.¹⁶

Report to the Sleep Health Foundation: 2016 Sleep Health Survey of Australian Adults

- 1.22 In 2016, Professor Robert Adams, Dr Sarah Appleton, Professor Anne Taylor, Professor Doug McEvoy, and Professor Nick Antic, on behalf of the Sleep Health Foundation, conducted a Sleep Health Survey of 1011 adults across Australia.¹⁷
- 1.23 The objective of the Sleep Health Survey was to ‘assess the scale of the health and social consequences of insufficient sleep and sleep disorders in Australia.’¹⁸
- 1.24 The results of the Sleep Health Survey indicated that inadequate sleep and poor sleep quality were common issues, affecting 33 to 45 per cent of adults. The Sleep Health Study further stated that sleep problems may be increasing in the community.¹⁹
- 1.25 The consequences of sleep problems identified in the Sleep Health Survey included negative impacts on work performance and productivity, and an increased risk of driving accidents due to drowsiness.²⁰ The Sleep Health

¹⁵ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, pp i-ii.

¹⁶ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, pp iii.

¹⁷ Professor Robert Adams, Dr Sarah Appleton, Professor Anne Taylor, Professor Doug McEvoy, and Professor Nick Antic (Adams, Appleton, Taylor, McEvoy, and Antic), *Report to the Sleep Health Foundation: 2016 Sleep Health Survey of Australian Adults (2016 Sleep Health Survey)*, p. 5.

¹⁸ Adams, Appleton, Taylor, McEvoy, and Antic, *2016 Sleep Health Survey*, p. 5.

¹⁹ Adams, Appleton, Taylor, McEvoy, and Antic, *2016 Sleep Health Survey*, p. 2.

²⁰ Adams, Appleton, Taylor, McEvoy, and Antic, *2016 Sleep Health Survey*, p. 2.

Survey stated that ‘overall, the picture emerges of a nation whose health, social life and productivity is suffering from lack of quality sleep’.²¹

- 1.26 The Sleep Health Survey also put forward that sleep-related problems are not currently prioritised in health care policy and stated:

Despite the relationship to general health and to key national priorities such as obesity, cardiovascular disease and diabetes, healthy sleep is not a national health priority or given a high priority in healthcare policy. The data in this report indicates this situation deserves to be rectified.²²

Access Economics ‘Wake Up Australia: The Value of Healthy Sleep’ Report

- 1.27 In October 2004, Access Economics released its report *Wake Up Australia: The Value of Health Sleep* (Wake Up Australia report) which had been prepared for Sleep Health Australia.

- 1.28 The *Wake Up Australia* report estimated that in 2004, over 1.3 million Australians experienced sleep disorders, which had an economic cost of \$10.3 billion. The sleep disorder (OSA) was identified as most common, with insomnia also being highly prevalent.²³

- 1.29 The *Wake Up Australia* report highlighted that sleep disorders can have wide ranging health and social impacts and stated:

These [sleep] disorders contribute to a range of other health and social problems, with substantial health and economic impacts – accidents and injuries, other chronic illnesses, production and consumption losses, and second generation effects, particularly from childhood sleep disorders.²⁴

- 1.30 The *Wake Up Australia* report made four recommendations to ‘address the current fragmented and under-resourced sleep health landscape’, including education and awareness raising; research and development; cost-effective prevention, treatment and management options; and the establishment of a National Sleep Health organisation to coordinate a national action plan.²⁵

²¹Adams, Appleton, Taylor, McEvoy, and Antic, *2016 Sleep Health Survey*, p. 12.

²²Adams, Appleton, Taylor, McEvoy, and Antic, *2016 Sleep Health Survey*, p. 13.

²³ Access Economics, *Exhibit 2: Wake Up Australia: The Value of Healthy Sleep Report 2004*, p. i.

²⁴ Access Economics, *Exhibit 2: Wake Up Australia: The Value of Healthy Sleep Report 2004*, p. i.

²⁵ Access Economics, *Exhibit 2: Wake Up Australia: The Value of Healthy Sleep Report 2004*, p. iii.

Report Structure

- 1.31 Chapter 2 outlines the prevalence of insufficient sleep; the causes of insufficient sleep, including lifestyle and behavioural factors; and the impacts of insufficient sleep including health impacts, accidents and economic costs.
- 1.32 Chapter 3 outlines the causes, symptoms and prevalence of sleep disorders; potential links between sleep disorders and other health conditions; and personal experiences of living with these conditions.
- 1.33 Chapter 4 discusses the impact of fatigue and impaired alertness in the workplace and on the road, with particular emphasis on industries that use shift work.
- 1.34 Chapter 5 discusses the diagnosis and treatment of sleep disorders; the accessibility and affordability of sleep medicine; the role of primary care and other healthcare workers in the provision of sleep health services.
- 1.35 Chapter 6 discusses awareness of sleep health and hygiene in the general community; the education provided to healthcare workers regarding sleep health issues; and research relating to sleep health.

2. Insufficient Sleep

Sleep affects all areas of our life; it is a fundamental building block of achieving and maintaining good health along with good nutrition and adequate exercise. Yet it is often overlooked and ignored.¹

Introduction

- 2.1 Inadequate sleep is prevalent in Australian society with estimates suggesting four in every ten Australians are regularly experiencing inadequate sleep.²
- 2.2 Inadequate sleep can be caused by sleep disorders or by insufficient sleep due to lifestyle factors, such as work patterns, or the use of electronic media. Environmental factors such as noise or light may also contribute to insufficient sleep.
- 2.3 The impacts of insufficient sleep include: increased risk of chronic diseases, impacts on mental health, impaired judgement, increased risk of accidents and reduced productivity. In 2016-17, the inadequate sleep was estimated to cost the Australian economy \$66.3 billion.³

Prevalence

- 2.4 The Royal Australasian College of Physicians (RACP) stated that inadequate sleep is experienced by 'between 33 and 45 per cent of Australian adults,

¹ Royal Australasian College of Physicians (RACP), *Submission 122*, p. 2.

² Deloitte Access Economics (Deloitte), *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. i.

³ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. iii.

depending on the methodology used to define inadequate.’ The RACP added that when both adolescents and adults are considered, ‘poor or inadequate sleep affects over 20 per cent of people on a daily or near-daily basis.’⁴

- 2.5 The National Sleep Foundation in the United States of America recommends that adults have between seven and nine hours of sleep each night.⁵ Younger people require more sleep, with the recommended duration for school aged children being between nine and 11 hours each night and for adolescents between eight and ten hours each night.⁶
- 2.6 In 2017, Deloitte Access Economics (Deloitte) was commissioned by the Sleep Health Foundation to investigate the costs of inadequate sleep and sleep disorders to the Australian economy. Deloitte stated that there was ‘estimated to be 7.4 million Australian adults who did not regularly get the sleep they need.’⁷
- 2.7 Deloitte estimated that 39.8 per cent of Australian adults experience some form of inadequate sleep. This was further broken down to:
- 5.8 per cent of adults with excessive daytime sleepiness⁸ (EDS) due to sleep disorders;
 - 13.3 per cent of adults with EDS not due to sleep disorders; and
 - 20.7 per cent of adults with subjective insufficient sleep.⁹
- 2.8 The University of Western Australia Centre for Sleep Science (UWA-CSS) stated that in addition to people experiencing clinical sleep disorders many people were experiencing inadequate sleep due to ‘poor sleep hygiene, poor sleep measures and lifestyle problems.’¹⁰

⁴ RACP, *Submission 122*, p. 3.

⁵ Dr Yu Sun Bin, Member, Australasian Epidemiological Association, *Official Committee Hansard*, Sydney, 5 February 2019, p. 31.

⁶ Professor Sarah Blunden, Dr Yaqoot Fatima, Dr Stephanie Yiallourou, and Associate Professor Chris Magee, *Submission 22*, p. 3.

⁷ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. i.

⁸ Excessive daytime sleepiness is a descriptor of sleepiness that can be measured through instruments such as the Epworth Sleepiness Scale.

⁹ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. i.

¹⁰ Professor Peter Eastwood, Director, Centre for Sleep Science, University of Western Australia; Director, Western Australian Pregnancy Cohort (Raine) Study, the Raine Study, *Official Committee Hansard*, Perth, 29 January 2019, p. 2.

- 2.9 Professor Robert Adams, Professor Gary Wittert, and Dr Sarah Appleton (Adams, Wittert, and Appleton) stated that ‘recent research has found that 12 per cent of adults sleep less than five and a half hours’ a night. Adams, Wittert, and Appleton added that ‘nearly a quarter of adults report that their typical routine does not allow them to get enough sleep, with this figure rising to around 30 per cent in the prime working ages of 18 to 44’ years of age.¹¹
- 2.10 Professor Ron Grunstein stated that there is little evidence that Australians are getting less sleep than previously, stating that data suggests ‘average sleep duration has not changed much in the past two decades.’ Professor Grunstein added, while sleep duration appears to be stable, ‘scientific reports of poor sleep quality ... appear to have increased over the years in Western society.’¹²
- 2.11 The University of Sydney’s Brain and Mind Centre (USyd-BMC) highlighted that sleep disturbance is also a problem for older people. The USyd-BMC explained that as people age they often experience sleep that is ‘less consolidated, with impaired sleep initiation and maintenance, more awakenings and less deep sleep.’¹³

Prevalence Among Children

- 2.12 While adult sleep duration has not declined in recent decades, ‘sleep time in certain key groups has been affected, particularly children and young adults.’¹⁴ The Well Spoken and the Canberra Sleeping Clinic (WS-CSC) added that ‘up to 24 per cent of all children, and 35 per cent of children under two years of age have frequent problems sleeping.’¹⁵
- 2.13 The Australian Council on Children and the Media (ACCM) stated that the ‘early establishment of healthy sleep patterns has great benefits for children’s physical and cognitive development.’¹⁶ The Parenting Research Centre added children’s sleep habits are a primary concern for parents,

¹¹ Professor Robert Adams, Professor Gary Wittert, and Dr Sarah Appleton, *Submission 78*, p. 8.

¹² Professor Ron Grunstein, *Submission 112*, pp [1]-2.

¹³ University of Sydney, Brain and Mind Centre, *Submission 105*, p. 2.

¹⁴ Professor Robert Adams, Professor Gary Wittert, and Dr Sarah Appleton, *Submission 78*, p. 8.

¹⁵ Well Spoken and Canberra Sleep Clinic, *Submission 129*, p. 2.

¹⁶ Australian Council on Children and the Media, *Submission 123*, p. 2.

stating that ‘no other topic tops sleep in the parenting world’ and that parents are ‘desperate for sleep related information.’¹⁷

- 2.14 The RACP cited evidence that 70 per cent of South Australian teenagers are getting insufficient sleep every school night.¹⁸ The Adelaide Institute for Sleep Health (AISH) drew attention to similar results from Canadian research which found that 85 per cent of teenagers did not get the recommended sleep duration.¹⁹

Common Causes of Inadequate Sleep

Lifestyle factors

- 2.15 The Sleep Health Foundation (SHF) stated that a significant cause of inadequate sleep, especially among younger people, is due to ‘work pressures or lifestyle choices that restrict sleep to create more time for work, family, social, and leisure pursuits, including social media.’²⁰ The SHF added that some people also conflate achievement with having minimal sleep and stated that ‘the attitude of wearing short sleep as a badge of honour ... needs to change.’²¹

Effect of Electronic Media

- 2.16 The ACCM was concerned that the use of smartphones and tablets in the evening is negatively affecting children’s sleeping patterns. The ACCM cited a survey which found that almost half of Australian children ‘regularly use screen-based devices at bedtime, with one in four children reporting associated sleep problems.’²²
- 2.17 Wellbeing in Schools Australia (WISA), a not-for-profit organisation involved in the training of school staff, stated that:

¹⁷ Dr Julie Green, Director, Parenting Research Centre, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 26.

¹⁸ RACP, *Submission 122*, p. 4.

¹⁹ Professor Danny Eckert, Matthew Flinders Fellow, Adelaide Institute for Sleep Health (AISH), Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 35.

²⁰ Sleep Health Foundation, *Submission 54*, p. 2.

²¹ Professor David Hillman, Deputy Chair, Sleep Health Foundation, *Official Committee Hansard*, Canberra, 11 February 2019, p. 21.

²² Australian Council on Children and the Media, *Submission 123*, p. 2.

Students fear the disconnection from their online friends and are keeping their electronic devices switched on [24 hours a day]. The result being they are reporting to teachers of having their sleep regularly interrupted during the night.²³

- 2.18 Similarly, the SHF stated ‘children who have, on average, three hours of screen time per day are more likely to have higher rates of poor sleep and poorer educational outcomes than children who spend less time in front of screens.’²⁴
- 2.19 The impact of electronic media on sleep is not limited to children. The AISH commented on a similar pattern among young adults (from 18 to 34 years of age) and stated that ‘the majority [of young adults] do spend time on screens just before bed, and those that do are far more vulnerable to poor sleep and sleep disturbances.’²⁵
- 2.20 SleepFit also commented that we now ‘live in a world of constant digital stimulation and electronic entertainment ... and many of us value alternatives to sleep higher than sleep itself.’²⁶ As an example, SleepFit drew attention to the continuous episode programming of streaming TV services which entices viewers to keep watching. SleepFit added that in this situation the ‘perceived payoff for staying up far outweighs the payoff for getting a good night’s sleep.’²⁷

Other Lifestyle Factors

- 2.21 SleepFit suggested that the culture of some workplaces could be detrimental to the sleep health of their employees, stating that ‘there are still some organisations actively glorifying lack of sleep and promoting a culture of late-night work.’²⁸

²³ Wellbeing in Schools Australia, *Submission 68*, p. 1.

²⁴ Sleep Health Foundation, *Submission 45*, pp 2-3.

²⁵ Professor Robert Adams, Professor of Sleep Medicine, AISH, Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 35.

²⁶ Ms Melissa Webster, Chief Executive Officer, SleepFit, *Official Committee Hansard*, Sydney, 5 February 2019, p. 1.

²⁷ Ms Melissa Webster, SleepFit, *Official Committee Hansard*, Sydney, 5 February 2019, p. 1.

²⁸ SleepFit, *Submission 47*, p. 3.

2.22 The Melbourne Sleep Disorders Centre (MSDC) stated that in many industries it can often be seen as a positive trait to function with minimal sleep. The MSDC added that there:

... has to be a society-wide shift [to] not seeing sleep as something that can be traded off as an optional extra, or that we can cheat sleep as much as we can, but [instead seeing sleep] as something that is important.²⁹

2.23 Research led by Professor Robert Adams explored the link between working late into the evening and sleeping difficulties. The research found that of the 22 per cent of people doing work 'in the hour before bed a few nights of the week or more, 69 per cent have two or more sleep problems, significantly more than adults who do not work before bed.'³⁰

2.24 Turning Point expressed concern about the effects of drug and alcohol use on sleep health. Turning Point stated that 40 per cent of Australians consume alcohol in the hour prior to bed and suggested that the 'effects of alcohol on sleep are detrimental to both underlying sleep physiology and health.'³¹

Environmental Factors

2.25 The Institute for Social Science Research (ISSR) emphasised that environmental and social factors can have a significant impact on an individual's ability to gain adequate sleep.³² The ISSR added that there was a need for sleep research to be translated into interventions which benefit the broader community, and stated that:

Such interventions may include consideration of built environments (e.g. street lighting and road noise impacts on sleep), policy (e.g. school start times or work shift times), and other aspects of urban and social planning.³³

²⁹ Dr David Cunnington, Sleep Physician and Director, Melbourne Sleep Disorders Centre, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 40.

³⁰ R J Adams, S L Appleton, A W Taylor, T K Gill, C Lang, R D McEvoy and N A Antic, *Exhibit 2f: 'Sleep Health of Australian Adults in 2016: Results of the 2016 Sleep Health Foundation National Survey'*, *Sleep Health*, vol. 3, no. 1, February 2017, p. 40.

³¹ Turning Point, *Submission 33*, p. [2].

³² Institute for Social Science Research, *Submission 79*, pp 5-6.

³³ Institute for Social Science Research, *Submission 79*, p. 7.

- 2.26 The Public Health Association of Australia described sleep as a ‘key indicator of social wellbeing’ and stated that sleep problems can be caused by factors including ‘poor housing conditions, noise and light pollution, lack of neighbourhood safety, unemployment, insecure work, financial hardship, and other stressors.’³⁴
- 2.27 SleepFit reported that among the 4000 people who had participated in its programs the most common environmental barriers to sleep were: bedrooms that were too hot or cold (37 per cent of participants), interruptions by children (20 per cent), and external noise (17.5 per cent).³⁵
- 2.28 Professor Sarah Blunden, Dr Yaqoot Fatima, Dr Stephanie Yiallourou, and Associate Professor Chris Magee (Blunden, Fatima, Yiallourou and Magee) raised a number of social and environmental factors that may place Aboriginal and Torres Strait Islanders at greater risk of having sleeping difficulties. These issues include: overcrowding in remote communities; ‘the high prevalence of domestic violence’; noise and music late at night; and ‘psychological stressors’ linked to ‘environmental, financial, social, and educational disadvantage.’³⁶
- 2.29 Blunden, Fatima, Yiallourou and Magee added that research has found that, Aboriginal and Torres Strait Islander children:
- ... report poorer sleep quality (e.g. sleep scheduling, sleep fragmentation), decreased sleep duration, worse sleep hygiene, increased sleepiness, and more instability and irregularity in their sleep-wake patterns, particularly in ‘get up’ times.³⁷

Artificial Lighting

- 2.30 An inquiry participant drew attention to the impact artificial light can have on sleep stating that ‘exposure to artificial light, particularly in the blue area of the visual spectrum suppresses melatonin production, and, in turn causes sleep disturbance.’³⁸ The inquiry participant added that common sources of

³⁴ Public Health Association of Australia, *Submission 64*, p. 4.

³⁵ SleepFit, *Submission 47*, p. 4.

³⁶ Professor Sarah Blunden, Dr Yaqoot Fatima, Dr Stephanie Yiallourou, and Associate Professor Chris Magee (Blunden, Fatima, Yiallourou, and Magee), *Submission 22*, pp 3-4.

³⁷ Blunden, Fatima, Yiallourou, and Magee, *Submission 22*, p. 6.

³⁸ Name Withheld, *Submission 11*, p. 2.

‘blue rich lights are: laptops, televisions, computer monitors, cool white house lights and cool white outdoor lighting, particularly street lighting.’³⁹

- 2.31 Professor Grunstein drew attention to the increasing use of Light Emitting Diode (LED) lights which emit more light in the blue spectrum than traditional incandescent bulbs and are contributing to an annual increase of 2.2 per cent in global light pollution.⁴⁰ Professor Grunstein added that while the overall light levels are important, blue ‘light is of the greatest concern as it has more powerful effects on the circadian system.’⁴¹
- 2.32 Professor Grunstein suggested that there was a need for building regulators, and engineering and architecture students to have a greater awareness of the negative impacts of excessive light at night. Professor Grunstein also recommended greater use of timers, ‘light shielding techniques, and focused illumination’ to ensure light is only used when and where necessary.⁴²

Noise

- 2.33 Professor Grunstein stated that ‘the burden of disease from environmental noise is the second highest after air pollution.’ Professor Grunstein added that European research had found that:

At least one million healthy years of life are lost every year from traffic-related environmental noise in Western Europe. Sleep disturbance and annoyance, mostly related to road traffic noise, constitute the bulk of this burden.⁴³

- 2.34 The Waubra Foundation suggested that sleep deprivation may be caused by industrial noise sources such as: mining operations; compressors used in heating and cooling; coal, gas, and wind power facilities; and aviation.⁴⁴
- 2.35 The Waverton Wollstonecraft Rail Noise Action Group (WWRNAG) suggested that noise from passing trains is causing sleep deprivation in members of its community in Sydney. The WWRNAG added that its

³⁹ Name Withheld, *Submission 11*, p. 2.

⁴⁰ Professor Ron Grunstein, *Submission 112*, p. 3.

⁴¹ Professor Ron Grunstein, *Submission 112*, p. 3.

⁴² Professor Ron Grunstein, *Submission 112*, p. 4.

⁴³ Professor Ron Grunstein, *Submission 112*, p. 5.

⁴⁴ Waubra Foundation, *Submission 120*, p. 2.

members reported taking longer than average to fall asleep and also waking between 8 and 11 times during the night.⁴⁵

- 2.36 Several inquiry participants living in the vicinity of wind power facilities reported that their sleep was being disturbed by noise, including low-frequency noise, from wind turbines. Ms Melissa Ware attributed noise from the wind farm near her property with symptoms including an 'inability to get to sleep, poor quality sleep, and waking up tired and not feeling refreshed or restored.'⁴⁶
- 2.37 The Waubra Foundation stated that some people do not become accustomed to low-frequency noise and vibration, but instead 'they find they become increasingly sensitive to the sound.'⁴⁷
- 2.38 In addition to wind turbines, Ms Mikala Mihaljevic and Ms Sumaia Abass attributed similar sleep deprivation symptoms to low-frequency noise emanating from urban areas within Sydney.⁴⁸
- 2.39 Dr David Hillman of the Sir Charles Gairdner Hospital, who is a member of the Australian Government Independent Scientific Committee on Wind Turbines, advised that the distance that wind farms are required to be set-back from residential properties varies between the states and territories. In Queensland, for example, the set-back is 1.5 kilometres and Dr Hillman stated at that distance most people 'simply cannot hear the [wind farms] at all'.⁴⁹
- 2.40 Dr Hillman also stated that wind farms cause low-frequency vibrations and that if 'you are right under a wind turbine there is a problem [but] if you are a reasonable distance from it there is not'. Dr Hillman added, however, that there may be individuals:

... with particular sensitivities to low-frequency, inaudible sound. Their needs need to be considered. It is a matter of listening respectfully, measuring, and taking action.⁵⁰

⁴⁵ Waverton Wollstonecraft Rail Action Group, *Submission 128*, p. 5.

⁴⁶ Ms Melissa Ware, *Submission 121*, p. 7.

⁴⁷ Waubra Foundation, *Submission 120*, p. 6.

⁴⁸ Ms Mikala Mihaljevic, *Submission 96*, p. 1; Ms Sumaia Abass, *Submission 72*, pp 1-2.

⁴⁹ Dr David Hillman, Sleep Physician, Sleep Health Foundation (SHF) and Sir Charles Gairdner Hospital (SCGH), *Official Committee Hansard*, Perth, 29 January 2019, p. 20

⁵⁰ Dr David Hillman, SHF and SCGH, *Official Committee Hansard*, Perth, 29 January 2019, p. 20

Impacts of Inadequate Sleep

2.41 The RACP outlined the broad range of impacts of inadequate sleep and stated that it:

... impacts full and functioning healthy recovery from existing conditions, work productivity, mental functioning, exposure to accident risk, quality of life, and a range of health conditions. It is also associated with increased all-cause mortality.⁵¹

2.42 Deloitte estimated that, in 2016-17, inadequate sleep and its consequences resulted in 3017 deaths in Australia. Over 77 per cent of these deaths were related to the effects of inadequate sleep on heart conditions, particularly among those people experiencing obstructive sleep apnoea. Almost 10 per cent of the deaths were due to motor vehicle accidents attributed to drowsy driving.⁵²

Health Impacts

2.43 The Australasian Sleep Association (ASA) summarised the importance of sleep describing it as a 'fundamental biological need, which is essential for physical and mental recuperation.' The ASA added that the impacts of inadequate sleep on health were wide-ranging as 'the function of every cell in the human body changes when we sleep, so having insufficient or poor quality sleep impairs the function of every cell.'⁵³

2.44 The Australasian Epidemiological Association (AEA) stated that 'studies indicate that poor habitual sleep increases the risk for the development of chronic health conditions by 20 to 40 per cent.'⁵⁴ The ASA described the conditions associated with insufficient or poor quality sleep, stating it results in a:

... greater risk of cardiovascular diseases, including hypertension, stroke, heart attack and arrhythmias; the prevalence of obesity and diabetes is increased;

⁵¹ RACP, *Submission 122*, p. 3.

⁵² Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, pp 27, 35.

⁵³ Australasian Sleep Association, *Submission 118*, p. 2.

⁵⁴ Australasian Epidemiological Association, *Submission 15*, p. 2.

there is a greater risk of dementia and more rapid progression of the disease; and the prevalence of some cancers may be increased.⁵⁵

Physical Health

2.45 Adams, Wittert, and Appleton stated that research has found that among people who slept the recommended seven to eight hours a day at the start of the study, any 'increase or decrease in sleep duration was associated with an increased mortality risk.'⁵⁶ Adams, Wittert, and Appleton added that 'a wealth of evidence indicates sleep duration may be a significant determinant of metabolic health, with adverse effects on the levels of glucose, cholesterol, and blood pressure.'⁵⁷

2.46 The AISH described research investigating the impacts of sleep deprivation and stated if you limit the sleep of a person to:

... five hours [of sleep] a night for five nights in a row, and measure their blood glucose on night one and at the end of that five-day period they will have gone from being completely healthy to being in a prediabetic state. Your blood alcohol concentration equivalent is over 0.05 after just five nights in a row at five hours of sleep. If you take a 20-year old male, do that same bout of testing and measure his testosterone at the start and the end of the five days, it is as though he has aged a decade.⁵⁸

2.47 Ms Crystal Grant and Associate Professor Siobhan Banks stated that inadequate sleep 'is associated with weight gain, which over time leads to obesity, a risk factor for numerous metabolic (including Type 2 Diabetes) and cardiovascular diseases.' Ms Grant and Associate Professor Banks explained one 'proposed mechanism for this association' between inadequate sleep and obesity:

Firstly, short sleep duration leads to increased fatigue, which may result in reduced physical activity (including energy expenditure). Secondly, short sleep duration results in increased wake time and hormonal changes that may affect hunger/appetite, resulting in possible increases to food intake.⁵⁹

⁵⁵ Australasian Sleep Association, *Submission 118*, p. 2.

⁵⁶ Professor Robert Adams, Professor Gary Wittert, and Dr Sarah Appleton, *Submission 78*, p. 8.

⁵⁷ Professor Robert Adams, Professor Gary Wittert, and Dr Sarah Appleton, *Submission 78*, p. 8.

⁵⁸ Professor Danny Eckert, AISH, *Official Committee Hansard*, Sydney, 5 February 2019, pp 36-37.

⁵⁹ Ms Crystal Grant and Associate Professor Siobhan Banks, *Submission 82*, p. [1].

2.48 The Charles Perkins Centre stated that inadequate sleep caused by disruptions to the circadian rhythm have been linked to cancer, including ‘pancreatic, colorectal, and lung cancer, and glioma, glioblastoma and melanoma.’ In addition, the Charles Perkins Centre stated that ‘disruptions to circadian rhythm are linked to cancer progression and a worse prognosis.’⁶⁰

Mental Health

2.49 The SHF highlighted the link between poor sleep and mental health by providing the example that ‘poor sleep in young, non-depressed Australian women was found to increase the risk of subsequent depression more than four-fold within a decade.’⁶¹

2.50 Similarly, the National Mental Health Commission (NMHC) stated that there are ‘clear and compelling reasons that indicate the close link between sleep health and mental health.’ The NMHC explained that ‘sleep deprivation can further contribute to the development of mental illness by lowering an individual’s resilience to respond to mental health problems.’⁶²

2.51 The NMHC also drew attention to research indicating a ‘strong correlation between sleep disturbances and suicidal ideation and behaviours.’ The NMHC cited a 2017 study which found that ‘sleep problems worsened suicidal thoughts in the ... days and weeks preceding a suicide attempt or suicide completion.’⁶³ The NMHC added that ‘complaints about sleep may serve as a warning sign and key risk factor, while providing an avenue for early intervention and prevention.’⁶⁴

2.52 The USyd-BMC advised that research indicates that there is ‘a bidirectional relationship between sleep disturbance and neurodegenerative disease.’⁶⁵ The USyd-BMC added that ‘sleep plays a critical role in clearing the brain of

⁶⁰ Charles Perkins Centre, *Submission 46*, pp 8-9.

⁶¹ Sleep Health Foundation, *Submission 54*, p. 3.

⁶² National Mental Health Commission, *Submission 62*, p. 1.

⁶³ National Mental Health Commission, *Submission 62*, p. 1.

⁶⁴ National Mental Health Commission, *Submission 62*, p. 1.

⁶⁵ University of Sydney, Brain and Mind Centre, *Submission 105*, p. 2.

toxins' and sleep disturbance is associated with 'more rapid cognitive decline.'⁶⁶ The USyd-BMC elaborated:

... recently there was a system discovered in the brain called the glymphatic system. It is essentially the garbage disposal or sewage system in your brain, but it only opens up properly when you are sleeping well. And so now we have a mechanism of action that explains why it is that people with poor sleep end up developing these systemic brain disorders ... it could be in the long term—it has not yet been confirmed—that if you mess with this glymphatic system you start getting the metabolites build up ... that have been linked strongly with Alzheimer's.⁶⁷

Economic and Social Costs

- 2.53 Deloitte estimated that, in 2016-17, the total cost of inadequate sleep in Australia was \$66.3 billion. This cost comprised '\$26.2 billion in financial costs and \$40.1 billion in the loss of wellbeing'.⁶⁸
- 2.54 Deloitte described the financial costs of inadequate sleep as comprising: \$17.9 billion in productivity loss; \$1.8 billion in health system costs; \$0.6 billion in informal costs; and \$5.9 billion in other costs, including deadweight costs.⁶⁹ The majority of the cost due to lost productivity was related to reduced employment levels (\$7.7 billion) and presenteeism⁷⁰ (\$6.8 billion).⁷¹
- 2.55 Deloitte's estimated lost wellbeing cost of \$40.1 billion was calculated by estimating the number of Disability Adjusted Life Years (DALYs)⁷² lost due to inadequate sleep. The cost of the lost DALYs was then calculated based on

⁶⁶ University of Sydney, Brain and Mind Centre, *Submission 105*, p. 2.

⁶⁷ Dr Nathaniel Marshall, Associate Professor, Sydney Nursing School, University of Sydney, and Centre for Sleep and Chronobiology, Woolcock Institute for Medical Research, Brain and Mind Centre, University of Sydney, *Official Committee Hansard*, Sydney, 5 February 2019, pp 16-17.

⁶⁸ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. iii.

⁶⁹ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. ii.

⁷⁰ Being present at work but performing in a suboptimal manner due to tiredness.

⁷¹ Professor David Hillman, *Submission 4*, p. 2.

⁷² Disability adjusted life years are a 'measurement unit that quantify the morbidity aspect and premature death associated with various diseases and injuries'. Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. 63.

the Australian Government's 'official estimate of the value of a statistical life year lost.'⁷³

Other Impacts

- 2.56 Inadequate sleep decreases work performance and productivity and increases the risk of accidents. SleepFit stated that inadequate sleep has been recognised by the insurance industry as a major source of risk due to the fact that 'tired people make more mistakes'.⁷⁴

Judgement and Mental Functioning

- 2.57 The RACP described the many ways that inadequate sleep can impair judgement and mental functioning, stating that:

Sleep loss impairs cognition, psychomotor function, and mood. This can result in lapses in attention and clear focus; reduced motivation; compromised problem solving; confusion; irritability, and memory lapses; impaired communication; slowed or faulty information processing and judgement; diminished reaction times; and indifference and loss of empathy.⁷⁵

- 2.58 Similarly, the WS-CSC stated that when sleep deprived:

... the human body struggles to extract glucose from the blood stream and the brain is unable to think clearly. This then impacts rational thinking, willpower, self-control, productivity, and interactions with colleagues.⁷⁶

- 2.59 The Appleton Institute stated that '21 per cent of men and 13 per cent of women have fallen asleep at work in the last month.' The Appleton Institute further stated that research in high risk industries indicated that 'workers who obtain less than five hours sleep prior to work experience almost twice as many errors as those who have slept more.'⁷⁷ In addition, the WS-CSC stated that 'dangerously, most sleep-impaired individuals believe their ability to perform these tasks is at its usual standards, when tests show it is not.'⁷⁸

⁷³ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. ii.

⁷⁴ Ms Melissa Webster, SleepFit, *Official Committee Hansard*, Sydney, 5 February 2019, p. 2.

⁷⁵ RACP, *Submission 122*, p. 4.

⁷⁶ Well Spoken and Canberra Sleep Clinic, *Submission 129*, p. 2.

⁷⁷ Appleton Institute, *Submission 88*, p. 1.

⁷⁸ Well Spoken and Canberra Sleep Clinic, *Submission 129*, p. 2.

Impacts on Children

- 2.60 The impact of inadequate sleep in children can manifest differently to adults as the 'effects compound over time and can have a significant influence on children's growth and development.'⁷⁹ The WS-CSC outlined the physical impacts of inadequate sleep in children as including restricted release of growth hormones, increased risk of obesity, increased cortisol levels making it difficult to 'wind down, go to sleep or stay asleep', and weakened immune systems.⁸⁰
- 2.61 The WS-CSC further stated that for children 'even small increments of sleep loss (as little as 30 minutes per night) can result in reduced performance on intelligence tests and affect learning in a significant way.'⁸¹
- 2.62 The WISA stated that disrupted sleep among students, which it attributed to night time use of digital devices, was resulting in students not being 'as attentive in class, struggling to remain awake, functioning below their capacity and in some instances not attending school on a regular basis or starting to disengage.'⁸²
- 2.63 In addition, the WS-CSC stated that inadequate sleep interferes with a child's 'capacity to regulate behaviour and emotion', which in turn makes them 'more likely to be rejected by their peers'.⁸³ Similarly, Associate Professor Jillian Dorrian, Dr Stephanie Centofani, Dr Amy Reynolds, and Professor Kurt Lushington stated that 'sleep plays a part in some of the critical issues in schools, including youth mental health and bullying.'⁸⁴
- 2.64 Blunden, Fatima, Yiallourou and Magee was of the view that although there is limited research regarding the impact of inadequate sleep on Aboriginal and Torres Strait Islander children available, evidence suggested it did impact on school performance and the likelihood of being absent from school. Blunden, Fatima, Yiallourou and Magee added that sleep awareness and education 'may have potential as another as yet unexplored avenue to

⁷⁹ Well Spoken and Canberra Sleep Clinic, *Submission 129*, p. 2.

⁸⁰ Well Spoken and Canberra Sleep Clinic, *Submission 129*, p. 3.

⁸¹ Well Spoken and Canberra Sleep Clinic, *Submission 129*, p. 4.

⁸² Wellbeing in Schools Australia, *Submission 68*, p. 1.

⁸³ Well Spoken and Canberra Sleep Clinic, *Submission 129*, p. 4.

⁸⁴ Association Professor Jillian Dorrian, Dr Stephanie Centofani, Dr Amy Reynolds, Professor Kurt Lushington, *Submission 85*, p. 2.

increase school attendance and school performance in young [Aboriginal and Torres Strait Islander] populations.’⁸⁵

Accidents

2.65 The WS-CSC stated that:

... even small amounts of sleep deprivation degrade a person’s abilities and increase the risk of micro sleeps—a dangerous state to be in while driving a car, wielding a scalpel or operating machinery ... unsurprisingly, a lack of sleep has been linked to motor vehicles crashes, industrial disasters, and medical and other occupational errors.⁸⁶

2.66 The AISH stated that ‘fatigue and sleepiness kill more people on the road than drugs and alcohol combined.’⁸⁷ Associate Professor Mark Howard and Associate Professor Clare Anderson elaborated that drowsiness is ‘the underlying cause of 20 to 30 per cent of road crashes’ in Australia.⁸⁸

2.67 The Queensland Government stated that ‘on average 31 people are killed and 462 seriously injured each year on Queensland roads as a result of crashes where fatigue played a part.’ The Queensland Government added, however, that these figures may underestimate the impact of fatigue as ‘it can be difficult to know if fatigue contributed to a crash.’⁸⁹

2.68 Research led by Professor Adams found that ‘drowsiness while driving is common’ in Australia, with 29 per cent of survey participants reporting driving while drowsy in the at least monthly. In addition, one-fifth of adults reported having dozed off while driving and five per cent reported having a ‘motor vehicle accident in the past year because they dozed off or were too tired.’⁹⁰

⁸⁵ Blunden, Fatima, Yiallourou, and Magee, *Submission 22*, pp 8-9.

⁸⁶ Well Spoken and Canberra Sleep Clinic, *Submission 129*, p. 2.

⁸⁷ Professor Danny Eckert, AISH, *Official Committee Hansard*, Sydney, 5 February 2019, p. 36.

⁸⁸ Associate Professor Mark Howard and Associate Professor Clare Anderson, *Submission 9*, p. 1.

⁸⁹ Queensland Government, *Submission 115*, p. 4.

⁹⁰ R J Adams, S L Appleton, A W Taylor, T K Gill, C Lang, R D McEvoy and N A Antic, *Exhibit 2f: ‘Sleep Health of Australian Adults in 2016: Results of the 2016 Sleep Health Foundation National Survey’*, *Sleep Health*, vol. 3, no. 1, February 2017, p. 40.

Concluding Comment

- 2.69 Sleep is a fundamental biological need, and (along with exercise and nutrition) it forms the foundation of health and wellbeing. Yet, as the Royal Australasian College of Physicians stated, the importance of sleep is often overlooked.⁹¹ It is concerning that four in every ten Australians are not getting adequate sleep and this indicates there is a need for a greater focus to be placed on sleep health.
- 2.70 The Committee was particularly concerned to hear about the impact that smartphones and other forms of electronic and digital devices may be having on the sleep health of children. The Committee heard that the majority of teenagers are getting insufficient sleep on most school nights, in part due to continual disruptions from their digital devices. Over time consistently insufficient sleep can influence children's growth and development as well as impact their performance at school, and also increase the likelihood of the development of negative behavioural patterns.
- 2.71 Adults are also risking their health by not prioritising sleep in their daily lives. As with children, many adults are using digital media in the late evening and night, which may have a detrimental impact on their sleep. In addition, a culture of 'burning the candle at both ends', which encourages people to work late into the evening can also result in reduced sleep. Individuals may believe that they are able to cope with a lifestyle involving regular insufficient sleep without experiencing any serious health effects. Unfortunately the evidence suggests that this is not the case.
- 2.72 The Australasian Sleep Association stated that insufficient sleep affects the functioning of every cell in the human body.⁹² While there is a need for further research on the health impacts of sleep, available evidence suggests that insufficient sleep increases the risk of many serious health conditions including: obesity, diabetes, cardiovascular conditions, and cancer.
- 2.73 In addition, insufficient sleep has been associated with a range of mental health issues. Sleep deprivation restricts people's resilience to deal with mental health issues and is associated with an increased risk of depression. Insufficient sleep is also linked with cognitive decline in older people. While the research is at an early stage, recent work has focussed on the role of sleep

⁹¹ RACP, *Submission 122*, p. 2.

⁹² Australasian Sleep Association, *Submission 118*, p. 2.

in clearing the brain of toxins and the possible links this may have to the development of Alzheimer's Disease.

- 2.74 As well as having direct health impacts, insufficient sleep can impair judgement and mental functioning. In 2016-17, the impact that this had on productivity alone was estimated to cost Australia \$17.9 billion. Including the effects on health and wellbeing, the overall cost of inadequate sleep is estimated to be \$66.3 billion.⁹³
- 2.75 Insufficient sleep also leads to fatigue which is a major contributing factor to road accidents. Fatigue kills more people on the road than alcohol and drugs combined. One-fifth of adults have reported dozing off while driving.⁹⁴
- 2.76 As individuals, there are few lifestyle changes that can be made that are as simple as prioritising sleep and yet have such widespread positive impacts. Improving the duration and quality of sleep can reduce the risk of developing chronic health conditions, enhance mental wellbeing, and improve productivity and mental functioning.

Recommendation 1

- 2.77 The Committee recommends that the Australian Government prioritise sleep health as a national priority and recognise its importance to health and wellbeing alongside fitness and nutrition.**

⁹³ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. iii.

⁹⁴ R J Adams, S L Appleton, A W Taylor, T K Gill, C Lang, R D McEvoy and N A Antic, *Exhibit 2f: 'Sleep Health of Australian Adults in 2016: Results of the 2016 Sleep Health Foundation National Survey'*, *Sleep Health*, vol. 3, no. 1, February 2017, p. 40.

3. Sleep Disorders

Introduction

- 3.1 Approximately one in five Australians are estimated to be affected by a major sleep disorder.¹ These include: Obstructive Sleep Apnoea (OSA), insomnia, Restless Legs Syndrome (RLS), circadian rhythm disorders and central disorders of hypersomnolence.
- 3.2 As well as the immediate effects of sleepiness and fatigue, sleep disorders may also contribute to other health conditions, including: diabetes, obesity, mental health and cardiovascular disease.²

Types, Causes and Symptoms of Sleep Disorders

Obstructive Sleep Apnoea

- 3.3 The sleep disorder, OSA occurs due to obstructions of the upper airway and is ‘characterised by snoring’ and ‘repetitive periods of obstructed breathing during sleep.’³ The disorder, OSA was described as a chronic health disorder⁴, with symptoms including: ‘sleep disruption, snoring and daytime

¹ Deloitte Access Economics (Deloitte), *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. 19.

² Sleep Health Foundation (SHF), *Submission 54*, p. 9.

³ Professor Robert Adams, Professor Gary Wittert, and Dr Sarah Appleton (Adams, Wittert, and Appleton), *Submission 78*, p. 3; Royal Australasian College of Physicians (RACP), *Submission 122*, p. 3; American Academy of Sleep Medicine (AASM), *International Classification of Sleep Disorders*, 3rd edn, AASM, Darien IL, 2014, p. 59.

⁴ Professor Danny Eckert, Director, Sleep Research Program, Neuroscience Research Australia (NeuRA), *Official Committee Hansard*, Sydney, 5 February 2019, p. 24.

sleepiness.⁵ During sleep, a ‘reduction in oxygen levels,’ brief awakenings, and ‘mechanical stresses on the heart and lungs’ can also occur.⁶

- 3.4 Depending on the frequency of impaired breathing events that occur during sleep, the severity of OSA can be measured as mild, moderate, or severe.⁷ The Canberra Sleep Clinic stated that the severity of OSA symptoms experienced do not necessarily provide an indication of ‘the severity of the apnoea measured by [a] sleep study.’⁸
- 3.5 Men and women may experience different symptoms of OSA. As a result, Professor Robert Adams, Professor Gary Wittert, and Dr Sarah Appleton (Adams, Wittert, and Appleton) were concerned that ‘current screening tools may miss many with significant OSA, especially women.’⁹
- 3.6 The sleeping disorder, OSA is caused by physiological and age-related factors, with ‘weight [being] the most profound risk factor.’¹⁰ Further, the University of Western Australia (UWA) Centre for Sleep Science (CSS) stated that there are a ‘whole cascade of reasons why men are more susceptible’ to OSA than women, elaborating that:

Men carry their fat a bit differently. [Men] tend to carry it up higher, whereas women carry it down lower. It's not good to have it around your neck for sleep apnoea. There are also different kinds of hormonal reasons. Women have hormones which drive breathing and muscles ... It does change post menopause; women do start becoming more susceptible.¹¹

⁵ RACP, *Submission 122*, p. 3.

⁶ RACP, *Submission 122*, p. 3.

⁷ Harvard University, *Healthy Sleep*, ‘Understanding the Results’, <http://healthysleep.med.harvard.edu/sleep-apnea/diagnosing-osa/understanding-results>, accessed 13 March 2019.

⁸ Canberra Sleep Clinic, *Submission 109*, p. 1.

⁹ Adams, Wittert, and Appleton, *Submission 78*, pp 4-5.

¹⁰ Professor Peter Eastwood, Director, Centre for Sleep Science, University of Western Australia (UWA); Director, Western Australia Pregnancy Cohort (Raine) Study, *The Raine Study, Official Committee Hansard*, Perth, 29 January 2019, p. 3.

¹¹ Professor Peter Eastwood, Centre for Sleep Science, UWA, *Official Committee Hansard*, Perth, 29 January 2019, p. 3.

Insomnia

- 3.7 Sleep Matters stated that ‘insomnia is not just the occasional night of poor sleep that we all experience but [it] is a chronic condition that doesn’t tend to resolve without treatment.’¹² Insomnia is characterised by ‘chronic difficulties in initiating or maintaining sleep, or frequent early [waking], resulting in impairment of daytime functioning.’¹³
- 3.8 Insomnia can be experienced as a symptom of another condition, but it may also be diagnosed as a sleep disorder independent of other existing health conditions.¹⁴ The UWA School of Psychological Science (SPS) stated that people may continue to experience insomnia even after co-morbid OSA has been treated.¹⁵
- 3.9 Insomnia which persists for less than three months is described as episodic (or acute) and is often associated with events such as ‘occupational stress, personal losses, [or] bereavement.’¹⁶ Insomnia is considered chronic if symptoms persist beyond three months.¹⁷ Adams, Wittert, and Appleton stated ‘objectively measured short sleep duration has been shown to be a risk factor for developing into the more severe form of chronic insomnia.’¹⁸
- 3.10 The UWA-CSS stated that insomnia is caused by a combination of anatomical (for example, the effect of exposure to light on the ‘body clock’) and behavioural factors.¹⁹ In regard to the behavioural elements of insomnia, Neuroscience Research Australia (NeuRA) and Sleep Matters highlighted the ‘vicious cycles’ of thought and anxiety that insomnia patients

¹² Dr Melissa Ree, Director, Sleep Matters, *Official Committee Hansard*, Perth, 29 January 2019, p. 8.

¹³ RACP, *Submission 122*, p. 3.

¹⁴ Dr Moira Junge and Emeritus Professor Dorothy Bruck, *Submission 8*, p. 5.

¹⁵ Professor Romola Bucks, Head of School of Psychological Science, and Professor, UWA, *Official Committee Hansard*, Perth, 29 January 2019, p. 4.

¹⁶ Dr Moira Junge and Emeritus Professor Dorothy Bruck, *Submission 8*, p. 5; AASM, *International Classification of Sleep Disorders*, 3rd edn, AASM, Darien, IL, 2014, p. 44.

¹⁷ Dr Moira Junge and Emeritus Professor Dorothy Bruck, *Submission 8*, p. 5; AASM, *International Classification of Sleep Disorders*, 3rd edn, AASM, Darien, IL, 2014, p. 22.

¹⁸ Adams, Wittert and Appleton, *Submission 78*, p. 8.

¹⁹ Professor Peter Eastwood, Centre for Sleep Science, UWA, *Official Committee Hansard*, Perth, 29 January 2019, p. 3.

experience.²⁰ Ms Rosemary Clancy stated that ‘the focus on quantity [of sleep] just creates performance anxiety around sleep and people then start to become fearful of it.’²¹

Restless Legs Syndrome

3.11 The movement disorder of RLS is ‘characterised by an irresistible urge to move the legs, that is worse at night, particularly when trying to get to sleep.’²² Mr Graham Revill noted that it can also affect the arms and the torso, and that ‘the feelings and pain are associated with lying down and trying to relax or sitting for some time.’²³

3.12 Dr Cunnington and Dr Swieca stated that the ‘symptoms of [RLS] are also variable and unpredictable. This can result in people unexpectedly having a very poor night’s sleep, and having difficulty performing work-related tasks the subsequent day.’ In severe cases, these involuntary and periodic movements can result in a ‘very disabling’ experience for patients.²⁴

Circadian Rhythm Sleep Disorders

3.13 The circadian rhythm is also known as the sleep-wake cycle. Austin Health and the Institute for Breathing and Sleep discussed Shift Work Sleep Disorder, which refers to the misalignment of sleep and wake times with the circadian rhythm due to shift work requirements. The symptoms include insomnia and/or excessive sleepiness.²⁵

3.14 Another circadian rhythm sleep disorder is ‘Non 24 Hour Sleep Wake Disorder’ (N24), also known as Hypnychthemeral Syndrome, where ‘an individual’s biological clock fails to synchronise to a 24-hour day.’ In people who experience N24, sleep times gradually delay each day.²⁶

²⁰ Dr Melissa Ree, Sleep Matters, *Official Committee Hansard*, Perth, 29 January 2019, p. 11; Professor Danny Eckert, NeuRA, *Official Committee Hansard*, Sydney, 5 February 2019, p. 26.

²¹ Ms Rosemary Clancy, Director, Let Sleep Happen, *Official Committee Hansard*, Canberra, 11 February 2019, p. 21.

²² Dr David Cunnington and Dr John Swieca, *Submission 73*, Attachment A, p. 2.

²³ Mr Graham Revill, *Submission 107*, p. 1.

²⁴ Dr David Cunnington and Dr John Swieca, *Submission 73*, Attachment A, pp 1-2.

²⁵ Austin Health and Institute for Breathing and Sleep, *Submission 84*, p. 3; AASM, *International Classification of Sleep Disorders*, 3rd edn, AASM, Darien, IL, 2014, p. 215.

²⁶ Name withheld, *Submission 57*, p. 6.

3.15 An inquiry participant outlined their child's experience of being unable to adjust to the day-night cycle and stated:

... the first symptoms of N24 usually noticed are periodic night-time insomnia and excessive daytime sleepiness. Due to the cyclical nature of the disorder, some affected persons will tend to feel normal for periods of days to weeks when their body's rhythm is synchronized with the rhythm of society around them. As the individual's body once again desynchronises ... the insomnia and excessive daytime sleepiness will return.²⁷

3.16 The sleep disorder of N24 is more common in visually impaired persons where it is due to the lack of light 'input to the circadian pacemaker.' In contrast, N24 is rare in sighted persons and there is 'limited knowledge' of the cause in these cases.²⁸

Central Disorders of Hypersomnolence

3.17 Central disorders of hypersomnolence are neurological disorders and include: narcolepsy type I (generally with cataplexy), narcolepsy type II (without cataplexy)²⁹, and idiopathic hypersomnia.³⁰

3.18 The Sir Charles Gairdner Hospital (SCGH) described narcolepsy 'as a neurological condition where some of the circuitry within the brain unstably switches between sleep and wakefulness.'³¹

3.19 Narcolepsy type I is thought to be caused by the 'autoimmune selective destruction of' the cells that produce hypocretin, a chemical in the brain known for 'regulating wake and sleep.'³² Dr Cunnington and Dr Swieca stated that 'narcolepsy without cataplexy and idiopathic hypersomnia are

²⁷ Name withheld, *Submission 57*, p. 6.

²⁸ AASM, *International Classification of Sleep Disorders*, 3rd edn, AASM, Darien, IL, 2014, pp 212-213.

²⁹ The third edition of the *International Classification of Sleep Disorders* states that 'some patients without cataplexy' will meet the marker for narcolepsy type I. In 2014, this prompted revised terminology for 'narcolepsy with cataplexy' and 'narcolepsy without cataplexy' to narcolepsy type I and narcolepsy type II.

³⁰ Professor Ron Grunstein, *Submission 112*, p. 7; Dr David Cunnington and Dr John Swieca, *Submission 73*, p. 2.

³¹ Dr David Hillman, Sleep Physician, SHF and Sir Charles Gairdner Hospital (SCGH), *Official Committee Hansard*, Perth, 29 January 2019, p. 19.

³² Dr David Cunnington and Dr John Swieca, *Submission 73*, p. 2; Narcolepsy Australia, *Submission 97*, p. 1.

less well characterised, with the exact biological mechanisms being unclear.’³³

- 3.20 Symptoms of narcolepsy include: excessive daytime sleepiness (often in the form of a ‘sleep attack’, where the sleepiness is sudden and overwhelming³⁴), sleep paralysis, hallucinations, and automatic behaviour. In cases of narcolepsy type I, this may also involve cataplexy.³⁵
- 3.21 Professor Grunstein stated that cataplexy involves the sudden loss of muscle tone.³⁶ The SCGH stated that during cataplexy, the patient’s ‘legs go wobbly and, in extreme cases, they’ll fall to the ground and be awake but unable to move for 30 seconds’ or more.³⁷ The triggers can vary depending on the person, and can occur ‘particularly after laughter or emotions.’³⁸
- 3.22 Idiopathic hypersomnia is characterised by an ‘excessive sleep need’, often ‘greater than 12 hours a day.’³⁹ Sleep Disorders Australia and Hypersomnolence Australia (SDA-HA) stated that ‘idiopathic hypersomnia is a neurological disorder diagnosed by identifying key clinical features’ and excluding other possible conditions.⁴⁰

Prevalence of Sleep Disorders in Australia

- 3.23 The Royal Australasian College of Physicians (RACP) advised that ‘the two most common sleep disorders are [OSA] and insomnia.’⁴¹ In 2017, Deloitte Access Economics (Deloitte) estimated the combined prevalence of OSA, RLS and insomnia to be 22.4 per cent of the Australian population.⁴²

³³ Dr David Cunnington and Dr John Swieca, *Submission 73*, p. 2.

³⁴ Ms Monica Kurth, *Submission 26*, p. 9.

³⁵ Narcolepsy Australia, *Submission 97*, p. 1; Professor Ron Grunstein, *Submission 112*, p. 7.

³⁶ Professor Ron Grunstein, *Submission 112*, p. 7.

³⁷ Dr David Hillman, SHF and SCGH, *Official Committee Hansard*, Perth, 29 January 2019, p. 19.

³⁸ Dr David Hillman, SHF and SCGH, *Official Committee Hansard*, Perth, 29 January 2019, p. 19.

³⁹ Professor Ron Grunstein, *Submission 112*, p. 8.

⁴⁰ SDA and Hypersomnolence Australia (HA), *Submission 2.1*, p. 4.

⁴¹ RACP, *Submission 122*, p. 3.

⁴² Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. 19; Deloitte developed population estimates based on a literature review of previously published prevalence rates. The populations studied in the literature evaluated by Deloitte vary.

- 3.24 There are a number of challenges to accurately estimating the number of Australians who experience a sleep disorder. The Western Australian Pregnancy Cohort Study (Raine Study) stated that ‘a challenge in stating prevalence estimates is what diagnostic cut-off to use to describe presence or absence of disease.’⁴³
- 3.25 In addition, the UWA-SPS explained that because people may have multiple sleep disorders, prevalence rates are ‘often confounded by co-occurrence’ of sleep disorders, which ‘makes the [overall] figures and ... estimates quite challenging.’⁴⁴ For example, the Australasian Sleep Association stated that insomnia ‘has a high co-morbidity (30 to 40 per cent) with other sleep disorders such as [OSA], and [RLS].’⁴⁵

Prevalence of Obstructive Sleep Apnoea

- 3.26 The 2016 Sleep Health Foundation (SHF) National Survey estimated that 8.3 per cent of the Australian adult population has been diagnosed with OSA. The prevalence of OSA increases with age, with the SHF National Survey highlighting that 5 per cent of 18 to 24 year olds have been diagnosed with OSA compared to 12 per cent of people over 65 years of age. In addition, the SHF National Survey also outlined significant gender based variation in the prevalence of OSA with 12.9 per cent of men and 3.7 per cent of women having been diagnosed with OSA.⁴⁶
- 3.27 The RACP stated that the SHF National Survey results ‘also noted a large group of participants with likely undiagnosed, symptomatic OSA.’⁴⁷ NeuRA similarly stated that more than 80 per cent of people with OSA remain undiagnosed.⁴⁸
- 3.28 Further, Adams, Wittert, and Appleton stated a population study had found that over 50 per cent of men aged over 40 years had previously undiagnosed

⁴³ Raine Study, *Submission 71*, p. 3.

⁴⁴ Professor Romola Bucks, UWA, *Official Committee Hansard*, Perth, 29 January 2019, p. 3.

⁴⁵ Australasian Sleep Association, ‘Insomnia’, <https://www.sleep.org.au/documents/item/355>, accessed 18 February 2019, p. 3.

⁴⁶ R J Adams, S L Appleton, A W Taylor, T K Gill, C Lang, R D McEvoy and N A Antic, *Exhibit 2f: ‘Sleep Health of Australian Adults in 2016: Results of the 2016 Sleep Health Foundation National Survey’*, *Sleep Health*, 3 (2017), p. 37.

⁴⁷ RACP, *Submission 122*, p. 8.

⁴⁸ NeuRA, *Submission 101*, p. 1.

OSA. Despite the apparent prevalence of the condition, 'only 11 per cent of men aged over 40 years report having been given a diagnosis of OSA.'⁴⁹

- 3.29 The Adelaide Institute for Sleep Health (AISH) stated that data for OSA in women and sleep disorders in Aboriginal and Torres Strait Islander peoples was lacking:

The negative health burden of OSA in women is under-researched and not well understood as the majority of epidemiological data are dominated by male cohorts. There is [also] a significant gap in research into the health impacts of sleep disorders in Indigenous Australians.⁵⁰

Prevalence of Restless Legs Syndrome

- 3.30 The SHF National Survey estimated that 17.6 per cent of Australian adults experience RLS.⁵¹ Using a narrower definition of RLS, Deloitte estimated that 2.8 per cent of the Australian population have RLS that is not the symptom of another disorder or condition.⁵²

Prevalence of Insomnia

- 3.31 Deloitte estimated that 11.3 per cent of the Australian population experience insomnia without comorbidities.⁵³ The SHF National Survey estimated episodic insomnia to be experienced by 20 per cent of Australian adults.⁵⁴ Adams, Wittert, and Appleton stated that the prevalence of chronic insomnia in Australia was unknown, but is likely to be at 10 per cent.⁵⁵

⁴⁹ Adams, Wittert, and Appleton, *Submission 78*, pp 3-4.

⁵⁰ Adelaide Institute for Sleep Health (AISH), *Submission 100*, p. 2.

⁵¹ The SHF National Survey used a broad definition of RLS, asking survey participants whether they experienced 'symptoms of restless legs that included unpleasant feelings in the legs for at least a few nights a week.'; R J Adams, S L Appleton and A W Taylor, T K Gill, C Lang, R D McEvoy and N A Antic, *Exhibit 2f: 'Sleep Health of Australian Adults in 2016: Results of the 2016 Sleep Health Foundation National Survey'*, *Sleep Health*, 3 (2017), p. 37.

⁵² Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. 18.

⁵³ Deloitte, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. 18.

⁵⁴ Adams, Wittert, and Appleton, *Submission 78*, p. 2; R J Adams, S L Appleton and A W Taylor, T K Gill, C Lang, R D McEvoy and N A Antic, *Exhibit 2f: 'Sleep Health of Australian Adults in 2016: Results of the 2016 Sleep Health Foundation National Survey'*, *Sleep Health*, vol. 3, no. 1, February 2017, p. 3.

⁵⁵ Adams, Wittert, and Appleton, *Submission 78*, p. 2; Canberra Sleep Clinic, *Submission 109*, p. 2.

Prevalence of Central Disorders of Hypersomnolence

- 3.32 The SCGH stated that narcolepsy ‘affects one in 2000 people, roughly.’⁵⁶ Dr David Cunnington and Dr John Swieca also indicated that approximately 0.03 to 0.05 per cent of the population are affected by ‘narcolepsy with cataplexy’, however ‘exact prevalence data [is] not clear’ for narcolepsy due to a lack of research.⁵⁷
- 3.33 The SDA-HA stated that figures relating to narcolepsy rates may be overstated.⁵⁸ The SDA-HA stated that general practitioners may be miscoding unexplained cases of excessive daytime sleepiness and ‘genuine cases of idiopathic hypersomnia ... as narcolepsy.’⁵⁹ Elaborating further, SDA-HA stated that this may distort the prevalence of idiopathic hypersomnia and narcolepsy in Pharmaceutical Benefits Scheme (PBS) and Medicare Benefits Schedule (MBS) data:

Australian government authorities (including the Therapeutic Goods Administration) rely on statistics from Australia’s PBS and MBS yet these records do not reflect the true prevalence of idiopathic hypersomnia and narcolepsy. Therefore, one could get a false impression of an epidemic of "narcolepsy" when in fact if you were to isolate the true narcoleptics the number would be quite small.⁶⁰

Intersection with Other Medical Conditions

- 3.34 The impacts of a sleep disorder are not limited to the immediate consequences of tiredness and fatigue, but may also be linked to longer-term health issues. The RACP stated that ‘a range of sleep disorders (insomnia, [RLS], and [OSA]) can contribute to heart disease, obesity, depression, early onset dementia and other serious health conditions.’⁶¹
- 3.35 In addition, the relationship between sleep disorders and other medical conditions may be bidirectional.⁶² That is, patients with a sleep disorder may

⁵⁶ Dr David Hillman, SHF and SCGH, *Official Committee Hansard*, Perth, 29 January 2019, p. 19.

⁵⁷ Dr David Cunnington and Dr John Swieca, *Submission 73*, p. 2.

⁵⁸ SDA-HA, *Submission 2.1*, p. 3.

⁵⁹ SDA-HA, *Submission 2.1*, p. 2.

⁶⁰ SDA-HA, *Submission 2.1*, p. 3.

⁶¹ RACP, *Submission 122*, p. 3.

⁶² NeuRA, *Submission 101*, p. 4.

have a higher risk of developing a chronic health condition, and patients with a chronic health condition may have a higher risk of developing a sleep disorder. To illustrate this, the UWA-SPS stated that ‘type II diabetes ... is a risk factor for apnoea, and sleep apnoea is a risk factor for type II diabetes.’⁶³

- 3.36 Adams, Wittert and Appleton expanded on the bidirectional relationship between OSA and other chronic health conditions, and stated:

Among men with multiple medical conditions (multimorbidity), such as diabetes or heart disease, undiagnosed OSA was present in 70 per cent. Those with severe OSA were over six times more likely to have three or more other chronic diseases than those men without OSA.⁶⁴

- 3.37 Obesity is a significant contributor to the development of OSA in the population. Dr Subash Heraganahally stated that obesity has ‘been well recognised as an important pre-requisite risk factor ... for the development of [OSA].’⁶⁵ The AISH commented on the impact that weight gain and ageing has on prevalence rates of sleep disorders, stating:

... OSA, insomnia and sleep restriction have increased by 30 to 80 per cent in the last two decades (affecting at least four million Australian adults) because of combined effects of increasing rates of people who are overweight and obese, and our ageing population.⁶⁶

- 3.38 The RACP considered OSA to be an ‘emerging cardiovascular risk factor.’⁶⁷ The Charles Perkins Centre added that OSA ‘increases the risk that a person will develop high blood pressure, heart disease, stroke, and increases deaths from heart disease.’⁶⁸ Highlighting the current limitations of research into OSA, Associate Professor Darren Mansfield stated that ‘the evidence of benefit for treatment of OSA on cardiovascular health remains unclear.’⁶⁹

- 3.39 In some cases, while an association between OSA and other chronic health conditions has been found, the details of this relationship are not well

⁶³ Professor Romola Bucks, UWA, *Official Committee Hansard*, Perth, 29 January 2019, p. 3.

⁶⁴ Adams, Wittert and Appleton, *Submission 78*, p. 4.

⁶⁵ Dr Subash Heraganahally, *Submission 1*, p. 1.

⁶⁶ AISH, *Submission 100*, p. 1.

⁶⁷ RACP, *Submission 122*, p. 8.

⁶⁸ Charles Perkins Centre, *Submission 46*, p. 7.

⁶⁹ Associate Professor Darren Mansfield, *Submission 50*, p. 1.

understood. For example, the Charles Perkins Centre stated that ‘OSA patients have higher rates of cancer and cancer mortality but it is unclear why.’⁷⁰ In addition, the RACP stated that a lack of clarity in the role of OSA in heart arrhythmia is due to a ‘paucity of data’ that prevents the establishment of ‘whether OSA is a risk factor for atrial fibrillation⁷¹ independent of obesity and other established risk factors.’⁷²

- 3.40 In addition to physical health conditions, sleep disorders have been linked to mental health conditions. Sleep Matters stated that ‘it is quite rare that we would be referred a case of insomnia that isn’t comorbid with other conditions ... [such as] depression and/or anxiety.’⁷³ Similarly, Adams, Wittert, and Appleton stated that there is an association between depression and OSA:

With regard to sleep apnoea, research in middle-aged and older men has shown the severity of depressive symptoms increases with the severity of sleep apnoea. It has also shown that when insomnia is co-morbid with sleep apnoea the prevalence and severity of depression increases significantly.⁷⁴

Personal Accounts of Living with Sleep Disorders

- 3.41 The Committee received evidence from individuals that detailed their experiences of living with a sleep disorder. These included patients living with OSA, RLS, idiopathic hypersomnia, narcolepsy and circadian rhythm disorders.
- 3.42 Those living with a sleep disorder spoke about the stigma and lack of understanding they experienced.⁷⁵ An inquiry participant who is experiencing OSA stated that ‘the issue of snoring is often the subject of great frivolity and embarrassment to the sufferer’, and was concerned that others would not consider OSA to be a medical issue.⁷⁶

⁷⁰ Charles Perkins Centre, *Submission 46*, p. 8.

⁷¹ Atrial fibrillation is a type of abnormal heart rhythm.

⁷² RACP, *Submission 122*, p. 9.

⁷³ Dr Melissa Ree, Sleep Matters, *Official Committee Hansard*, Perth, 29 January 2019, p. 11.

⁷⁴ Adams, Wittert and Appleton, *Submission 78*, p. 6.

⁷⁵ Mrs Angela Stewart, *Submission 116*, p. 2; Name withheld, *Submission 14*, p. 3. Name withheld, *Submission 67*, p. 2; Miss Laura Thompson, *Submission 17*, p. 1.

⁷⁶ Name withheld, *Submission 56*, p. 1.

- 3.43 As sleep disorders may not be easily diagnosed⁷⁷, the parent of a child experiencing N24 described the difficulty with obtaining support at school, stating that ‘we were judged as bad parents as we did not have any diagnosis to support our claims.’⁷⁸
- 3.44 The parent also described the impact that caring for a sleep disorder patient can have on family members, stating that they were exhausted and could no longer provide home schooling:
- We had to obtain an exemption from education as the exhaustion of her mother meant she could no longer teach her as she was fearful of developing a sleep disorder of her own.⁷⁹
- 3.45 Mr Graham Revill stated that he felt that obtaining treatment or relief for his RLS would have conflicted with his employment:
- ... I doubt if my employer would have accepted “lack of sleep” as a reason for sick leave. I would not have been willing to ask my doctor for such a certificate because there was a story going around that if you told your doctor that you were exhausted because of inability to sleep then the doctor would report me and my driver’s licence would be cancelled or suspended. I couldn’t risk losing my job.⁸⁰
- 3.46 A teacher living with a sleep disorder stated that whilst their employer is ‘wonderfully supportive’ of their part-time arrangements, working at a school meant there was ‘no capacity to make accommodations for my disorder.’ The teacher added that ‘a nap would allow me to clear the fog and be a more productive employee, but I am unable to do so at work.’⁸¹
- 3.47 Inquiry participants stated that narcolepsy is not recognised as a disability for the purposes of the Disability Support Pension (DSP) or the National Disability Insurance Scheme.⁸² An inquiry participant stated that:

⁷⁷ Name withheld, *Submission 57*, pp 1-2; Name withheld, *Submission 67*, p. 1. Name withheld, *Submission 99*, pp 1-2; Mrs Pamela Bird, *Submission 42*, p. 2.

⁷⁸ Name withheld, *Submission 57*, p. 2.

⁷⁹ Name withheld, *Submission 57*, p. 2.

⁸⁰ Mr Graham Revill, *Submission 107*, p. 3.

⁸¹ Name withheld, *Submission 99*, p. 2.

⁸² Mr Aaron Schokman, *Submission 108*, p. 1; Ms Fiona Mobbs, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 33; Mrs Michelle Chadwick, Director, SDA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 34.

The most suitable payment is [the DSP] which currently does not have the condition, or any other sleep disorder listed as a medical condition to begin with. This means that they have to try to relate their impairments to the current impairment tables⁸³, [and] then be assessed under those tables by an assessor who in most cases hasn't even heard of narcolepsy, never mind have any concept of how debilitating the condition can be.⁸⁴

- 3.48 The inquiry participant further stated that 'due to their excessive sleepiness ... [narcolepsy patients] are unable to manage the requirements for Newstart eligibility.'⁸⁵

Box 3.1 Living with Narcolepsy

Individuals experiencing narcolepsy described a wide range of impacts. Ms Eliza Wells stated that 'every aspect of my life has been affected [by narcolepsy]; finances, work, education, social connection, relationships, home, leisure and obviously health.'⁸⁶

For some people with narcolepsy they may experience symptoms of the condition for a long period before they receive a diagnosis of narcolepsy.⁸⁷ The delayed diagnosis can occur due to their attribution of their symptoms to other causes, such as 'work or the busyness of raising a family'⁸⁸ or a lack of awareness of narcolepsy amongst medical professionals. Ms Fiona Mobbs stated that after her diagnosis, her 'sleep specialist said ... *why are you not back at work? Why are you still tired?*'⁸⁹ In the case of children, Mrs Monica Kurth described her daughter not mentioning symptoms such as feeling 'floppy', elaborating that 'kids ... don't know or say *this is an unusual thing that's happening to me.*'⁹⁰

⁸³ Department of Social Services, '3.6.3.05 Guidelines to the Rules for Applying the Impairment Tables', *Social Security Guide*, 4 February 2019, accessed 18 February 2019; Social Security (Tables for the Assessment of Work-related Impairment for Disability Support Pension) Determination 2011 (Cth).

⁸⁴ Name withheld, *Submission 10*, p. 3.

⁸⁵ Name withheld, *Submission 10*, p. 3.

⁸⁶ Ms Eliza Wells, *Submission 95*, p. 2.

⁸⁷ Mrs Melissa Jose, *Submission 90*, p. 1; Ms Fiona Mobbs, *Submission 86*, p. 2.

⁸⁸ Name withheld, *Submission 67*, pp 1-2.

⁸⁹ Ms Fiona Mobbs, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 29.

⁹⁰ Mrs Monica Kurth, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 33.

Difficulty in accessing medical care for narcolepsy, particularly in regional areas, was described in some personal accounts. After being diagnosed in a metropolitan area and moving to a regional town, Ms Wells found that the 'local GPs ... not only have no understanding of narcolepsy, they also appear to have little to no interest in gaining one.'⁹¹ Mrs Pamela Bird stated that there are 'very few' specialists in Hobart, and her family needed to travel to Melbourne for medical care.⁹²

Those living with narcolepsy stated they felt a lot of stigma attached to their disorder.⁹³ The disorder is not immediately obvious, as 'the condition functions under the aesthetic of normality.'⁹⁴ Mrs Angela Stewart stated 'there's a nasty social stigma of being a *bludger* attached to patients diagnosed with invisible disorders.'⁹⁵ Addressing these sentiments, Ms Mobbs stated that 'we're not lazy; we're people, who want to do a lot, trapped inside bodies that cannot.'⁹⁶

Some personal accounts also outlined experiences of cataplexy.⁹⁷ Mrs Pamela Bird stated that her daughter may have cataplectic episodes ranging from a few times a day, to 30 to 40 times a day.⁹⁸ Describing the feeling of embarrassment when having a cataplectic episode in public, Ms Mobbs stated that:

If someone is behind me when I'm having [a cataplectic episode], it would just look like I'm drunk. It's extremely embarrassing. You just want to go somewhere where no-one can see what's happening.⁹⁹

Those experiencing cataplexy stated that they avoided triggers in order to

⁹¹ Ms Eliza Wells, *Submission 95*, pp 4-5.

⁹² Mrs Pamela Bird, *Submission 42*, p. 1.

⁹³ Miss Laura Thompson, *Submission 17*, p. 1; Name withheld, *Submission 14*, p. 3.

⁹⁴ Name withheld, *Submission 14*, p. 1.

⁹⁵ Mrs Angela Stewart, *Submission 116*, p. 2.

⁹⁶ Ms Fiona Mobbs, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 29.

⁹⁷ Name withheld, *Submission 14*, p. 1; Ms Fiona Mobbs, *Submission 86*, p. 1.

⁹⁸ Mrs Pamela Bird, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 30.

⁹⁹ Ms Fiona Mobbs, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 28.

manage their symptoms. Mrs Bird stated that she saw her 'bright, bubbly child become a hollow shell.'¹⁰⁰ Ms Laura Thompson stated that she muted her positive emotions in response to her cataplexy:

Unfortunately my cataplexy is associated with positive emotions, mostly laughter, sometimes pride, anticipation or joy. Just imagine holding yourself back from the happiest moments in your life in fear that you will experience this terrifying attack.¹⁰¹

Inquiry participants stated they found it difficult to remain in the workforce.¹⁰² Ms Fiona Mobbs stated 'my workplace was extremely unsupportive. I had to resign from my job last year in May.'¹⁰³ Another inquiry participant further stated that maintaining employment makes maintaining a social and family life difficult:

Over time, it is possible to learn to live with the conditions but maintaining full-time employment comes at the cost of social and family life. It is very hard to achieve a work-life balance when you constantly feel exhausted and you find that sleep is not refreshing.¹⁰⁴

Some inquiry participants had the opportunity to access Sodium Oxybate (marketed as Xyrem).¹⁰⁵ Mr Aaron Schokman, speaking about the effects of Sodium Oxybate, stated 'my symptoms ... are managed, and I have been able to work full time, socialise and complete my studies.'¹⁰⁶ Sodium Oxybate remains a restricted and expensive medication in Australia, with one inquiry participant stating that 'I am still beholden to my mother for intermittent financial assistance. My fulltime wages simply do not cover the costs.'¹⁰⁷

¹⁰⁰ Mrs Pamela Bird, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 27.

¹⁰¹ Ms Laura Thompson, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 26.

¹⁰² Name withheld, *Submission 10*, p. 1; Name withheld, *Submission 14*, pp 1-2; Ms Eliza Wells, *Submission 95*, p. 4.

¹⁰³ Ms Fiona Mobbs, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 28.

¹⁰⁴ Name withheld, *Submission 67*, p. 1.

¹⁰⁵ Mrs Melissa Jose, *Submission 90*, p. 1; Mr Aaron Schokman, *Submission 108*, p. 2.

¹⁰⁶ Mr Aaron Schokman, *Submission 108*, p. 2.

¹⁰⁷ Name withheld, *Submission 14*, p. 2.

Ms Noeline Bakels also questioned the lack of PBS subsidy for Sodium Oxybate, asking: ‘why not spend the money on helping them become functioning members of society rather than dependent on the welfare system living barely half a life?’¹⁰⁸

Concluding Comment

- 3.49 Estimates suggest that more than one in five Australians live with a sleep disorder, with Obstructive Sleep Apnoea (OSA) and insomnia accounting for the majority of these cases. Despite the prevalence of these conditions, there is limited data available about the occurrence of sleep disorders within specific population groups. In particular, there is a need for further research into the prevalence and experience of sleep disorders among women and Aboriginal and Torres Strait Islander peoples.
- 3.50 Gaining adequate, quality sleep is a requirement for maintaining long-term good health. It is therefore not surprising that a sleep disorder causing continually disturbed sleep can have serious health implications. The Committee heard that these impacts include an increased risk of conditions such as diabetes, obesity, and cardiovascular disease.
- 3.51 In particular, OSA appears to be closely connected to obesity. The Committee is concerned that OSA’s relationship with weight gain, as well as ageing, will result in the prevalence of OSA rising alongside increasing rates of obesity and an ageing population in Australia.
- 3.52 Emerging evidence about the connection between sleep disorders and cardiovascular disease was also raised. The Committee is interested in the relationship between sleep and cardiovascular health as sleep is a risk factor for heart disease that may potentially be treated early. There are still, however, many research questions to be answered, including the impact that managing a sleep disorder can have on the risk of cardiovascular disease.
- 3.53 The Committee also received information that there is a close relationship between mental health and sleep disorders, for example chronic insomnia may result from conditions such as anxiety and depression. In many cases this relationship may be bidirectional where disturbed sleep exacerbates a mental health condition and this condition also increases the impact of a sleep disorder.

¹⁰⁸ Ms Noeline Bakels, *Submission 60*, p. 2.

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- 3.54 The Committee was concerned to hear that many people with sleep disorders have experienced stigma as a result of their condition. Assumptions made about a person with a sleep disorder may stem from a lack of understanding in the community about these conditions and how they can be managed.
- 3.55 The Committee appreciated the individuals who shared their personal experiences of living with a sleep disorder, or caring for a family member or friend with a sleep disorder. Their accounts highlight the debilitating and wide-ranging effects that sleep disorders can have on lifestyle.

4. Sleep Health and the Workplace

Introduction

- 4.1 Individuals experiencing inadequate sleep or a sleep disorder may be less productive at work, and may also be at a heightened risk of workplace accident or injury. Types of work which can affect sleep quality or duration, such as shift work, may also negatively impact an individuals' health and work performance.
- 4.2 Industries including: health care, road and rail transport, aviation, and mining, depend on a high level of accuracy and alertness while also utilising shift work and/or long hours. Workplace initiatives such as guidelines for hours of work and rest periods, and enhanced awareness of the importance of sleep, may assist in minimising the impact of fatigue in the workplace.

Fatigue and Impaired Alertness in the Workplace

- 4.3 Inadequate sleep has been associated with impaired performance in the workplace, primarily through reduced productivity while at work and increased absenteeism.¹ The Appleton Institute stated that this comes at a cost to both individuals and the community more broadly:

Many Australian workers are sleepy at work, sleepy on the roads on their commute to work, and may experience errors in the workplace or may miss work because they are too tired. This comes at a cost to employers, employees, and the safety of the broader community.²

¹ Ms Melissa Webster, Chief Executive Officer (CEO), SleepFit, *Official Committee Hansard*, Sydney, 5 February 2019, p. 1.

² Appleton Institute, *Submission 88*, p. 1.

- 4.4 In addition to reducing workplace productivity, inadequate sleep and sleep disorders have been linked to workplace injuries and accidents. The Cooperative Research Centre for Alertness, Safety and Productivity (Alertness CRC) stated that:
- There is up to a 50 per cent increased risk of occupational injury, absenteeism and error or safety violation attributed to fatigue in employees with a sleep disorder, with up to 45 per cent of individuals in safety sensitive occupations such as law enforcement and commercial transportation in this category.³
- 4.5 Overall, the Alertness CRC stated that the ‘indirect financial cost to Australia of lost productivity and accidents due to poor sleep in 2016-2017 was over \$24 billion.’⁴
- 4.6 Certain types of work have been found to impact negatively on sleep duration and quality. This includes shift work (particularly night shifts)⁵, fly-in-fly-out work⁶, and work that involves being on call and/or long hours.⁷ The Appleton Institute also stated that inadequate sleep is more prevalent in ‘safety-critical’ occupations⁸, which include occupational drivers, emergency services, health care workers, and machinery operators.⁹
- 4.7 Safe Work Australia’s *Guide to Managing the Risk of Fatigue* outlines that employers, officers (such as company directors), and employees all have duties regarding the management of fatigue and associated risks in the workplace. These are outlined in Table 4.1.

Table 4.1 Health and Safety duties in relation to managing the risks of fatigue

Who	Duties
Person conducting a	‘Has the primary duty to ensure, so far as is reasonably practicable, workers and other persons are not exposed to health and safety risks arising from the

³ Cooperative Research Centre for Alertness, Safety and Productivity (Alertness CRC), *Submission 92*, p. 1.

⁴ Alertness CRC, *Submission 92*, p. 1.

⁵ Sleep Health Foundation, *Submission 54*, p. 8.

⁶ National Mental Health Commission, *Submission 62*, p. 2.

⁷ Appleton Institute, *Submission 88*, pp 1-2.

⁸ Appleton Institute, *Submission 88*, p. 2.

⁹ Sleep Health Foundation, *Submission 54*, p. 8.

business or undertaking	business or undertaking. This includes ensuring, so far as is reasonably practicable: <ul style="list-style-type: none"> <li data-bbox="438 258 1264 323">▪ provision and maintenance of a work environment without risks to health and safety, <li data-bbox="438 331 1161 359">▪ provision and maintenance of safe systems of work, and <li data-bbox="438 367 1264 468">▪ monitoring the health of workers and the conditions at the workplace for the purpose of preventing illness or injury of workers arising from the conduct of the business or undertaking. <p data-bbox="350 483 1274 654">The duty on the person conducting the business or undertaking is not removed by a worker's preference for certain shift patterns for social reasons, their willingness to work extra hours or to come to work when fatigued. The person conducting the business or undertaking should adopt risk management strategies to manage the risks of fatigue in these circumstances.'</p>
Officers	'Officers such as company directors, must exercise due diligence to ensure the business or undertaking complies with its work health and safety duties. This includes taking reasonable steps to ensure the business or undertaking has and uses appropriate resources and processes to manage the risks associated with fatigue.'
Workers	'Workers must take reasonable care for their own health and safety and must not adversely affect the health and safety of other persons. Workers must also comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to fatigue at the workplace, such as policies on fitness for work or second jobs. Workers' duties in relation to fatigue do not mean they must never work extra hours. However, they should talk to their manager or supervisor to let them know when they are fatigued. They should also avoid working additional hours and undertaking safety critical tasks when they know it is likely they are fatigued.'

Source: Safe Work Australia, 'Guide for Managing the Risk of Fatigue at Work', 2013, pp 3-4.

4.8 Safe Work Australia also advised that the states and territories are responsible for the regulation of work health and safety matters including fatigue. Specific industries may also be subject to additional regulation and legislation (such as the rail and heavy vehicle industries).¹⁰

¹⁰ Ms Bianca Wellington, Acting Branch Manager, Legal and Workplace Health and Safety Strategy Branch, Safe Work Australia, *Official Committee Hansard*, Canberra, 11 February 2019, p. 4, 15.

Shift Work

- 4.9 The Sleep Health Foundation stated that approximately 16 per cent of Australian workers are shift workers.¹¹ Some shift workers solely perform day shifts, while others may have a rotating roster of shifts through the day and night. Deloitte Access Economics cited health care and mining as two industries that use both day and night shift work.¹²
- 4.10 Austin Health and the Institute for Breathing and Sleep explained that shift work, particularly when involving night shifts, can result in ‘sleep restriction (less sleep) as well as circadian dyssynchrony (struggling against our sleep-wake drive).’¹³ The Australian Capital Territory (ACT) Government estimated that ‘night shift workers get on average 25 to 33 per cent less sleep than day or evening shift workers.’¹⁴
- 4.11 The Austin Health and Institute for Breathing and Sleep also highlighted that female shift workers may be ‘particularly vulnerable’ to inadequate sleep, as women often ‘take on a greater proportion of domestic duties than their male counterparts and have less time available for sleep and recovery.’¹⁵

Safety Risks Associated With Shift Work

- 4.12 Ms Crystal Grant and Associate Professor Siobhan Banks described how night shift work can have detrimental effects that include impaired driving performance and impaired decision making and reaction time. This may have serious implications for shift workers in safety-critical occupations.¹⁶ The Sleep Health Foundation stated that the accident rate of shift workers is double that of non-shift workers in Australia, and that it ‘is highly likely that much of this additional risk is sleep-related.’¹⁷ The Melbourne Sleep Disorders Centre further stated that there is also evidence of higher rates of

¹¹ Sleep Health Foundation, *Submission 54*, p. 8.

¹² Deloitte Access Economics, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, 2017, p. 14.

¹³ Austin Health and the Institute for Breathing and Sleep, *Submission 84*, p. 3.

¹⁴ Australian Capital Territory (ACT) Government, *Submission 126*, p. 1.

¹⁵ Austin Health and the Institute for Breathing and Sleep, *Submission 84*, p. 3.

¹⁶ Ms Crystal Grant and Associate Professor Siobhan Banks, *Submission 82*, p. [6].

¹⁷ Sleep Health Foundation, *Submission 54*, p. 8.

industrial accidents amongst those workers who find night shift work particularly hard.¹⁸

- 4.13 As well as having an increased risk of accidents or errors while at work, the Woolcock Institute of Medical Research stated that night shift workers may be at heightened risk of vehicle accidents when driving home from a shift, due to fatigue.¹⁹

Health Impacts Associated With Shift Work

- 4.14 Ms Grant and Associate Professor Banks stated that night shift workers are at a higher risk of ‘developing the health conditions frequently associated with sleep loss.’²⁰ The Austin Health and Institute for Breathing and Sleep similarly stated that appropriate management of shift work was ‘exceedingly important to prevent the development of mental and physical health disorders’, as well as preventing workplace errors and accidents.²¹

- 4.15 The Charles Perkins Centre at the University of Sydney outlined potential links between shift work and cancer and stated:

Night shift work, which disrupts the timing of sleep, was classified by the World Health Organisation as a probable carcinogen in 2007. Risk of breast and prostate cancer have been specifically linked to shift work.²²

- 4.16 Dr Ian Dunican stated that ‘shift work leads to weight gain, which can lead to sleep apnoea.’²³ Austin Health similarly highlighted the ‘two-way influence’ between sleep loss and obesity, as ‘impaired sleep causes obesity, but obesity causes sleep apnoea.’²⁴

¹⁸ Dr John Swieca, Sleep Physician and Medical Director, Melbourne Sleep Disorders Centre (MSDC), *Official Committee Hansard*, Melbourne, 6 February 2019, p. 40.

¹⁹ Professor Ronald Grunstein, Head, Sleep and Circadian Research Group, Woolcock Institute of Medical Research and Central Clinical School, University of Sydney, *Official Committee Hansard*, Canberra, 11 February 2019, p. 17.

²⁰ Ms Crystal Grant and Associate Professor Siobhan Banks, *Submission 82*, p. [2].

²¹ Austin Health and Institute for Breathing and Sleep, *Submission 84*, p. 3.

²² Charles Perkins Centre, University of Sydney, *Submission 46*, p. 9.

²³ Dr Ian Dunican, Director/Principal Consultant, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 5.

²⁴ Associate Professor Mark Howard, Director, Victorian Respiratory Support Service, Austin Health, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 20.

- 4.17 In addition to these health concerns generally associated with shift work, approximately 10 to 15 per cent of shift workers may experience *Shift Work Sleep Disorder* (SWSD).²⁵ Austin Health and the Institute for Breathing and Sleep characterised SWSD as involving ‘chronic insomnia (difficulty falling asleep, staying asleep or waking too early at the end of sleep) and daytime sleepiness.’²⁶
- 4.18 Professor Ron Grunstein outlined what he considered is needed to manage SWSD and stated:
- SWSD requires workforce screening and intensive management with scheduling changes, behavioural management and pharmacotherapy of daytime insomnia and appropriate use of medications such as wakefulness promoters.²⁷
- 4.19 Professor Grunstein further recommended: better education regarding SWSD and its risks; the development of SWSD clinics; and guidelines regarding the ‘use of hypnotics and wakefulness promoters for the management of SWSD.’²⁸

Shift Rostering Practices

- 4.20 The ACT Government stated that ‘ideal rostering for shift workers’ should include consideration of:
- ‘Time of day (particularly midnight to 6 a.m. ensuring possibility of breaks)
 - Time spent working (especially shifts [greater than] 10 hours)
 - Avoiding rapid shift changes
 - Cumulative fatigue
 - Opportunities to rest and eat (fatal motor vehicle accidents after shift work are well recognised)
 - Including all time worked in assessing fatigue and not just what is rostered

²⁵ Professor Ron Grunstein, *Submission 112*, p. 11.

²⁶ Austin Health and Institute for Breathing and Sleep, *Submission 84*, p. 3.

²⁷ Professor Ron Grunstein, *Submission 112*, p. 11.

²⁸ Professor Ron Grunstein, *Submission 112*, p. 11.

- Allow at least one day free in every seven in which opportunity for unrestricted sleep is possible.²⁹

4.21 When considering shift scheduling, the Canberra Sleep Clinic stated that working both day and night shifts over a short period of time can cause workers to feel ‘constantly jetlagged.’ The Canberra Sleep Clinic also cautioned against having workers ‘moving back from days, to nights, to evening shifts.’ Instead, the Canberra Sleep Clinic stated that a stable evening or night shift for several weeks may be preferable, as this will ‘allow the circadian position to stabilise.’³⁰

4.22 In contrast, Dr Dunican cautioned against working a permanent night shift, instead recommending a rotating roster with adequate time off to recover.³¹ The ACT Government similarly recommended a shift pattern which includes no more than three night shifts in a row. The ACT Government outlined its recommended shift rotation pattern and stated:

A clockwise shift rotation pattern (known as the French System) is recommended, with simple and predictable scheduling templates used where possible (three day, three evening and three night shifts and three recuperative days off). The number of consecutive days on night shift should be optimally one or two but no more than three days. Shifts should ideally be eight hours. Recuperation time should be at least 24 hours following one or more night shifts but optimally three days of recuperation time is required to overcome sleep-disruption. Naps are recommended as a tool to increase alertness during shifts (especially for shifts longer than eight hours).³²

4.23 The Sir Charles Gairdner Hospital emphasised that both the workplace and the individual have a role in managing fatigue. The Sir Charles Gairdner Hospital stated:

There are things that employers and workplaces can do to provide opportunities for sleep, and so they should. Shift work design, forward rotation of shifts, and making sure there is adequate time off for recuperation et cetera are very important. It is equally important that the individuals doing

²⁹ ACT Government, *Submission 126*, p. 3.

³⁰ Canberra Sleep Clinic, *Submission 109*, p. 3.

³¹ Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 4.

³² ACT Government, *Submission 126*, p. 4.

this sort of work take those opportunities and that the opportunities exist for them.³³

4.24 Dr Sutapa Mukherjee described how she was ‘often surprised at the rosters that many workers are expected to work with no concern or understanding of the circadian clock and biological rhythms.’³⁴ Dr Mukherjee stated that extensive data on rostering and scheduling considerations for shift work is available and should be used by Australian workplaces.³⁵ The Canberra Sleep Clinic expressed similar concerns, and recommended the principles of circadian physiology be applied to shift work rostering.³⁶

4.25 Dr Dunican described how modelling software can be used to optimise shift structures and stated:

... from an organisational point of view, we use things like biomathematical modelling, which is a sophisticated platform that allows us to compare and contrast different shift work options so that we can design adequate rest opportunities. We use that modelling type of software which predominantly was used in military and aviation in the [United States of America]. It is slowly coming into Australia.³⁷

4.26 The University of Western Australia School of Psychological Science (UWA-SPS) was concerned that, regardless of shift structure, shift work and the associated sleep disruption may not be compatible with good psychological health and that more research was needed. The UWA-SPS stated that it was:

... not convinced that it is possible to be psychologically healthy and not sleep when we are designed to sleep ... if you disturb someone's sleep in their 20s they have a fourfold increase in the risk of depression. We know that suicidality increases with poor sleep ... if you don't sleep properly it impacts and can permanently impact your attention, problem-solving, memory, ability to learn and study, relationships—everything. So I am not convinced that we know the answer to that question, and I think we absolutely need to know the

³³ Dr David Hillman, Sleep Physician, Sleep Health Foundation and Sir Charles Gairdner Hospital, *Official Committee Hansard*, Perth, 29 January 2019, p. 17.

³⁴ Dr Sutapa Mukherjee, *Submission 18*, p. 2.

³⁵ Dr Sutapa Mukherjee, *Submission 18*, p. 2.

³⁶ Canberra Sleep Clinic, *Submission 109*, pp 3-4.

³⁷ Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 4.

answer. For that, we need to do the research and, for that, we need the funding.³⁸

Industries Using Shift Work

- 4.27 Dr Dunican stated that in some of the ‘biggest industries in Australia ... such as mining, agriculture, manufacturing [and] transport, there is mainly shift work.’³⁹ The health care sector, including nurses and emergency personnel, also widely utilises shift work.⁴⁰ Dr Dunican stated that in general, ‘shift work and fatigue risk management are difficult areas for Australian businesses to manage.’⁴¹
- 4.28 Dr Dunican highlighted the industries and workplaces he considered to be ‘leading examples’ in relation to sleep management. These included the Civil Aviation Safety Authority, and some parts of the aviation, rail, oil and gas industries. At the same time, Dr Dunican stated that there was a lot of room for improvement within these industries, as well as the manufacturing and transportation sectors.⁴²
- 4.29 The Alertness CRC stated that it was seeing ‘a proactive approach, to a certain extent’ to the management of fatigue in both the transport and mining sectors. The Alertness CRC also highlighted, however, that these sectors (as well as the healthcare sector) have ‘a lot of complex issues and barriers’ which can make it difficult to employ effective solutions.⁴³
- 4.30 Neuroscience Research Australia (NeuRA) stated that the aviation industry has ‘been on the front foot’ about managing fatigue risk and shift work, while the rail industry has not been as proactive. The NeuRA further stated that ‘doctors are some of the worst offenders in this area.’⁴⁴

³⁸ Professor Romola Bucks, Head of School of Psychological Science, and Professor, University of Western Australia, *Official Committee Hansard*, Perth, 29 January 2019, p. 5.

³⁹ Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 4.

⁴⁰ Deloitte Access Economics, *Exhibit 2b: Asleep on the Job: Costs of Inadequate Sleep in Australia*, p. 14.

⁴¹ Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 2.

⁴² Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 5, 7.

⁴³ Mr Anthony Williams, CEO, Alertness CRC, *Official Committee Hansard*, Canberra, 11 February 2019, p. 17.

⁴⁴ Professor Danny Eckert, Director, Sleep Research Program, Neuroscience Research Australia (NeuRA), University of New South Wales, and Matthew Flinders Fellow, Adelaide Institute for Sleep Health, Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 27.

Box 4.1 Fatigue in the Aviation Industry

In January 2019 the Australian Transport Safety Bureau released its report *Fatigue Experiences and Culture in Australian Commercial Air Transport Pilots* (ATSB Report). The ATSB Report surveyed a sample of Australian pilots in order to ‘understand the level and perceptions of fatigue’ in the airline industry.⁴⁵

The ATSB Report found that the majority of surveyed pilots stated that they were ‘sufficiently well rested by the end of their last duty’, but that a ‘small but significant number of pilots’ reported obtaining levels of sleep that have been associated with impaired performance.⁴⁶

Other findings included that approximately half of the domestic and international pilots surveyed reported obtaining less sleep on duty than they did at home, and that ‘15 per cent of international pilots responded they had no rest during their last international flight.’⁴⁷

The ATSB Report also stated that some domestic pilots ‘have negative perceptions of rest opportunities provided by their employers.’ Concerns raised by some respondents in this cohort included that rest periods were too short, duty periods were too long, and accessing food during duties could be difficult.⁴⁸

In addition, over 90 per cent of respondents stated that their employer had a formal process for pilots to remove themselves from duty due to fatigue. The pilots that did remove themselves, however, ‘generally perceived their actions left a negative impression with management ... and did not feel comfortable doing so.’⁴⁹

⁴⁵ Australian Transport Safety Bureau (ATSB), *Exhibit 10: Fatigue Experiences and Culture in Australian Commercial Air Transport Pilots*, 2019, p. 1.

⁴⁶ ATSB, *Exhibit 10: Fatigue Experiences and Culture in Australian Commercial Air Transport Pilots*, 2019, p. [3].

⁴⁷ ATSB, *Exhibit 10: Fatigue Experiences and Culture in Australian Commercial Air Transport Pilots*, 2019, p. [3].

⁴⁸ ATSB, *Exhibit 10: Fatigue Experiences and Culture in Australian Commercial Air Transport Pilots*, 2019, p. [3].

⁴⁹ ATSB, *Exhibit 10: Fatigue Experiences and Culture in Australian Commercial Air Transport Pilots*, 2019, p. [3].

In summary, the ATSB report stated that:

It is important for operators to implement policies to reduce the likelihood of fatigue-related issues through rostering practices and by providing an organisational culture where crew can report fatigue in a supportive environment.⁵⁰

The ATSB Report also drew attention to the responsibility of individual pilots to remove themselves from duty if they feel fatigued, and to use rest periods to obtain sufficient sleep.⁵¹

- 4.31 The Appleton Institute highlighted the disability care workforce, including Residential Support Workers, which it described as having ‘unique work environments and roster designs.’ The Appleton Institute further stated that the disability care workforce is ‘critically understudied from a sleep loss perspective’, but emerging evidence indicates that Residential Support Workers ‘experience insufficient sleep and may be at risk of burnout.’⁵²

Health Sector and Shift Work

- 4.32 Health care is a sector that is reliant on shift work.⁵³ The Royal Australasian College of Physicians (RACP) described that ‘fatigue in the health industry can have detrimental impacts on patient care (errors and adverse events) for nurses who are shift workers, and other medical practitioners who may be on call.’⁵⁴
- 4.33 The Queensland Nurses and Midwives’ Union (QNMU) highlighted the common work hours for its members as including ‘extended work hours or overtime, being on call, consecutive shifts and short turnaround between shifts.’⁵⁵ Health Business Solutions (HBS) stated that these work hours and

⁵⁰ ATSB, *Exhibit 10: Fatigue Experiences and Culture in Australian Commercial Air Transport Pilots*, 2019, p. [3].

⁵¹ ATSB, *Exhibit 10: Fatigue Experiences and Culture in Australian Commercial Air Transport Pilots*, 2019, p. [3].

⁵² Appleton Institute, *Submission 88*, p. 1.

⁵³ Health Business Solutions (HBS), *Submission 58*, p. 1.

⁵⁴ Royal Australasian College of Physicians (RACP), *Submission 122*, pp 10-11.

⁵⁵ Queensland Nurses and Midwives’ Union (QNMU), *Submission 49*, p. 5.

shift patterns for nurses can 'affect their sleep patterns and quality and thus pose risks to their health and safety and that of the patients they care for.'⁵⁶

- 4.34 The HBS expressed concerns related to agency nursing staff who are contracted to work shifts in hospitals. The HBS stated that while laws in the states and territories usually require eight to 10 hours rest between shifts, 'agency staff may work double shifts, which ... is insufficient for the health care worker to rest and recover.'⁵⁷
- 4.35 The HBS recommended that legislation and regulations regarding time off between shifts in the health sector be made consistent across jurisdictions and in line with other industries. In addition, the HBS recommended that health and aged care quality standards include management of working hours and rostering as a criterion, and that a review of staffing practices be mandatory in any accreditation review.⁵⁸
- 4.36 The QNMU also made the point that 'it is essential that rostering guidelines include fatigue risk management and have structured shift design and shift length to ensure disruption to sleep is minimal.'⁵⁹
- 4.37 The Queensland Government stated negotiations with nurses and midwives regarding a new certified agreement in 2018 had a 'focus on nurses' shift work and fatigue.' The Queensland Government stated that as a result:
- ... Queensland Health agreed to introduce a new industrial entitlement for Queensland's public sector nurses and midwives. From 25 September 2018, if any nurse or midwife is recalled to the workplace for any period between rostered shifts, that recall triggers a fresh ten-hour break before they recommence duty.⁶⁰
- 4.38 The Queensland Government further stated that the new agreement specified that 'where practicable, nurses and midwives on night shift may sleep in an appropriately safe setting during their break to minimise fatigue.'⁶¹

⁵⁶ HBS, *Submission 58*, p. 1.

⁵⁷ HBS, *Submission 58*, pp 3-4.

⁵⁸ HBS, *Submission 58*, p. 5.

⁵⁹ QNMU, *Submission 49*, p. 5.

⁶⁰ Queensland Government, *Submission 115*, p. 11.

⁶¹ Queensland Government, *Submission 115*, p. 11.

Road and Workplace Accidents

4.39 The Queensland Government stated that fatigue can negatively impact driving performance through:

- 'Vigilance and alertness deterioration;
- Decreased concentration;
- Performance impairment;
- Slower reaction times; and
- Judgement impairment.'⁶²

4.40 Turning Point drew attention to data from Victoria which further highlighted the impact of inadequate sleep on accident rates and stated:

VicRoads estimate that sleep loss is a contributing factor in 23 per cent of all motor vehicle accidents, and experimental data has shown that driving capability after prolonged wake periods (greater than 17 hours) is similar to driving with a [blood alcohol level] of 0.05, the legal limit in all Australian jurisdictions.⁶³

4.41 The Alertness CRC similarly provided statistics regarding impaired alertness and vehicle accidents and stated that:

It is ... estimated that 20 per cent of serious car crash injuries (and 30 per cent of fatal crashes) are attributed to impaired alertness making it the largest identifiable and preventable cause of transport accidents.⁶⁴

Road Transport Industry

4.42 Dr Dunican was of the view that the trucking sector is performing 'quite poorly' in relation to sleep management.⁶⁵ Dr Dunican cited an example from Western Australia and stated:

In Western Australia [road transport workers] can drive 17 hours without taking small breaks ... being awake for 17 hours is the equivalent of being intoxicated at 0.05 per cent. You will see the same reaction times. So we have a long way to go on that ... That is a challenge given the remote operations, such

⁶² Queensland Government, *Submission 115*, p. 4.

⁶³ Turning Point, *Submission 33*, p. 3.

⁶⁴ Alertness CRC, *Submission 92*, p. 1.

⁶⁵ Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 5.

as fly-in fly-out mines where we have road transport coming from Perth to Kalgoorlie or up to the Pilbara region. It can be quite difficult. It would be an area that would need a lot of support.⁶⁶

- 4.43 The ACT Government stated that Australia would benefit from ‘uniform national legislation providing regulations for drivers’ working hours and minimum rest.’ The ACT pointed to regulation in the European Union (EU) as an example Australia could follow and stated that:

... [in the EU] the non-stop driving time may not exceed 4.5 hours. After 4.5 hours of driving the driver must take a break period of at least 45 minutes. However, this can be split into two breaks, the first being at least 15 minutes, and the second being at least 30 minutes in length. The daily driving time shall not exceed nine hours. The daily driving time may be extended to at most 10 hours not more than twice during the week. The weekly driving time may not exceed 56 hours. In addition to this, a driver cannot exceed 90 hours driving in a fortnight.⁶⁷

- 4.44 Dr Dunican similarly recommended that a ‘national guidance document across each state and territory’ regarding driving and rest times be developed in consultation with road transport stakeholders. Dr Dunican explained that currently, regulations regarding road and rest times differ across states and territories, which can be difficult for transport companies that operate across state lines to manage. Dr Dunican further explained that some industries (such as mining) may be subject to additional regulations, which add further complexity.⁶⁸

Sleep Apnoea in Truck Drivers

- 4.45 The Adelaide Institute for Sleep Health (AISH) stated that ‘up to 38 per cent of Australian truck drivers have Obstructive Sleep Apnoea’ (OSA), and that sleep disorders such as OSA have been associated with increases in workplace and vehicle accidents.⁶⁹ The AISH also made the point that there are ‘large individual differences’ in the way people respond to inadequate sleep in the workplace, which poses a ‘significant clinical challenge’ in how to recognise those who are at the highest risk of accident or error. The AISH

⁶⁶ Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 5.

⁶⁷ ACT Government, *Submission 126*, p. 4.

⁶⁸ Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 7.

⁶⁹ Adelaide Institute for Sleep Health (AISH), *Submission 100*, p. 5.

recommended that tools be developed ‘that can identify those drivers with sleep apnoea who are most vulnerable to driving accidents.’⁷⁰

4.46 Professor Grunstein stated that his organisation had ‘developed more accurate ways of detecting which drivers with sleep apnoea are at risk on the roads for crashes.’ Professor Grunstein recommended the development of new guidelines for crash risk assessments for drivers with sleep apnoea, which should be ‘based on the latest science.’⁷¹

4.47 The Melbourne Sleep Disorders Centre put forward a best practice example of a transport company in Queensland which has ‘actively investigated and treated sleep apnoea in transport drivers who do long haul drives.’⁷² The Melbourne Sleep Disorders Centre described the management process, and stated that this company:

... systematically [has] the patients assessed by a doctor, and, if appropriate, a sleep study performed. The transport company actually rented out ... the treatment equipment for the sleep apnoea, for the drivers every month for the first 12 months. If a driver was consistent with treatment and was continuing to drive for that company, the company would buy the device outright. They then went back to their insurer with that risk reduction strategy and negotiated lower premiums and lower excesses ... It was better for the business and so much nicer for the employment.⁷³

4.48 The Melbourne Sleep Disorders Centre further explained that this type of best practice approach from a workplace is ‘rare’.⁷⁴

Rail Industry

4.49 The Office of the National Rail Safety Regulator (ONRSR) described how fatigue risk is managed in the rail industry and stated:

Under the *Rail Safety National Law*, fatigue risk management is regulated under a risk-based approach with primary duties on rail transport operators, rail safety workers and other duty holders, to ensure rail safety work is undertaken safely, so far as is reasonably practicable. Operators in New South

⁷⁰ AISH, *Submission 100*, p. 5.

⁷¹ Professor Ron Grunstein, *Submission 112*, pp 11-12.

⁷² Dr John Swieca, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 40.

⁷³ Dr John Swieca, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 40.

⁷⁴ Dr John Swieca, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 40.

Wales and Queensland however have additional requirements under the National Regulations whereby hours of work are prescribed for train drivers.⁷⁵

- 4.50 The ONRSR further advised that under this framework, it does not mandate standards; ‘rather the duty is on the operator to demonstrate, [so far as is reasonably practicable], the safety of railway operations and rail safety work.’⁷⁶ The ONRSR also stated that rail operators are required to have a fatigue management plan in place.⁷⁷
- 4.51 The ONRSR advised that since it began its role over five years ago, ‘a consistent approach to the legislative framework for managing fatigue [has not been] reached.’ The ONRSR stated that as a result, it was currently undertaking a review of the differing legislative requirements for managing fatigue, in order to make a recommendation on ‘the most effective consistent approach.’⁷⁸
- 4.52 The increasing use of technology and automation in the rail industry, and the accompanying rise in ‘passive monitoring’ by workers, was identified as an emerging challenge by the ONRSR. The ONRSR stated that, while technology and automation can make railways safer, the associated increase in passive monitoring by workers may impact alertness and ‘introduce different fatigue factors which would require assessing as part of a fatigue risk management program.’⁷⁹
- 4.53 The ONRSR stated that there was ‘limited data’ to conclusively determine the impacts of fatigue on rail safety, particularly in live operational settings. In addition, the ONRSR stated that there were ‘mixed findings’ relating to whether working a permanent night shift led to an elevated fatigue risk.⁸⁰
- 4.54 In contrast, the Rail, Tram and Bus Union (RTBU) considered that the ONRSR’s description of the data and research findings was ‘incorrect and

⁷⁵ Office of the National Rail Safety Regulator (ONRSR), *Submission 63*, p. 1.

⁷⁶ ONRSR, *Submission 63*, p. 1.

⁷⁷ Ms Sue McCarrey, Chief Executive, ONRSR, *Official Committee Hansard*, Sydney, 5 February 2019, p. 38.

⁷⁸ ONRSR, *Submission 63*, p. 1.

⁷⁹ ONRSR, *Submission 63*, p. 2.

⁸⁰ ONRSR, *Submission 63*, p. 2.

misleading'. The RTBU further stated that there is a 'clear link between fatigue, reduced performance and elevated risk of accident or injury.'⁸¹

4.55 The RTBU also stated that Australia is behind other countries in terms of fatigue management:

Australia's failure to adopt a prescriptive fatigue management system means we are lagging behind many other comparable countries. The [United States of America], the [United Kingdom] and EU have benchmarks for working hour regulations mandating prescriptive maximum duty hours and minimum rest period.⁸²

4.56 Recognising these international examples, the RTBU recommended that 'hours of service limits should be a central part of fatigue risk management within the rail industry, with additional fatigue risk management strategies incorporated within these limits.'⁸³

4.57 The ONRSR put forward a different view and stated that in relation to hours worked:

ONRSR has been unable to find any evidence of greater rail safety outcomes when comparing the prescribed hours of operations for train drivers in New South Wales and Queensland compared with safety outcomes in other jurisdictions that operate under a purely risk-based approach to fatigue risk management in the rail industry in Australia.⁸⁴

Workplace Awareness, Practices, and Assistance Available

4.58 The Alertness CRC outlined challenges associated with identifying, monitoring and reducing the impact of poor alertness in the workplace and stated:

- 'The available tools to measure, monitor and manage the substantial public safety risks posed by reduced alertness [are] inadequate. The sleepy brain ... cannot judge its own level of impairment and therefore 'self-evaluation' is unreliable. More evidence based objective measures are needed to support fitness for duty testing and roadside driver monitoring.

⁸¹ Rail, Tram and Bus Union, *Submission 127*, pp 1-2.

⁸² Rail, Tram and Bus Union, *Submission 127*, p. 2.

⁸³ Rail, Tram and Bus Union, *Submission 127*, p. 2.

⁸⁴ ONRSR, *Submission 63*, p. 2.

- Sleep loss affects different people in different ways. Our ability to identify those individuals or groups who are most vulnerable to the effects of poor alertness, and will benefit most from countermeasures, has been limited in operational or community settings.
- There has been failure to account for the variation between individuals when managing fatigue. A “one-size-fits-all” approach is not appropriate or cost-effective and leads to ineffective treatments and wasted resources.
- Effective strategies to improve alertness in the workplace and to help shift workers reduce the health and safety risks inherent in their work schedule are lacking or poorly integrated with other aspects of their lives.⁸⁵

- 4.59 The NeuRA similarly highlighted that people respond to a lack of sleep and/or sleep disorders in a variety of ways, with some more able to cope than others. As such, the NeuRA emphasised that targeted approaches which can determine who is at more risk will be required.⁸⁶
- 4.60 The Alertness CRC advised it is conducting research which can support the development of technologies to improve fatigue management in the workplace and on the road. This includes the development of tools for assessing alertness; improved scheduling solutions (particularly for the healthcare and mining sectors); and improved lighting in workplaces to increase alertness.⁸⁷
- 4.61 The Alertness CRC stated that ‘industry driven, targeted research’ and ‘effective research translation pathways’ are critical to ongoing innovation in the area of sleep health and alertness management.⁸⁸
- 4.62 Dr Dunican was concerned that many businesses were being provided with ‘misinformation’ about effective sleep health practices. Dr Dunican stated that this can affect a business’ ‘safety and productivity, which ultimately [is] going to affect their retention and recruitment of their people and make them an unhappy workforce.’⁸⁹
- 4.63 The AISH advised that a range of useful resources regarding shift work and SWSD are available to businesses, but that ‘none of this material is digitised

⁸⁵ Alertness CRC, *Submission 92*, p. 2.

⁸⁶ Professor Danny Eckert, NeuRA, *Official Committee Hansard*, Sydney, 5 February 2019, p. 27.

⁸⁷ Alertness CRC, *Submission 92*, p. 3.

⁸⁸ Mr Anthony Williams, Alertness CRC, *Official Committee Hansard*, Canberra, 11 February 2019, p. 2.

⁸⁹ Dr Ian Dunican, Melius Consulting, *Official Committee Hansard*, Perth, 29 January 2019, p. 7.

or in a user-friendly format for organisations.’ The AISH advised that it was working with the Alertness CRC to develop ‘tools, algorithms and online systems’ to assist with the rostering and management of fatigue amongst shift workers.⁹⁰

- 4.64 In addition to support for shift workers, the AISH highlighted that assistance was needed for individuals who work ‘non-standard hours’ (beyond the 9:00 am to 5:00 pm bracket). The AISH stated:

Shift workers working overnight account for ... 15 to 20 per cent of workers in Australia, but non-standard work hours probably account for another 30 to 40 per cent. There are people getting up early going to work and getting home late who try and adjust their sleep ... I think we have less-well-described means of helping those people, and that probably requires more work.⁹¹

- 4.65 A number of inquiry participants recommended the development of guidelines for fatigue and/or shift work. Dr Gemma Paech stated that it is ‘vital that there are guidelines in place to improve safety and productivity in the workplace, particularly within industries that involve shift work.’⁹²
- 4.66 The Sleep Health Foundation similarly recommended ‘redoubling efforts to ensure adequate national guidelines regarding shift rosters to ensure there is adequate opportunity for sleep.’⁹³ The Australasian Sleep Association also called for ‘guidelines to inform improved rostering practices and work environments’, with a focus on shift work, long work requirements, and the transport industry.⁹⁴

Workplace Awareness and Education

- 4.67 Dr Paech advised that there is a need for greater awareness among shift workers of how to manage their sleep effectively and stated:

⁹⁰ Dr Andrew Vakulin, NHMRC Career Development Fellow, AISH, Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 37.

⁹¹ Professor Robert Adams, Professor of Sleep Medicine, AISH, Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 37.

⁹² Dr Gemma Paech, *Submission 19*, p. 1.

⁹³ Sleep Health Foundation, *Submission 54*, p. 8.

⁹⁴ Australasian Sleep Association, *Submission 118*, p. 7.

Workers ... need to have a greater understanding into how to optimise their sleep between working hours and the appropriate use of stimulants to promote alertness during shifts.⁹⁵

- 4.68 The Sleep Health Foundation recommended that, in addition to the development of national guidelines for shift rosters, action should be implemented 'to encourage workers to ensure that those opportunities for sleep are taken.'⁹⁶
- 4.69 Dr Mukherjee stated that 'workplace education is essential both for workers and employers.'⁹⁷ The QNMU similarly stated that there was a need for education of both employers and employees on 'how inadequate and poor sleep can not only impact a person's health and wellbeing but also reduces workplace productivity.'⁹⁸
- 4.70 Dr Mukherjee recommended 'targeted educational programs to assist industry with rostering, shift work management [and] fatigue management to maximise safety and productivity.' In particular, Dr Mukherjee singled out the transport and mining industries as two 'high risk' sectors 'where workplace accidents have the potential to be catastrophic.'⁹⁹ The Sleep Health Foundation similarly recommended the 'development and distribution of educational material specifically for those involved in safety critical occupations (such as occupational drivers) and shift work.'¹⁰⁰
- 4.71 The Australasian Sleep Association recommended the development of education campaigns aimed at minimising workplace risks of inadequate sleep. These campaigns should focus on ways to avoid drowsiness when driving and target high risk groups including 'young drivers, shift workers, and [the] transport industry.'¹⁰¹
- 4.72 The QNMU emphasised the importance of having a workplace culture 'that is supportive of sleep health.'¹⁰² The Melbourne Sleep Disorders Centre

⁹⁵ Dr Gemma Paech, *Submission 19*, p. 1.

⁹⁶ Sleep Health Foundation, *Submission 54*, p. 8.

⁹⁷ Dr Sutapa Mukherjee, *Submission 18*, p. 2.

⁹⁸ QNMU, *Submission 49*, p. 6.

⁹⁹ Dr Sutapa Mukherjee, *Submission 18*, p. 2.

¹⁰⁰ Sleep Health Foundation, *Submission 54*, p. 8.

¹⁰¹ Australasian Sleep Association, *Submission 118*, p. 7.

¹⁰² QNMU, *Submission 49*, p. 6.

similarly highlighted that implementing workplace measures to address fatigue risk may require ‘attitudinal change amongst the leaders [of a company] to actually implement it.’¹⁰³

4.73 The RACP also supported the development of education and awareness programs for specific industries. The RACP stated that it:

... supports education and awareness programs that recognise the risks and manage risks associated with the hazard of fatigue ... To this end, the RACP supports the availability of targeted programs in industries and workplaces that require periods of extended working hours (such as the police, fire and emergency services, typically in response to specific events), as well as those who are routinely engaged in evening and overnight shift work, such as the mining (such as Fly-In / Fly Out workers), transport (including those engaged in road, rail, maritime and/or air transport), and hospitality industries.¹⁰⁴

4.74 The HBS recommended an awareness program be developed for health care workers, to increase recognition of ‘problems associated with “mixed” shift patterns and signs of fatigue.’ In addition, the HBS recommended ‘mandating that health care facilities provide resources for health care workers to fully understand the risks of fatigue and what they personally can do to prevent it.’¹⁰⁵

4.75 Associate Professor Siobhan Banks and Professor David Hillman advised that farmers would benefit from an educational campaign to address the impact of inadequate sleep in the workplace. In particular, this education campaign could highlight practical strategies for farmers to use, including: optimal break times, the importance of hydration and eating well, using air conditioning and caffeine to remain alert and mental health support.¹⁰⁶ Associate Professor Banks and Professor Hillman stated that:

These kinds of fatigue management strategies have long been used in other Australian industries such as mining, transportation and healthcare but have not found their way onto farms. Education is the key to changing this.¹⁰⁷

¹⁰³ Dr David Cunnington, Sleep Physician and Director, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 41.

¹⁰⁴ Royal Australasian College of Physicians, *Submission 122*, p. 11.

¹⁰⁵ Health Business Solutions, *Submission 58*, p. 5.

¹⁰⁶ Associate Professor Siobhan Banks and Professor David Hillman, *Submission 83*, pp 1-2.

¹⁰⁷ Associate Professor Siobhan Banks and Professor David Hillman, *Submission 83*, p. 2.

Screening and Treatment in High-Risk Workplaces

- 4.76 The Sleep Health Foundation stated that fatigue becomes a major issue in safety critical occupations, such as occupational drivers, and industries that utilise shift work. Recognising these ‘at-risk’ cohorts, the Sleep Health Foundation recommended increased sleep health screening of these groups, in order to ‘help identify clinical sleep problems and other vulnerabilities and thereby reduce the risk of accidents or errors.’¹⁰⁸
- 4.77 The Sleep Management Group similarly recommended that sleep studies be mandatory for professional drivers and machinery operators. If a sleep disorder is then diagnosed, treatment should also be compulsory.¹⁰⁹
- 4.78 The AISH cautioned against penalising drivers with OSA, as has been recommended in the United States of America (US):

Currently, the US Federal Motor Carrier Safety Administration recommends disqualifying all drivers with “moderate to severe” OSA. In Australian terms that would mean taking 30 per cent of the driving workforce off the roads. This blanket screening and penalising of drivers based on presence or absence of OSA is inappropriate, would be an economic disaster, and is a scientifically flawed recommendation.¹¹⁰

- 4.79 SleepFit outlined its digital assessment and management model that workplaces can use to assess the sleep health of employees. SleepFit advised that its program includes workers being given a digital sleep risk assessment, with employees then being ‘triaged into programs suitable for their needs.’ These programs target poor sleep habits, insomnia, and sleep apnoea, and have a range of supports available. SleepFit recommended the government support ‘research programs in workplace settings’, as well as ‘sleep awareness and intervention programs in Australian workplaces’ to support greater sleep health.¹¹¹

¹⁰⁸ Sleep Health Foundation, *Submission 54*, p. 8.

¹⁰⁹ Sleep Management Group, *Submission 65*, p. 3.

¹¹⁰ AISH, *Submission 100*, p. 5.

¹¹¹ SleepFit, *Submission 47*, pp 1-2.

Testing for Drowsiness in Drivers

- 4.80 Associate Professor Mark Howard and Associate Professor Clare Anderson called for further research into technologies which can detect drowsiness in drivers and stated:

Australia is a world leader in research and commercial development of alertness monitoring and detection technology, which can detect drowsiness in real time. Further research is required to understand how to affectively implement this technology in order to reduce crashes through alerting drivers and using the data to identify high risk situations and adjust schedules and implement interventions when drowsiness is detected.¹¹²

- 4.81 Associate Professor Howard and Associate Professor Anderson also drew attention to new technology which can test for drowsiness at the roadside, in a similar way to current roadside testing for alcohol and drugs. Associate Professor Howard and Associate Professor Anderson stated that field trials are required to confirm the accuracy of this technology in real-life settings. The roll out of this technology would also need to be accompanied by the development of legislation to enable prosecution for 'driving while drowsy.'¹¹³

Concluding Comment

- 4.82 Sleep health is essential for workers to be productive and alert in the workplace, as well as to maintain long term health and wellbeing. Work that involves long hours, working during the night, and/or a rotating schedule may impact on sleep quality and duration, which may then negatively affect work performance.
- 4.83 Shift work in particular has been linked to lower levels of workplace productivity, as well as increased risk of injury or accident. In addition, the Committee was concerned to hear that shift work has been linked to health conditions associated with inadequate sleep, including obesity, sleep disorders, mental health conditions and cancer.
- 4.84 It is particularly important that workers in safety-critical occupations have adequate rest opportunities to maintain alertness in the workplace. The Committee was concerned to hear that the road transport industry, where a

¹¹² Associate Professor Mark Howard and Associate Professor Clare Anderson, *Submission 9*, p. 1.

¹¹³ Associate Professor Mark Howard and Associate Professor Clare Anderson, *Submission 9*, p. 1.

lapse in concentration could be fatal, may not be as advanced as other sectors in the management of fatigue in the workplace. The high rates of sleep apnoea amongst truck drivers, which makes them more vulnerable to accidents, may also point to a need for sleep health screenings of this cohort.

- 4.85 Concerns were raised that many workplaces do not use the most up-to-date research and data regarding optimal shift structures and rest breaks when designing work rosters. Ensuring all workplaces have access to clear information about how to structure shift schedules may help increase workplace productivity and the wellbeing of employees.
- 4.86 The Committee also heard there is a need for increased awareness of the importance of sleep health in the workplace. This involves both individuals optimising opportunities for rest breaks and sleep, and workplaces creating a culture that is supportive of sleep health.
- 4.87 The Committee was pleased to hear about developments in technology that will enable roadside testing for drowsiness in drivers. While further research and development is needed, the Committee considers that this technology has the potential to significantly reduce accidents and improve road safety and possibly minimise road fatalities.

Recommendation 2

- 4.88 The Committee recommends Safe Work Australia and the Alertness CRC provide updated guidelines (based on current research and science) for industries using shift work, regarding optimal shift structures and other workplace practices that promote alertness, productivity and ensure worker safety.**

Recommendation 3

- 4.89 The Committee recommends the Australian Government work with the states and territories to:**
- **Develop a nationally consistent approach to working hours and rest breaks for shift workers; and**
 - **Consider whether there is a need for sleep health screenings for shift workers; and**

-
- **That this approach be based on guidelines recommended by Safe Work Australia and the Alertness CRC.**

5. Diagnosis, Management and Treatment of Sleep Disorders

Introduction

- 5.1 The diagnosis of many sleep disorders is undertaken through an overnight sleep study. Relatively simple or mild sleep disorder cases can be diagnosed through sleep studies undertaken at home but more severe cases or those involving co-morbidities are likely to require diagnosis in a sleep laboratory. In many parts of Australia there are long waiting lists to access laboratory sleep studies and these studies can be costly. These factors may contribute to the under-diagnosis of some conditions such as Obstructive Sleep Apnoea (OSA).
- 5.2 Effective treatment options are available for many sleep disorders, including common conditions such as OSA and insomnia. The accessibility and affordability of these treatment options can, however, act as a barrier to the greater uptake of treatment. In particular, the limited number of practising sleep specialists constrains access to sleep health services especially for paediatric care and for people living in regional, rural, and remote areas.

Diagnosis and Treatment of Sleep Health Issues

- 5.3 The University of Western Australia School of Psychological Science (UWA-SPS) commented that the 'majority of Australian adults will not seek any sort of formal assistance with sleep difficulties.' The UWA-SPS further stated that 24 per cent of people with sleep disorders assume their sleep

problems will go away, 18 per cent get advice from family, friends or self-treat, and 10 per cent do nothing.¹

- 5.4 The Canberra Sleep Clinic (CSC) stated that individuals may not be aware of the symptoms of a sleep disorder because ‘sleep by its nature involves a loss of awareness, so that disturbances to sleep quality and quantity are often not recognised.’ In addition, the CSC stated that people rapidly develop a ‘feeling of tolerance to inadequate sleep’ and so may not feel the symptoms during the day.²

Diagnostic Sleep Studies

- 5.5 Many sleep disorders are diagnosed through a sleep study undertaken in the home or in a dedicated sleep laboratory. Relatively simple conditions can be diagnosed through at-home studies. For example, the Australasian Sleep Technologists Association (ASTA) stated that at-home sleep tests ‘can be performed for patients with a high likelihood of sleep disordered breathing, in the absence of any other significant medical condition.’³
- 5.6 Similarly, Austin Health stated that ‘the evidence internationally [is] that home sleep studies—performed well, performed on the right people, interpreted by the right people—are sufficiently good to diagnose sleep apnoea.’⁴
- 5.7 Patients with more complex sleep health conditions or co-morbidities may require a diagnostic study at a sleep laboratory. The Charles Perkins Centre (CPC) explained that laboratory sleep studies ‘generate a wealth of data from the numerous physiological signals that are collected about a person’s brain activity, eye movements, muscle activity, heart rhythm, breathing, and snoring.’⁵
- 5.8 The ASTA stated that laboratory sleep studies are necessary for patients with ‘narcolepsy, parasomnias, idiopathic hypersomnolence, periodic limb movement, nocturnal hypoventilation, and [Rapid Eye Movement]

¹ School of Psychological Science, University of Western Australia, *Submission 25*, p. 2.

² Canberra Sleep Clinic, *Submission 109*, p. 1.

³ Australasian Sleep Technologists Association (ASTA), *Submission 98*, p. 4.

⁴ Associate Professor Fergal O’Donoghue, Respiratory and Sleep Physician, Department of Respiratory and Sleep Medicine, Austin Health, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 23.

⁵ Charles Perkins Centre, *Submission 46*, p. 6.

behaviour disorder.’⁶ The Australian Capital Territory (ACT) Government advised that 36 per cent of the diagnostic sleep studies it undertook were complex and thus not suitable for home-based sleep studies.⁷

Diagnosis and Treatment of Sleep Apnoea

5.9 Associate Professor Darren Mansfield described the management of OSA in Australia as having:

... evolved over time in non-systemic fashion as resources have struggled to keep up with the high burden of the disease. The field now comprises various diagnostic and treatment models, including specialist physician, general practitioner and industry led pathways.⁸

5.10 There are two primary treatment options for OSA, namely, Continuous Positive Airway Pressure (CPAP) therapy and Mandibular Advancement Splints (MAS). Absolute Sleep summarised the difference between the two treatment options as CPAP providing a pneumatic splint that blows the airway open and MAS a mechanical splint which stops the airway collapsing.⁹

5.11 Neuroscience Research Australia (NeuRA) described CPAP therapy as the ‘first-line therapy’ for sleep apnoea. NeuRA added, however, that 50 per cent or more of people who are prescribed CPAP therapy are unable to tolerate it or only use the CPAP machine for a few hours each night.¹⁰

5.12 In addition to CPAP therapy, sleep apnoea may be treated through the use of a MAS, which is fitted by a dentist. The Dental Sleep Medicine Council of the Australasian Sleep Association (ASA) stated that approximately 40 per cent of dentists offered this service.¹¹ The Australian Dental Association (ADA) outlined MAS treatments and stated that:

⁶ ASTA, *Submission 98*, p. 5.

⁷ Australian Capital Territory (ACT) Government, *Submission 126*, p. 2.

⁸ Associate Professor Darren Mansfield, *Submission 50*, p. 4.

⁹ Dr Christopher Pantin, Principal Dentist, Absolute Sleep, *Official Committee Hansard*, Perth, 29 January 2019, p. 14.

¹⁰ Neuroscience Research Australia, *Submission 101*, p. 1.

¹¹ Dental Sleep Medicine Council of the Australasian Sleep Association (ASA), *Submission 48*, p. 2.

...the purpose of the mandibular advancement device is to move the lower jaw forward and also the tongue and the palate, to help prevent it from falling back, which is often a cause of people's snoring.¹²

- 5.13 The ADA stated that if all patients wanted to use a MAS to treat their sleep apnoea approximately 'one-third would get a fantastic result, about one-third would get a reasonable result ... and one-third would fail'.¹³ The ADA added that MAS was less appropriate than CPAP for severe cases of sleep apnoea, or people with body mass indexes above 30, but that 'for the thinner patient, the fitter patient, probably an oral appliance is better.'¹⁴
- 5.14 The CPC stated that even when a MAS device only has a small impact on a person's sleep apnoea the health benefits may be similar to CPAP therapy because 'although it may not be reducing the sleep apnoea as much, people wear [the MAS] more and the health effects seem to be equivalent.'¹⁵
- 5.15 The ADA stated that MAS treatment does have a number of side effects such as increased saliva flow, soreness in the teeth, gums, or muscles, and jaw stiffness, but that these symptoms could be easily treated by the dentist. The ADA expressed greater concern about the approximately 40 per cent of patients that experience clinically relevant bite changes. The ADA added, however, that:

In the bigger picture of living better, sleeping better and having a healthier life, is a bite change as significant for [the patient]? For some it is; for some it is not.¹⁶

Insomnia Treatment

- 5.16 Insomnia is typically treated either through the prescription of sleeping medications such as benzodiazepines or through the application of Cognitive Behaviour Therapy for Insomnia (CBT-I).

¹² Mrs Eithne Irving, Deputy Chief Executive Officer, Australian Dental Association (ADA), *Official Committee Hansard*, Melbourne, 6 February 2019, p. 1.

¹³ Dr Andrew Gikas, Member, ADA, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 2.

¹⁴ Dr Andrew Gikas, ADA, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 4.

¹⁵ Dr Kate Sutherland, Research Fellow, Charles Perkins Centre, University of Sydney, *Official Committee Hansard*, Sydney, 5 February 2019, p. 18.

¹⁶ Dr Andrew Gikas, ADA, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 3.

- 5.17 The Royal Australasian College of Physicians (RACP) cited evidence which found that, between the years 2000 and 2015, 90 per cent of patients presenting to general practitioners (GPs) with insomnia were treated with medication, 20 per cent were provided with non-pharmacological advice, and one per cent were provided with an onward referral.¹⁷
- 5.18 The RACP expressed concern that the most common approach to insomnia treatment was to prescribe medication. The RACP suggested that the reasons GPs typically use pharmacological treatments include: a lack of time, not knowing referral paths for sleep specialists, a shortage of CBT-I providers, and pressure coming from patients.¹⁸

Pharmacological Treatment

- 5.19 An analysis of national health surveys data for the thirty year period from 1977 to 2007 found that ‘use of sleep medications has decreased significantly since 1977 in both men and women, especially in older age groups.’¹⁹
- 5.20 Despite this, the Australian Longitudinal Study on Women’s Health (ALSWH) found that the use of medication to sleep was prevalent among women and increased with age. The ALSWH found that seven per cent of women it surveyed born from 1946 to 1951 took sleeping medication while in their late 40s but this increased to 18 per cent when this cohort reached their mid-60s. Among the women born from 1921 to 1926, 18 per cent took sleeping medications when in their early 70s and this rose to 24 per cent when they reached their late 80s.²⁰
- 5.21 Reconnexion added that ‘there is a widely held view that benzodiazepines are inappropriately prescribed and dispensed’.²¹ Reconnexion described benzodiazepines as being among the most commonly prescribed drugs in Australia and estimated that between seven million and 10 million scripts for benzodiazepines are written in Australia each year.²²

¹⁷ Royal Australasian College of Physicians, *Submission 122*, p. 6.

¹⁸ Royal Australasian College of Physicians, *Submission 122*, pp 6-7.

¹⁹ Y S Bin, N S Marshall, and N Glozier, *Exhibit 12: Trends in Sleep Medication Use in Australian Adults, 1977-2007*, p. [1].

²⁰ Australian Longitudinal Study on Women’s Health, *Submission 114*, pp 7-8.

²¹ Reconnexion, *Submission 43*, p. 1.

²² Ms Janet Shaw, Manager, Reconnexion, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 12; Reconnexion, *Submission 43*, p. 1.

Cognitive Behaviour Therapy for Insomnia

- 5.22 Emeritus Professor Dorothy Bruck and Dr Moira Junge stated that ‘a wealth of rigorous research, conducted across many countries internationally’ had found that CBT-I was a ‘highly effective treatment for chronic insomnia’.²³ Similarly, Sleep Matters stated that 70 to 80 per cent of insomnia patients can be effectively treated with CBT-I.²⁴
- 5.23 Emeritus Professor Bruck and Dr Junge described CBT-I as containing the following components:
- Sleep psychoeducation (understanding normal sleep and its determinants);
 - Sleep hygiene (environmental and lifestyle factors that may affect sleep);
 - Sleep restriction therapy;
 - Stimulus control therapy;
 - Relaxation training;
 - Cognitive therapy (dealing with dysfunctional thoughts and attitudes about sleep); and
 - Mindfulness therapy.²⁵
- 5.24 Dr Giselle Withers stated that for insomnia patients CBT-I is a ‘superior treatment’ to the use of medications as it is longer lasting and it ‘addresses the root causes of insomnia and empowers the individual to mitigate potential relapse.’²⁶
- 5.25 Dr Withers called for a step-based approach to the treatment of insomnia. Dr Withers stated that people with mild insomnia and good motivation could use self-help or online programs which are ‘highly accessible and cost-effective.’ Dr Withers stated that people with severe insomnia or co-morbidities with other health conditions ‘should be referred to face-to-face treatments with suitably qualified health professionals.’²⁷

²³ Emeritus Professor Dorothy Bruck and Dr Moira Junge, *Submission 8*, p. 3.

²⁴ Dr Melissa Ree, Director, Sleep Matters, *Official Committee Hansard*, Perth, 29 January 2019, p. 10.

²⁵ Emeritus Professor Dorothy Bruck and Dr Moira Junge, *Submission 8*, p. 3.

²⁶ Dr Giselle Withers, *Submission 30*, p. 2.

²⁷ Dr Giselle Withers, *Submission 30*, p. 3.

5.26 Sleep Matters advised that most straightforward cases of insomnia can be treated with four to six sessions with a psychologist.²⁸ Emeritus Professor Bruck and Dr Junge also advised that an abbreviated two-session treatment focussing on sleep restriction therapy has been successful in initial studies and called for a larger scale Australian study of this therapy.²⁹

Box 5.1 Impacts of Long-Term Benzodiazepine Use

Benzodiazepines are a class of minor tranquilisers used to treat insomnia and anxiety. Benzodiazepines can be an effective treatment for cases of acute insomnia, for example when there is a contributing factor such as 'post-operative pain or recent loss of a loved one.'³⁰

Reconnexion advised that clinical guidelines suggest benzodiazepines should 'only be prescribed on an intermittent basis for no longer than two to four weeks in order to prevent the development of tolerance and dependency'.³¹ Similarly, Austin Health described sedative medications (such as benzodiazepines) as inappropriate for first-line treatment of insomnia stating that they have 'limited effectiveness, have many side-effects, and cause long-term dependency problems.'³²

Reconnexion described withdrawing from benzodiazepines as both difficult and dangerous and stated for some of its clients the process can take years.³³ Ms Sandra Kirby described the process of withdrawal as a 'nightmare' and harder than withdrawing from heroin.³⁴

Benzodiazepine use has been found to increase the risk of car accidents, falls, and the development of dementia and Alzheimer's disease.³⁵ In addition, benzodiazepine use has been associated with drug induced deaths. Let Sleep Happen stated that benzodiazepines were the 'most

²⁸ Dr Melissa Ree, Sleep Matters, *Official Committee Hansard*, Perth, 29 January 2019, p. 11.

²⁹ Emeritus Professor Dorothy Bruck and Dr Moira Junge, *Submission 8*, pp 3-4.

³⁰ Emeritus Professor Dorothy Bruck and Dr Moira Junge, *Submission 8*, p. 2.

³¹ Reconnexion, *Submission 43*, p. 1.

³² Austin Health and the Institute for Breathing and Sleep, *Submission 84*, p. 2.

³³ Ms Janet Shaw, Reconnexion, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 12.

³⁴ Ms Sandra Kirby, *Submission 13*, p. 1.

³⁵ Reconnexion, *Submission 43*, pp 1-2.

common substance present in accidental and intentional drug-induced deaths, being identified in 663 or 36 per cent of [these] deaths' in 2016.³⁶

Let Sleep Happen added that approximately 70 per cent of these deaths were accidental. Long-term benzodiazepine use can lead to memory loss and this combined with increasing dosage, due to the development of tolerance, can increase the risk of overdose. Alcohol or other drugs are also a factor in nearly all cases of accidental overdose involving benzodiazepines.³⁷

Diagnosis and Treatment of Other Sleep Disorders

5.27 Dr David Cunnington and Dr John Swieca stated that central disorders of hypersomnolence, such as narcolepsy are:

... poorly understood and often not recognised by healthcare providers, insurers, employers and the general public. This leads to difficulties and delays in making a diagnosis, accessing treatment and receiving appropriate accommodations in the workplace to optimise participation.³⁸

5.28 Central disorders of hypersomnolence can be difficult to diagnose and testing requires an overnight laboratory sleep study and additional daytime vigilance testing undertaken by a sleep specialist.³⁹

5.29 The Sir Charles Gairdner Hospital (SCGH) stated that narcolepsy is often misdiagnosed.⁴⁰ The difficulties of diagnosis were illustrated by Ms Laura Thompson who has narcolepsy and stated that 'eight years is the average time between symptom onset and diagnosis.'⁴¹

³⁶Ms Rosemary Clancy, Director, Let Sleep Happen, *Official Committee Hansard*, Canberra, 11 February 2019, p. 2.

³⁷Ms Rosemary Clancy, Let Sleep Happen, *Official Committee Hansard*, Canberra, 11 February 2019, p. 2.

³⁸ Dr David Cunnington and Dr John Swieca, *Submission 73*, p. 2.

³⁹ ASTA, *Submission 98*, p. 5.

⁴⁰ Dr David Hillman, Sleep Physician, Sleep Health Foundation (SHF) and Sir Charles Gairdner Hospital (SCGH), *Official Committee Hansard*, Perth, 29 January 2019, p. 19.

⁴¹ Ms Laura Thompson, Private Capacity, *Official Committee Hansard*, Canberra, 11 February 2019, p. 27.

- 5.30 The SCGH stated that narcolepsy can be well managed with the use of stimulants, particularly Sodium Oxybate (marketed as Xyrem).⁴² Narcolepsy Australia stated that there is no cure for narcolepsy but that Sodium Oxybate can provide a 'better future [for] narcolepsy sufferers' and 'drastically reduces the risk of serious harm due to cataplectic episodes.'⁴³
- 5.31 Referring to Restless Leg Syndrome, Mr Graham Revill stated that 'most GPs don't understand the problem so they prescribe the standard solution which is drugs'. Mr Revill added that some of the drugs prescribed for Restless Leg Syndrome have serious side effects and can lead to dependency.⁴⁴

Costs and Accessibility of Sleep Medicine

Access to Sleep Medicine

- 5.32 The ASA advised that there are currently 470 sleep physicians working in Australia but that the majority of these physicians work in both sleep medicine and respiratory medicine.⁴⁵ The ASA added that in the public health system there are 223 sleep medicine beds across 51 hospitals and medical clinics.⁴⁶
- 5.33 The Queensland Government stated that its Sleep Disorders Program operated sleep centres in nine public hospitals and medical clinics. The Queensland Government further stated that these centres 'provide statewide coverage, ensuring services are available for Queenslanders in rural and remote areas.'⁴⁷
- 5.34 The ACT Government advised that, in 2011, it opened a two bed sleep laboratory at Canberra Hospital. Since the opening of the laboratory, demand for sleep health consultations has exceeded capacity and has continued to increase in the last five years. The ACT Government also

⁴² Dr David Hillman, SHF and SCGH, *Official Committee Hansard*, Perth, 29 January 2019, pp 19-20.

⁴³ Narcolepsy Australia, *Submission 97*, p. 2.

⁴⁴ Mr Graham Revill, *Submission 107*, p. 2.

⁴⁵ Professor Peter Eastwood, President, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 12.

⁴⁶ Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 11.

⁴⁷ Queensland Government, *Submission 115*, p. 6.

advised that a lack of appropriately skilled staff was a key limiting factor in the provision of sleep medicine services.⁴⁸

- 5.35 In addition to government owned centres, private providers also operate sleep clinics and deliver services. Air Liquide Healthcare Australia (ALHA) advised that it provides sleep services in over 100 locations in Australia, including operating 32 sleep laboratories across four states.⁴⁹ The Sleep Management Group (SMG) advised that it operates 15 sleep clinics, four of which offer sleep laboratories.⁵⁰
- 5.36 Sleep Disorders Australia and Hypersomnolence Australia (SDA-HA) stated that access to treatment and support for sleep disorders is ‘lacking across Australia.’ The SDA-HA drew attention to the example of the new Royal Adelaide Hospital (RAH) which does not have inpatient sleep diagnostic facilities. The SDA-HA stated that ‘whilst less complex cases could be managed in private facilities, having the expertise and resources to manage complex patients is essential for a hospital such as RAH.’⁵¹
- 5.37 The SDA-HA added that, across Australia, 35 onsite sleep clinics have closed since the recent introduction of changes to the Medicare Benefits Schedule (MBS).⁵² The ASA stated that these closures were most likely in clinics that ‘were reliant on patients having in-laboratory sleep studies.’ The ASA added that with the changes to the MBS, physicians were required to provide a justification for studies to be done in a laboratory rather than at-home and this could result in the closure of clinics that did not offer home based testing.⁵³

⁴⁸ ACT Government, *Submission 126*, p. 2.

⁴⁹ Air Liquide Healthcare Australia, *Submission 111*, p. 2.

⁵⁰ Mr Robert Leslie, Founder and Director, the Sleep Management Group, *Official Committee Hansard*, Sydney, 5 February 2019, p. 10.

⁵¹ Sleep Disorders Australia and Hypersomnolence Australia (SDA-HA), *Submission 2*, p. 1.

⁵² Mrs Michelle Chadwick, Director, Sleep Disorders Australia, *Official Committee Hansard*, Canberra, 11 February 2019, pp 5-6.

⁵³ Dr Maree Barnes, Immediate Past President, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 7.

5.38 Access to medical sleep services can be affected by long waiting times. For example, Austin Health stated that in some cases there can be wait times of 18 months to access its sleep health services.⁵⁴

5.39 Similarly, Dr Maree Barnes of the ASA provided an example of typical wait times for patients at her clinic. Dr Barnes stated:

I work in a relatively inner city public hospital and even in my relatively well serviced area there is a waiting time. To get a sleep study you've got to see me first. The waiting time for that is anything between six months and two years and then you might wait another 12 months to get a diagnostic sleep study. Then you wait another 12 months to get your CPAP titration study.⁵⁵

Access to Paediatric Sleep Medicine

5.40 Children with sleep health issues do not necessarily have the same level of access to sleep medicine as adults. For example, home-based diagnostic sleep studies are not available for children.⁵⁶

5.41 In addition, the ASA stated that, across the 51 hospitals and clinics it surveyed, 33 of the 223 public sleep medicine beds were for paediatric care.⁵⁷ The ACT Government advised that there 'are no publically funded [sleep medicine] services available for children and adolescents in the ACT.'⁵⁸

5.42 Dr Sadasivam Suresh stated that there is a small pool of paediatric sleep clinicians and as such 'it is not unusual for children [to wait] up to 18 months to see a specialist.' In addition, Dr Suresh stated that diagnostic testing centres, which are primarily located in hospitals, 'across Australia are operating at maximum capacity and have a waiting time for sleep [studies] of up to 18 months.'⁵⁹

5.43 Professor Karen Waters highlighted the wait times in Sydney to access diagnostic sleep studies for children. Professor Waters stated that currently

⁵⁴ Professor Christine McDonald, Director, Department of Respiratory and Sleep Medicine, Austin Health, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 21.

⁵⁵ Dr Maree Barnes, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 10.

⁵⁶ ASTA, *Submission 98*, p. 4.

⁵⁷ Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 11.

⁵⁸ ACT Government, *Submission 126*, p. 2.

⁵⁹ Dr Sadasivam Suresh, *Submission 31*, p. 3.

‘outpatient appointments have a three to six month delay and overnight sleep tests have a 9 to 12 month wait time.’⁶⁰

- 5.44 Professor Waters stated that this was ‘indicative of insufficient services in this area’ and suggested that her sleep unit needed to double its capacity for young children. Professor Waters also suggested that for neo-natal infants the most cost-effective option would be to establish an outreach diagnostic service that could travel to metropolitan neo-natal nurseries.⁶¹
- 5.45 Dr Gillian Nixon also drew attention to the long waiting lists to see paediatric sleep physicians and added that children with sleep apnoea are often treated by an ear, nose and throat surgeon which required an additional waiting period.⁶²
- 5.46 The Canberra Sleep Clinic and Well Spoken (CSC-WS) stated that ‘untreated, sleep problems impact ... a child’s development, and compound over time.’⁶³ The Sleep Health Foundation (SHF) agreed and added that ‘the thought of a child with a fairly obvious sleep disorder waiting for some time for investigation ... is a matter of serious concern.’⁶⁴
- 5.47 The CSC-WS suggested that addressing paediatric sleep health required the implementation of a national screening program delivered by professionals across the health, education, and childcare sectors. In addition, the CSC-WS recommended that treatment pathways should focus on insomnia and breathing associated with sleep disorders and, for children ‘treatment should be organised as early as possible, no matter the severity.’⁶⁵

Access to Sleep Medicine in Regional, Rural and Remote Areas

- 5.48 The ASTA stated that access to treatment and support for sleep disorders is ‘almost non-existent’ outside metropolitan areas and major regional centres. As a consequence, the ASTA suggested that the use of diagnostic sleep studies in regional and remote areas was far lower than in other parts of

⁶⁰ Professor Karen Waters, *Submission 55*, p. 1.

⁶¹ Professor Karen Waters, *Submission 55*, p. 1.

⁶² Dr Gillian Nixon, Paediatric Respiratory and Sleep Physician, Monash Children’s Hospital, Monash Health; Department of Paediatrics, Monash University, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 30.

⁶³ Canberra Sleep Clinic and Well Spoken, *Submission 129.1*, p. 1.

⁶⁴ Professor David Hillman, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 10.

⁶⁵ Canberra Sleep Clinic and Well Spoken, *Submission 129.1*, p. 3.

Australia. The ASTA advised that in regional and remote areas there are 31 sleep studies conducted per year for every 100 000 people whereas the Australian average is 575 studies per 100 000 people per year.⁶⁶

5.49 The CSC agreed that people living in regional and rural areas are 'not as well served' as people living in cities in regard to sleep medicine. The CSC added that in regional and rural areas 'diagnosis is made by less detailed testing at home [and] clinical management is undertaken mostly by GP's who have little opportunity for training and experience.'⁶⁷ Similarly, GenesisCare stated that the delivery of CPAP treatment in remote and rural regions 'can be difficult as there is often a lack of local expertise and support.'⁶⁸

5.50 As an example of the challenges of providing sleep medicine in regional areas GenesisCare stated:

In Gladstone, Queensland, we have an established sleep laboratory within the private hospital, our sleep and respiratory physician visits from Brisbane monthly and also provides telehealth consultations. There is a lack of local sleep physicians within Gladstone, and access to private respiratory physicians is also quite limited in the region. As a result, oftentimes patients with significant respiratory conditions are seen as priority and therefore those with sleep disordered breathing are triaged and, consequently, left with delays to accessing specialist advice and treatment.⁶⁹

5.51 Emeritus Professor Bruck and Dr Junge commented on the potential role of telehealth and internet based resources to provide insomnia treatment in regional and remote areas and stated that CBT-I is:

... likely to be successfully adaptable to telehealth. There is a large volume of research on the efficacy of CBT-I using online delivery models (often therapist-guided). Thus, CBT-I can potentially be effectively delivered in rural, regional and remote areas in a low-cost manner.⁷⁰

5.52 Sleep Matters advised, however, that in order to claim a telehealth CBT-I session under Medicare:

⁶⁶ ASTA, *Submission 98*, p. 4.

⁶⁷ Canberra Sleep Clinic, *Submission 109*, p. 2.

⁶⁸ GenesisCare, *Submission 80*, p. 1.

⁶⁹ GenesisCare, *Submission 80*, p. 2.

⁷⁰ Emeritus Professor Dorothy Bruck and Dr Moira Junge, *Submission 8*, p. 3.

People have to be living a long way from a centre and, if there is a psychologist locally, they need to see them [in person] even though that person may have zero training in behavioural sleep medicine. So it would be really helpful if patients were able to access whoever has a speciality in the disorder that they are presenting with, rather than having to access the person that is closest to them.⁷¹

Sleep Health Sector

Sleep Medicine Services Available under Medicare

- 5.53 The Adelaide Institute for Sleep Health (AISH) stated that ‘Medicare-funded sleep studies for sleep apnoea cost the Australian taxpayer \$69 million per annum’. The AISH added that this cost was ‘increasing rapidly with 14 per cent per annum growth compared to 6 per cent per annum for all other Medicare services.’⁷²
- 5.54 Home diagnostic tests were added to the MBS in 2008. The SMG stated that this had resulted in the expansion of ‘access to diagnostic testing to a much wider group of patients as cost to the patient was no longer a consideration and barrier for screening and diagnosis.’⁷³ Similarly, the ASTA stated that home based testing had increased access to diagnosis of sleep health issues for people living in non-metropolitan areas.⁷⁴
- 5.55 Austin Health suggested that the recent changes to the MBS had a goal of transferring the ‘majority of straightforward patients with sleep apnoea ... to a home sleep study for a diagnosis’, which it considered ‘a correct goal and supported by the evidence.’⁷⁵
- 5.56 The Melbourne Sleep Disorders Centre (MSDC) stated that the recent review undertaken by the MBS Taskforce has resulted in ‘necessary changes’ that had:

... modernised the list of item numbers to reflect clinical practice across a range of sleep related disciplines. A consequence of that is to wipe out some of the

⁷¹ Dr Melissa Ree, Sleep Matters, *Official Committee Hansard*, Perth, 29 January 2019, p. 11.

⁷² Adelaide Institute for Sleep Health, *Submission 100*, p. 3.

⁷³ Sleep Management Group, *Submission 65*, p. 1.

⁷⁴ ASTA, *Submission 98*, p. 4.

⁷⁵ Associate Professor Fergal O’Donoghue, Austin Health, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 23.

corporatised high-volume models of care that were at times hard to defend, in terms of their approach to health care. There are unintended consequences, and a number of patients who would have had a diagnosis made through those corporatised models of care are now seeking care elsewhere.⁷⁶

- 5.57 Jeffrey & Ree Psychology and Sleep Matters (Jeffrey & Ree) stated that ‘in order to obtain a Medicare rebate to see a psychologist ... [insomnia] patients must first see their GP for a Mental Health Treatment Plan.’ Jeffrey & Ree stated that the need for a Mental Health Treatment Plan acted as a barrier to people accessing CBT-I, both because of the stigma associated with mental health and because the treatment plan may ‘adversely impact life insurance premiums and occupational opportunities.’⁷⁷
- 5.58 Dr Giselle Withers called for higher Medicare rebates for psychologists to run group CBT-I sessions. Dr Withers stated that group programs are more cost-effective for the health system but ‘psychologists are [not encouraged] to run group [sessions], as they would earn less per hour than for individual sessions.’⁷⁸
- 5.59 The ADA called for ‘better regulation around the availability’ of one-size-fits-all mouthguards used to treat snoring that are available over the counter or via the internet. The ADA stated that these devices provide ‘very poor effectiveness compared with a professionally made’ device and advocated that they should be regulated ‘under the auspices of the Therapeutic Goods Administration.’⁷⁹

Level 3 and 4 Testing and Oximetry

- 5.60 The SHF suggested that there could be greater use of simpler diagnostic tests for sleep disorders, known as level 3 and level 4 sleep studies. The SHF stated that level 3 and level 4 tests were in-home tests that measured a limited number of parameters and were ‘suitable as part of screening procedures [and] also for diagnosis of simple cases.’⁸⁰

⁷⁶ Dr John Swieca, Sleep Physician and Medical Director, Melbourne Sleep Disorders Centre (MSDC), *Official Committee Hansard*, Melbourne, 6 February 2019, p. 39.

⁷⁷ Jeffrey & Ree Clinical Psychologists and Sleep Matters, *Submission 103*, p. 2.

⁷⁸ Dr Giselle Withers, *Submission 30*, p. 5.

⁷⁹ Mrs Eithne Irving, ADA, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 1.

⁸⁰ Professor David Hillman, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 7.

- 5.61 The Pharmaceutical Society of Australia (PSA) added that level 3 home-based studies were being managed by pharmacists and that the studies were ‘an excellent way—appropriate to the scope of practice—for pharmacists to be able to pick up on people who can be managed or need to be referred on to more specialist assessment.’⁸¹
- 5.62 The SMG suggested that the ‘technology for sleep testing has improved dramatically over the last five years.’ The SMG added that level 3 tests could now be done ‘at a much lower cost to government’ and that they could be interpreted by a GP who could triage simple cases and refer more complex cases to a sleep physician.⁸²
- 5.63 In contrast, ALHA expressed some concerns about Level 3 and Level 4 testing. The ALHA stated that these tests do not require an assessment by a GP or sleep physician and therefore ‘patients may be inappropriately referred to testing, incorrectly diagnosed, and then inappropriately treated.’⁸³
- 5.64 The Thoracic Society of Australia and New Zealand (TSANZ) commented on the role of oximetry testing, which measures oxygen in the blood, in diagnosing OSA. The TSANZ stated that oximetry testing is used for screening and triaging ‘especially in areas which have poor access to major laboratories’⁸⁴ but that it has been ‘removed from the MBS during the recent review process.’⁸⁵

Medicare Audits

- 5.65 An inquiry participant working in the field of sleep medicine raised the issue of Medicare audits of clinicians undertaking sleep studies. The inquiry participant stated that during 2018 at least 20 to 25 per cent of sleep clinicians were:

⁸¹ Mr Robert Buckham, Manager, Strategic Policy, Pharmaceutical Society of Australia, *Official Committee Hansard*, Canberra, 11 February 2019, p. 11.

⁸² Sleep Management Group, *Submission 65*, p. 3.

⁸³ Air Liquide Healthcare Australia, *Submission 111*, p. 2.

⁸⁴ Professor Bruce Thompson, Director/President Elect, Thoracic Society of Australia and New Zealand, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 44.

⁸⁵ Thoracic Society of Australia and New Zealand, *Submission 77*, p. 1.

... subject to targeted Medicare compliance activity/audits over the rendering of the diagnostic sleep services ... this level of activity is unprecedented in any other disciplines in Medicine and Dentistry.⁸⁶

- 5.66 The SMG stated that 79 providers, possibly representing as many as 20 per cent of practising sleep physicians had received letters from Medicare in February 2018. The SMG suggested that this indicated that sleep physicians undertaking home diagnostic studies had 'become a target for Medicare and the Professional Services Review committee.'⁸⁷

Role of Primary Care Health Workers

- 5.67 The SHF stated that there is a need for a greater proportion of sleep services to be provided by primary care medical staff and stated:

It is not appropriate or necessary that all patients with sleep disorders be managed by sleep physicians ... the management of uncomplicated sleep disorders should be devolved to primary care and allied and community health workers.⁸⁸

- 5.68 This view was shared by the AISH which stated that sleep specialists are 'overburdened, dealing in many instances with unnecessarily simple cases.'⁸⁹ The AISH added that:

The current reliance on specialist services and corporate providers, rather than primary care, means that the community burden of sleep disorders remains largely unmet.⁹⁰

- 5.69 The SCGH stated that ongoing management is required of patients undertaking CPAP therapy. The SCGH further stated that specialist sleep physicians are not able to 'deal with the magnitude of managing these patients' and suggested that primary care professionals such as

⁸⁶ Name Withheld, *Submission 53*, p. 1.

⁸⁷ Sleep Management Group, *Submission 65*, pp 1-2.

⁸⁸ SHF, *Submission 54*, p. 7.

⁸⁹ Adelaide Institute for Sleep Health, *Submission 100*, p. 3.

⁹⁰ Adelaide Institute for Sleep Health, *Submission 100*, p. 3.

psychologists, GPs, and nurses could instead provide this ongoing patient support.⁹¹

- 5.70 SleepGP stated that it provides the Royal Australian College of General Practitioners (RACGP) accredited training for GPs so that they can provide care and management for patients with uncomplicated OSA and thereby reduce ‘the pressure on, and wait times for, limited numbers of sleep specialists.’⁹² SleepGP suggested that GP based care provides a:

... comprehensive clinically based, patient-centred [model of care] that provides an alternative to ‘commercial’ pathways which simply sell OSA sufferers a CPAP device without proper assessment of their co-morbidities, medications and anatomy.⁹³

- 5.71 The RACGP called for the ‘introduction of a MBS item number for organised sleep studies in general practice.’⁹⁴ The RACGP added that:

Integration of such studies into primary care, and away from specialist based services and tertiary care, can potentially achieve more effective results and decrease costs. However relevant standards should be in place before such studies can be undertaken.⁹⁵

- 5.72 Ms Catherine Buchan suggested that specialist sleep nurses could have a greater role in the provision of sleep health services. Ms Buchan cited research which found that specialist sleep nurses had been able to manage sleep health patient populations with ‘equivalent outcomes to sleep physicians.’⁹⁶ Ms Buchan added that ‘nurses access to provider numbers and Medicare rebates for fee for services needs to be reviewed in any models of care [that] utilises nurses in the workforce.’⁹⁷

- 5.73 The SHF suggested that overseas experience had shown that nurses could be trained to deliver CBT-I. The SHF stated that ‘we need to have a massive

⁹¹ Professor Bhajan Singh, Head of Department, Department of Pulmonary Physiology and Sleep Medicine, SCGH, and Director, West Australian Sleep Disorders Research Institute, *Official Committee Hansard*, Perth, 29 January 2019, p. 18.

⁹² SleepGP, *Submission 41*, p. 2.

⁹³ SleepGP, *Submission 41*, p. 2.

⁹⁴ Royal Australian College of General Practitioners, *Submission 45*, p. 1.

⁹⁵ Royal Australian College of General Practitioners, *Submission 45*, p. 1.

⁹⁶ Ms Catherine Buchan, *Submission 74*, p. 1.

⁹⁷ Ms Catherine Buchan, *Submission 74*, p. 1.

upskilling of nurses, psychologists and other allied health professionals so that they can deliver these sometimes very simple sessions.’⁹⁸

- 5.74 The CSC-WS suggested that there was a ‘big role that allied health can play, particularly in screening, and triaging in screening, to relieve the burden on the medical fraternity.’⁹⁹ Similarly, the PSA stated that pharmacists can also be involved in the management of patients with sleep disorders such as sleep apnoea. The PSA stated that pharmacists may screen patients and either refer them to a medical practitioner or support their use of CPAP therapy to treat sleep apnoea.¹⁰⁰
- 5.75 Professor Darren Mansfield stated that the barriers to primary care practitioners becoming more involved in the provision of sleep health services included: limited knowledge, short GP consultations, lack of reimbursements for GPs to gain new skills or provide complex consultations, and limited nurse practitioner pathways.¹⁰¹

Referral Pathways

- 5.76 Medicare item numbers that came into force on 1 November 2018, enable GPs to directly refer patients to a laboratory sleep study. Previously an appointment with a sleep specialist was also required to access a sleep study.¹⁰²
- 5.77 To access the direct referral pathway a GP must first complete two questionnaires that determine the patient’s eligibility for a sleep study. The SMG stated that these questionnaires exclude ‘a lot of patients that may have sleep disorders’ and that ‘Medicare are making it difficult to diagnose patients rather than providing improved access to diagnosis and then treatment where necessary.’¹⁰³

⁹⁸ Emeritus Professor Dorothy Bruck, Chair, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 12.

⁹⁹ Mrs Sharon Moore, Speech Pathologist, Canberra Sleep Clinic and Well Spoken, *Official Committee Hansard*, Canberra, 11 February 2019, p. 11.

¹⁰⁰ Mr Robert Buckham, Manager, Strategic Policy, Pharmaceutical Society of Australia, *Official Committee Hansard*, Canberra, 11 February 2019, p. 4.

¹⁰¹ Professor Darren Mansfield, *Submission 50*, p. 5.

¹⁰² Royal Australasian College of Physicians, *Submission 122*, p. 7.

¹⁰³ Sleep Management Group, *Submission 65*, p. 2.

- 5.78 Austin Health and the Institute for Breathing and Sleep (AH-IBS) stated that the questionnaires provide sleep physicians with more information which ‘allow us to triage more effectively’ but also highlight some potential limitations of the changes.¹⁰⁴ The AH-IBS stated that:
- This direct referral pathway requires that GPs be familiar with several sleep-related questionnaires (to determine patient eligibility for this streamlined pathway) and have an understanding of patient clinical suitability for the test ... in the absence of any significant component of sleep education in the medical courses, this is likely to be beyond the capability of many GPs.¹⁰⁵
- 5.79 The ASA agreed and suggested that while the intention of the changes had been to make it easier for GPs to refer patients directly to sleep studies, this pathway ‘has really not been utilised.’¹⁰⁶
- 5.80 Mr John Malouf stated that the recent Medicare changes have altered the criteria for accessing a sleep study ‘towards typical male symptoms’ and that therefore ‘women will be disproportionately disadvantaged.’ Mr Malouf added that ‘49 per cent of women with moderate to severe OSA will no longer be eligible for a Medicare funded sleep study without having to go to the inconvenience and expense of seeing a sleep physician.’¹⁰⁷
- 5.81 The AISH stated that the Medicare changes were a ‘step in the right direction’ but also suggested that it is:
- ... possible that this measure alone is insufficient to change practice when primary care professionals are not mandated to manage patients in primary care, or recommend self-management strategies.¹⁰⁸
- 5.82 A related issue is the ability of patients to be directly referred between psychologists and sleep physicians. The Australian Psychological Society stated that if a psychologist believed a patient had a physiological sleep disorder they would refer the patient back to their GP for onward referral.¹⁰⁹

¹⁰⁴ Professor Christine McDonald, Austin Health, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 21.

¹⁰⁵ Austin Health and the Institute for Breathing and Sleep, *Submission 84*, p. 2.

¹⁰⁶ Dr Maree Barnes, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 10.

¹⁰⁷ Mr John Malouf, *Submission 52*, p. 1.

¹⁰⁸ Adelaide Institute for Sleep Health, *Submission 100*, p. 3.

¹⁰⁹ Ms Ros Knight, President, Australian Psychological Society, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 9.

- 5.83 Similarly, the SCGH stated that if a sleep physician believes a patient needs to see a psychologist they are not able to directly refer the patient to the psychologist.¹¹⁰
- 5.84 Dentists are also unable to refer patients directly to sleep physicians, although they are able to refer patients back to GPs and ear, nose, and throat surgeons. The ADA stated that following the fitting of a MAS dentists would like to refer the patient back to the sleep physician to check the effectiveness of the treatment but this is not currently possible.¹¹¹

Commercial Providers in the CPAP Market

- 5.85 The AISH stated that there was a 23 per cent per annum increase in the cost to Medicare of home-based sleep studies provided by ‘medical corporates using a vertically integrated model,¹¹² i.e. diagnostic testing leading to the sale of CPAP’ devices.¹¹³
- 5.86 Professor Ron Grunstein expressed concern regarding the ‘over-investigation of mild sleep apnoea’ and commented that patients with mild to moderate sleep apnoea were ‘being recommended treatment with [CPAP] machines for their condition, despite no evidence of its value.’ Professor Grunstein also raised concerns regarding the vertical integration of companies offering diagnostic services and selling treatment devices.¹¹⁴
- 5.87 Similarly, the SCGH stated that CPAP resellers, who buy from manufacturers and sell to consumers, often encourage patients to purchase the most expensive devices. The SCGH added that:
- ...in many instances commercial interests have trumped the medical interests of patients, and patients have been convinced to put their hard-earned money towards equipment that they probably don’t need.¹¹⁵
- 5.88 The SCGH stated that the emergence of commercial sales of CPAP devices was in part due to the long waiting times to see sleep specialists and in part

¹¹⁰ Dr David Hillman, SHF and SCGH, *Official Committee Hansard*, Perth, 29 January 2019, p. 21.

¹¹¹ Dr Andrew Gikas, ADA, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 4.

¹¹² In a vertically integrated model a single company is providing the patient both with healthcare advice and selling the patient a product to manage their condition.

¹¹³ Adelaide Institute for Sleep Health, *Submission 100*, p. 3.

¹¹⁴ Professor Ron Grunstein, *Submission 112*, p 1.

¹¹⁵ Professor Bhajan Singh, SCGH, *Official Committee Hansard*, Perth, 29 January 2019, p. 18.

because there is no regulation, such as the need for a prescription, that limits who can buy and sell CPAP devices.¹¹⁶

- 5.89 Associate Professor Darren Mansfield suggested that patients outside of metropolitan areas were receiving treatment from companies selling CPAP machines whose ‘commercial and healthcare priorities may not always be aligned.’ Professor Mansfield attributed this situation to poor access to services outside metropolitan areas which had created a ‘void [that] has been filled by the sleep apnoea device industry.’¹¹⁷

Costs and Government Support

Sleep Apnoea Treatment

- 5.90 The ASTA stated that CPAP devices can be purchased for between \$700 and \$800 and will last three to five years. In addition, the masks required to use the device cost between \$100 and \$150 and last about 18 months.¹¹⁸ The SMG stated that there were many brands of CPAP devices with costs varying between \$1000 and \$2000.¹¹⁹
- 5.91 The SHF stated that access to CPAP is ‘often constrained by its affordability to individuals, particularly those of limited means.’¹²⁰ Similarly, GenesisCare highlighted the difficulty some people experience funding OSA treatment, stating:

Provision of CPAP requires a substantial upfront cost to the patient. Many patients with significant sleep disordered breathing have other co-morbidities ... patients have difficulty meeting the cost of sleep disordered treatments, particularly when they are also paying for appointments, medications and therapies for their co-morbidities. State based schemes to assist in supply of sleep disordered breathing treatment are a benefit, but for some even the reduced costs are excessive. This [is] also quite evident in Indigenous patients.¹²¹

¹¹⁶ Professor Singh, SCGH, *Official Committee Hansard*, Perth, 29 January 2019, p. 18.

¹¹⁷ Associate Professor Darren Mansfield, *Submission 50*, p. 5.

¹¹⁸ Dr Kerri Melehan, President, ASTA, *Official Committee Hansard*, Sydney, 5 February 2019, p. 8.

¹¹⁹ Mr Robert Leslie, Founder and Director, Sleep Management Group, *Official Committee Hansard*, Sydney, 5 February 2019, p. 12.

¹²⁰ SHF, *Submission 54*, p. 5.

¹²¹ GenesisCare, *Submission 80*, p. 2.

5.92 The MSDC stated that upcoming changes to private health insurance requirements will result in sleep medicine being 'in the lowest possible tier, that is, insurers will be well within their rights to exclude sleep diagnostics and treatments for anything but the gold level, the highest tier, of insurance.'¹²² The MSDC stated that these changes 'may make it more difficult for patients to seek care' in the private system, but 'at the same time the public hospitals have not been able to increase their resources to provide more diagnoses and treatment.'¹²³

5.93 Similarly, the SMG stated that:

Limiting sleep studies to the gold tier is likely to severely limit or prevent access of part of the population to an appropriate diagnosis for their sleep disorder, and put additional stress on the public hospital system, which already has demand for sleep services exceeding supply.¹²⁴

5.94 The ADA stated that the average fee for MAS treatment is \$1450.¹²⁵ Absolute Sleep stated there is 'no public funding for this treatment at all' and that the 'current level of rebates for MAS devices across private health funds are insufficient and do not lead to patient or provider uptake of MAS.'¹²⁶

Government Support for CPAP Therapy

5.95 State and Territory Governments provide funding to patients for CPAP therapy if they meet a range of financial, medical, and in some cases geographical criteria.

5.96 Table 5.1 summarises information provided by the ASA on support provided by state and territory governments to assist people access CPAP equipment. The ASA added that in all jurisdictions 'many patients are unable to afford or access [the funding programs] and remain untreated.'¹²⁷

¹²² Dr John Swieca, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 39.

¹²³ Dr John Swieca, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 39.

¹²⁴ Sleep Management Group, *Submission 65*, p. 2.

¹²⁵ Dr Andrew Gikas, ADA, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 2.

¹²⁶ Dr Christopher Pantin, Principal Dentist, Absolute Sleep, *Official Committee Hansard*, Perth, 29 January 2019, pp 12-13.

¹²⁷ Australasian Sleep Association, *Submission 118.1*, pp 1-5.

Table 5.1 Government Support for CPAP Therapy

Jurisdiction	Key Eligibility Criteria	Equipment Provision	Other Notes
ACT	Pensioner or Health Care Card holder OSA of 'significant severity'	CPAP	Patients must demonstrate ability to use CPAP through self-funded trial 2 week waiting period
NSW	Permanent or long-term disability 'Require the assistive technology to remain in a community setting'	CPAP device and some consumable products	4 month or more waiting period Co-payments range from a minimum of \$100 per year to 20 per cent of the device cost
NT	Pensioner or Health Care Card holder or disability preventing work Significant OSA and meet clinical criteria	Rental of CPAP device, patients purchase mask and consumables	Patient rents CPAP at their expense for 4 to 6 weeks to demonstrate adherence Scheme not available in Alice Springs and Central Australia
Qld	Pensioner or Health Care Card holder	Loan of CPAP device Consumables and accessories such as the mask not provided	2 month rental period at patient's expense
SA	Pensioner or Health Care Card holder Severe OSA with 'significant medical co-morbidities'	CPAP device Replacement of consumables not provided	Only available in 2 of the 4 Local Health Network areas
Tas	Health Care Card holder	CPAP device rented at \$50 per year Initial consumables provided but patients must fund replacements	A cap of the number diagnostic sleep studies that can be undertaken provides an effective cap on the number of devices that will be funded

Vic	Health Care Card holders with moderate to severe OSA Hospital based funding and not all hospitals provide funding		No state-wide program. People living in rural areas and some metropolitan areas have 'no or very limited access' to CPAP funding
WA	Pensioner or Health Care Card holder At least moderate OSA	CPAP device	Patient must demonstrate use and benefit of CPAP through trial and own expense

Source: Australasian Sleep Association, Submission 118.1, pp 1-5.

5.97 The SHF further explained that CPAP devices are historically funded by the states and territories as:

... under the Medicare system, provision was made to the states for appliances: walking sticks, walking frames and that sort of thing, and that's where CPAP sat ... that is, that it's a state-by-state responsibility. Federally, there's no responsibility taken for the provision of appliances, and I think it shows.¹²⁸

5.98 Associate Professor Darren Mansfield stated that the cost of CPAP devices in Australia is amongst the highest in the world and suggested that a 'federally based government subsidised CPAP program for low to middle income earners would significantly improve affordability.'¹²⁹ Associate Professor Mansfield suggested that access to the scheme should require a prescription from a medical practitioner with sleep medicine training and that a tendering process with CPAP manufacturers could reduce the cost to government.¹³⁰

5.99 The SHF stated that the annual cost of CPAP therapy is approximately \$550 per person, but that if societal costs such as productivity are considered

¹²⁸ Professor David Hillman, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 9.

¹²⁹ Associate Professor Darren Mansfield, *Submission 50*, p. 2.

¹³⁰ Associate Professor Darren Mansfield, *Submission 50*, p. 2.

CPAP therapy 'actually saves the country \$440 per person treated.'¹³¹ Associate Professor Mansfield provided a slightly higher figure for the benefit to society, stating that treating OSA with CPAP provides a 'net cost saving to society of \$857 per person treated.'¹³²

Hypersomnolence Disorders Treatment

- 5.100 The SDA-HA stated that 'there are no medications on the Pharmaceutical Benefits Scheme (PBS) for idiopathic hypersomnia and people with idiopathic hypersomnia cannot access schedule 8 medications without a narcolepsy diagnosis.'¹³³ The SDA-HA called for the medications Dexamphetamine and Modafinil/Armodafinil to be approved for use to treat idiopathic hypersomnia.¹³⁴
- 5.101 The SHF stated that it had previously attempted to have Modafinil listed on the PBS as a first-line treatment for hypersomnolence disorders but that this had been rejected and amphetamines remain the first-line treatment. The SHF stated that 'amphetamines are problematic drugs ... my choice would be Modafinil before amphetamines.'¹³⁵
- 5.102 In addition to Modafinil people experiencing narcolepsy may also be treated with Sodium Oxybate (marketed as Xyrem). Narcolepsy Australia, however, stated that 'uptake [of Sodium Oxybate] has been minimal' citing the high cost of the medication as the main factor preventing greater usage.¹³⁶ Sodium Oxybate is currently available in Australia via import through the special access scheme but its purchase is not funded or subsidised by the Australian Government.¹³⁷ The SDA-HA stated that the annual cost of Sodium Oxybate treatment was between \$15 000 and \$20 000 depending on the dose.¹³⁸

¹³¹ Professor David Hillman, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 10.

¹³² Associate Professor Darren Mansfield, *Submission 50*, p. 4.

¹³³ SDA-HA, *Submission 2.1*, p. 3.

¹³⁴ SDA-HA, *Submission 2.1*, p. 4.

¹³⁵ Professor David Hillman, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 9.

¹³⁶ Narcolepsy Australia, *Submission 97*, p. 2.

¹³⁷ Dr Jane Cook, First Assistant Secretary, Medicines Regulations Division, Department of Health, *Official Committee Hansard*, Canberra, 11 February 2019, p. 8.

¹³⁸ Mrs Michelle Chadwick, SDA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 9.

5.103 The Department of Health stated that the Therapeutic Goods Administration (TGA) 'has not received an application from a potential Australian Sponsor to designate a medicine containing Sodium Oxybate as an orphan drug¹³⁹', despite being aware of a public petition in 2015 aimed at achieving this goal.¹⁴⁰ The Department of Health also stated that the TGA had not 'received a registration application for any medicine containing Sodium Oxybate', but that:

The TGA has been approached in 2018 by potential sponsors for Sodium Oxybate and has had two pre-submission discussions. Written advice to the sponsors was provided by the TGA at the time and no follow-up applications have been received to date.¹⁴¹

5.104 In order to be approved for distribution by the TGA, the Sodium Oxybate medicine would need to have an Australian Sponsor, which is usually (but not always) the relevant pharmaceutical company. The Department of Health outlined the process and stated:

To gain approval to supply therapeutic goods in Australia, a sponsor would need to submit an application together with supporting data to the TGA for evaluation. The TGA is unable to compel a sponsor to submit an application to register therapeutic goods; and approval for marketing in Australia cannot be given in the absence of an application. As the sponsor must be able to provide scientific data to support the registration of a medicine and also commit to post-market monitoring requirements, registration applications are ordinarily submitted by pharmaceutical companies rather than other bodies. That said, other bodies are not precluded from applying for the registration of a medicine but would need to ensure they are able to fulfil the obligations of a sponsor under the Act.¹⁴²

¹³⁹ The Department of Health outlined 'orphan designation' and stated: 'If a company considers that it may not be economically viable to market a medicine in Australia or if the intended patient population is small, then they can consider whether their medicine meets the criteria for orphan designation. If the criteria are met then the TGA's designation, application and registration fees are waived.' Department of Health, *Submission 131.1*, p. 3.

¹⁴⁰ Department of Health, *Submission 131*, p. 1.

¹⁴¹ Department of Health, *Submission 131*, p. 2.

¹⁴² Department of Health, *Submission 131.1*, p. 4.

Concluding Comment

Accessibility of Sleep Health Services

- 5.105 In many cases, people who are experiencing sleep disorders are waiting a year or more to see a specialist or undertake a sleep study. This situation is particularly troubling in the field of paediatric sleep medicine. The waiting lists for diagnosis and treatment of children's sleep health conditions can be even longer than for adults and delays in treatment can have long-lasting impacts on childhood development.
- 5.106 New methods of delivering sleep health services are required as there remains an unquantified number of people with undiagnosed sleep apnoea. Combined with long waiting lists for such services add to the complication. If diagnosis rates for sleep apnoea improve, existing sleep health services may be placed under significant strain and the need for new delivery methods will only increase.
- 5.107 The most effective means of improving the delivery of sleep health services appears to be through the expansion of the pool of practitioners engaged in sleep medicine. It is estimated that as many as one in five Australians experience a sleep disorder with 470 practising sleep physicians in Australia.¹⁴³ The provision of sleep health services should be a shared responsibility that involves general practitioners (GPs), nurses, psychologists, dentists, and remaining allied health professionals.
- 5.108 Enabling a greater role for primary care workers will improve the accessibility of sleep health services across Australia, particularly in regional and rural areas where access to specialists is limited. Examples of how primary care workers could have greater involvement in the delivery of sleep health services include: GPs taking a greater role in the diagnosis of mild or simple sleep disorders; GPs leading the ongoing management of people with obstructive sleep apnoea (OSA) following initial diagnosis and treatment; and nurse practitioners delivering Cognitive Behavioural Therapy for Insomnia (CBT-I) sessions for cases of insomnia not involving co-morbidities.

¹⁴³ Deloitte, *Exhibit 2b: Asleep on the Job: Cost of Inadequate Sleep in Australia*, August 2017, p. 19; Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 12.

- 5.109 The Committee supports recent changes that enable GPs to directly refer patients for sleep studies. This pathway, however, does not appear to be frequently used and adjustments may be required.

Diagnosis and Treatment of Sleep Disorders

- 5.110 Medicare rebates are available for in-laboratory (level 1) and at-home (level 2) overnight sleep studies only. The Committee heard that simpler diagnostic tests (levels 3 and 4) are also available which could provide a cost-effective means of expanding the number of Australians who are tested for sleep disorders.
- 5.111 For some people, a simple test interpreted by a GP may provide a sufficient diagnosis to develop a treatment plan. For people with more complex or serious conditions, a simple, accessible test could act as a trigger to consult a sleep physician and undergo additional testing.
- 5.112 There is a need to review the diagnostic testing currently available through Medicare to increase the number of Australians tested for sleep disorders.

Treatment for Sleep Apnoea

- 5.113 The condition of OSA has potentially serious health implications, but is often undiagnosed and untreated. Fortunately there are two effective treatment options for OSA available: Continuous Positive Airway Pressure (CPAP) therapy and Mandibular Advancement Splints (MAS). In order to ensure that the significant benefits of treatment are realised, it is crucial that these treatment options are both accessible and affordable.
- 5.114 The Committee is concerned that treating OSA can be prohibitively expensive for some individuals. In addition, the systems for subsidising CPAP devices vary significantly across each state and territory. In all jurisdictions, however, there are likely to be access issues due to the prohibitive cost of the devices.
- 5.115 In its previous *Inquiry into the Hearing Health and Wellbeing of Australia* the Committee found concerning examples of hearing devices being sold on a commission basis with examples of monopoly-type sales arrangements in place.
- 5.116 The Committee is concerned that there are indications of a similar dynamic occurring in the provision of CPAP devices. With no regulation in the CPAP industry, devices are able to be sold independent of any diagnosis or treatment plan provided by a medical professional. This creates a situation

where there is a strong likelihood of a divergence between a patient's healthcare needs and the commercial imperatives of business.

- 5.117 There is a need for regulation to ensure that the provision of CPAP devices is in line with medically diagnosed need. The objective of a new regulatory framework should be to improve access to CPAP devices for people with OSA but also ensure that access is provided on the basis of a diagnosis and long term management by an appropriately trained medical practitioner.

Treatment for Insomnia

- 5.118 Insomnia is a common disorder that can have serious physical and mental health and wellbeing impacts. The Committee was pleased to hear that CBT-I offers a relatively straightforward treatment that is effective in 70 to 80 per cent of cases. Despite this success rate, only a small minority of patients who present to their GP with insomnia symptoms are referred on to CBT-I treatment. Instead, approximately 90 per cent of patients leave their GP with a prescription for a sleeping medication (e.g. benzodiazepine).
- 5.119 In many cases, benzodiazepine use can rapidly lead to dependence which over a prolonged period can have a debilitating impact on a person's health and wellbeing. The Committee considers that CBT-I should be reviewed as a first line therapy for insomnia, rather than a prescription for benzodiazepines.
- 5.120 A key component of ensuring that people experiencing insomnia are referred to CBT-I treatment is providing GPs with adequate training and knowledge about its effectiveness.
- 5.121 In addition, the Committee believes there needs to be greater regulation of benzodiazepines and assistance for existing dependency on benzodiazepines.

Treatment for Narcolepsy

- 5.122 The Committee was pleased to hear that a treatment option for Narcolepsy exists that could potentially lead to substantial reductions in the symptoms of these conditions. Sodium Oxybate (marketed as Xyrem), which is available in the United States of America, has enabled some people experiencing narcolepsy the ability to re-enter the workforce or undertake study which would otherwise not be possible.
- 5.123 Currently, Sodium Oxybate is only available in Australia through a limited import system at a cost of between \$15 000 to \$20 000 per year.

- 5.124 Wider availability of Sodium Oxybate may enable people experiencing narcolepsy to more fully participate in their family, social, and work lives.
- 5.125 Sodium Oxybate must first be listed or registered through the Therapeutic Goods Administration (TGA) as this process is an important guarantee of the safety of the drugs available in Australia. The Committee urges the Australian Government to work with relevant parties to progress an application for the consideration of this drug by the TGA.

Recommendations

Recommendation 4

- 5.126 **The Committee recommends that the Department of Health undertake a review of the Medicare Benefits Schedule as it relates to sleep health services in Australia. The review should include, but not be limited to, the following:**
- **Simple diagnostic sleep studies (Level 3 and Level 4) that do not currently attract Medicare rebates;**
 - **Ensuring recent changes to enable general practitioners to directly refer patients to diagnostic sleep studies are effective; and**
 - **Barriers to accessing Cognitive Behavioural Therapy for Insomnia via telehealth for patients in regional, rural, and remote areas.**

Recommendation 5

- 5.127 **The Committee recommends that the Australian Government work with the states and territories, and provides funding where necessary, to:**
- **Ensure that all Pensioner or Health Care Card holders with moderate to severe obstructive sleep apnoea, regardless of their location, have access to a free trial of Continuous Positive Airway Pressure (CPAP) therapy and if the trial is successful free ongoing CPAP treatment; and**
 - **Undertake a review to assess the potential benefits of providing subsidised CPAP therapy across the broader Australian community.**

Recommendation 6

5.128 The Committee recommends that the Australian Government and the Australian Competition and Consumer Commission monitor the Continuous Positive Airway Pressure industry to ensure that vertical integration in the industry does not result in actions that:

- **Limit the quality of care or clinical advice provided to patients; or**
- **Result in anti-competitive behaviour in the industry.**

Recommendation 7

5.129 The Committee recommends that if there is no distributor willing to put forward a submission, the Australian Government work with patient advocacy groups such as Narcolepsy Australia or the Sleep Health Foundation to make a submission for the listing or registration of Sodium Oxybate under the Orphan Drug Program.

6. Research and Awareness of Sleep Health Issues

Introduction

- 6.1 Although approximately one third of a human lifespan is spent sleeping, the importance of sleep to overall health and general wellbeing is often taken for granted. To resolve this, the Sleep Health Foundation (SHF) and the Australasian Sleep Association (ASA) has advocated for a preventive health campaign to educate Australians on how and why they should improve their sleep habits.¹
- 6.2 Sleep is a multidisciplinary issue. In addition to specialist practitioners, contributions to sleep medicine are made by a range of health professionals including general practitioners (GPs), psychologists, nurses, dentists, and pharmacists.
- 6.3 The Australian sleep research community is based across clinical and university research settings, and receives funding from the National Health and Medical Research Council (NHMRC). Opportunities to resolve gaps in the existing body of research knowledge were identified by inquiry participants. The expansion of sleep health knowledge is also closely intertwined with data collection for the monitoring of sleep health issues in the Australian population.

¹ Sleep Health Foundation (SHF) and Australasian Sleep Association (ASA), *Exhibit 11: Pre Budget Submission 2019-20*, p. 4.

Community Awareness of Sleep Health Issues

- 6.4 The Melbourne Sleep Disorders Clinic (MSDC) stated that when it opened its clinic 25 years ago the awareness of sleep disorders in the community was ‘very poor.’ The MSDC added that the number of sleep clinics in Melbourne had grown significantly during the time it has been in operation.² Beyond awareness of clinical sleep disorder diagnosis and treatment, the Public Health Association of Australia (PHAA) stated that the awareness of good sleep health as part of ‘everyday lifestyle and routine’ in the community has not yet occurred.³
- 6.5 Neuroscience Research Australia (NeuRA) held concerns that some ‘people think it’s some heroic feat if you can get by on not much sleep’, and further stated that it has never had a patient ‘in the lab that can get by on four hours of sleep and function optimally.’⁴ The MSDC stated that in the ‘business world’, working through the night is seen as a ‘positive trait’, despite the memory and judgement impairment.⁵
- 6.6 The MSDC stated that there ‘has to be a society-wide shift about not seeing sleep as something that can be traded off as an optional extra.’⁶ The SHF recognised the difficulty for an individual alone to change their sleep behaviour, and stated that ‘when we see changing attitudes around us, then our own behaviours will change with them.’⁷
- 6.7 In response to concerns about community attitudes regarding sleep, the SHF and the ASA have called for a national campaign to improve the awareness of sleep health in the community. The SHF stated that a national sleep health awareness campaign should:

² Dr John Swieca, Sleep Physician and Medical Director, Melbourne Sleep Disorders Centre (MSDC), *Official Committee Hansard*, Melbourne, 6 February 2019, p. 39.

³ Dr Yu Sun Bin, Member, Public Health Association of Australia (PHAA), *Official Committee Hansard*, Canberra, 11 February 2019, p. 18.

⁴ Professor Danny Eckert, Director, Sleep Research Program, Neuroscience Research Australia (NeuRA) University of New South Wales, and Matthew Flinders Fellow, Adelaide Institute for Sleep Health, Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 27.

⁵ Dr David Cunnington, Sleep Physician and Director, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 40.

⁶ Dr David Cunnington, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 40.

⁷ Professor David Hillman, Deputy Chair, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 21.

... educate Australians about the purpose of sleep, normal sleep requirements, the consequences of inadequate sleep (because of insufficient duration, inappropriate timing relative to time of day, or inadequate quality due to an unrecognised sleep disorder or other problem), self-help measures to improve sleep and sources of professional help where problems persist.⁸

6.8 The SHF stated that a key message of a national sleep health awareness campaign should be to inform the public that behavioural changes can be an effective first step in resolving sleep issues:

We know there are behavioural things that people can do, and that's the message that we need to get out to the public: 'you can problem-solve some of your sleep problems yourself by seeking out information, and you can make behavioural changes that could well make a difference. If that doesn't work and your GP thinks that you may have a sleep disorder, then go down that track'.⁹

6.9 The SHF and ASA estimated that a national community education campaign would cost \$18.26 million over four years.¹⁰ The SHF and ASA stated that this would include funding for:

- 'a national media and social media educational campaign focused on the value of making lifestyle choices that promote wellbeing and alertness through prioritising sleep';
- a community speaker program;
- resources and a speaker program for schools;
- a website with educational material;
- 'translation of information into the most widespread community languages [other than English] spoken by Australians.'¹¹

6.10 There are limited examples of public awareness campaigns relating to sleep, both locally and globally. The Department of Health has published sleep guidelines for children up to five years of age, as part of its *24-Hour Movement Guidelines for the Early Years*.¹² The Department of Health,

⁸ SHF, *Submission 54*, pp 3-4.

⁹ Emeritus Professor Dorothy Bruck, Chair, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, pp 22-23.

¹⁰ SHF and ASA, *Exhibit 11: Pre Budget Submission 2019-20*, p. 6.

¹¹ SHF and ASA, *Exhibit 11: Pre Budget Submission 2019-20*, p. 7.

¹² Department of Health, 'Australian 24-Hour Movement Guidelines for the Early Years (Birth to 5 years): An Integration of Physical Activity, Sedentary Behaviour, and Sleep',

however, does not have specific programs relating to sleep health, and further stated that:

[Sleep health has] not been an area that's been specifically focused on within the department, so there's not a sleep plan or a sleep health plan being developed.¹³

- 6.11 Campaigns targeting drowsy driving were cited as an example of Australian public health campaign related to sleep. The University of Sydney (USyd) Brain and Mind Centre (BMC) commented on the number of billboards warning against drowsy driving, and stated this is an example where sleep awareness has been taken seriously.¹⁴ Similarly, the Adelaide Institute for Sleep Health (AISH) praised the drowsy driving campaign run by the Victorian Transport Accident Commission which uses the key slogan of 'a 15 minute power nap could save your life.'¹⁵
- 6.12 In addition, the University of Western Australia (UWA) School of Psychological Science recommended the inclusion of sleep health education as part of licensing for new drivers.¹⁶
- 6.13 Preventive health campaigns addressing other health issues can serve as models for how a sleep health public awareness campaign can be structured and targeted. The USyd-BMC suggested, however, that a sleep health awareness campaign may be more complex to implement than other public health campaigns. Comparing sleep health to the *Quit* smoking campaign, the USyd-BMC stated that sleep is not a single problem:

There isn't a single target there in the way that the behaviour of lighting a cigarette and smoking it is. So, from a public health point of view, it's not a unitary problem that you can just whack with about 15 different things in the

<http://www.health.gov.au/internet/main/publishing.nsf/Content/npra-0-5yrs-brochure>, accessed 1 March 2019.

¹³ Mr David Weiss, Assistant Secretary, Preventive Health Policy Branch, Department of Health, *Official Committee Hansard*, Canberra, 11 February 2019, p. 11.

¹⁴ Dr Nathaniel Marshall, Associate Professor, Sydney Nursing School, University of Sydney, and Centre for Sleep and Chronobiology, Woolcock Institute of Medical Research (WIMR), Brain and Mind Centre, University of Sydney, *Official Committee Hansard*, Sydney, 5 February 2019, p. 18.

¹⁵ Professor Danny Eckert, Matthew Flinders Professor, Adelaide Institute for Sleep Health (AISH), Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 36; Transport Accident Commission, 'Drowsy Driving', <https://www.tac.vic.gov.au/road-safety/tac-campaigns/drowsy-driving>, accessed 25 February 2019.

¹⁶ University of Western Australia (UWA) School of Psychological Science, *Submission 25*, p. 1.

way we did with smoking. ... Sleep is not one problem; it's hundreds of problems. So it's not going to be as simple.¹⁷

- 6.14 SleepFit stated that organisations focus on 'mental health yet there is much research that points to sleep [as] underpinning' mental health conditions.¹⁸ The National Mental Health Commission (NMHC) and SleepFit saw the potential for sleep problems to be addressed in a 'non-stigmatising way', which does not always occur where there are also mental health issues.¹⁹ The NMHC further stated that discussion of sleep issues may provide an avenue for 'early intervention and prevention' of 'suicidal ideation and behaviours.'²⁰
- 6.15 The Parenting Research Centre described the 'ingredients' of a successful public health campaign. The Parenting Research Centre stated they seek to embed their 'resources into the daily practice of those who work with families', such as 'maternal and child health nurses, general practitioners, teachers and early years educators.'²¹ The Parenting Research Centre further elaborated on the message they wanted to send when communicating a public health issue:
- ... this is an important issue, it's okay not to know everything, there are things you can do, here are some very practical ... tips and strategies that you can incorporate into every day.²²
- 6.16 Red Nose, which has led the public awareness campaigns to reduce the risk of Sudden Infant Death Syndrome (SIDS), advocated for simple messaging. Red Nose stated that overseas bodies had up to 22 safe sleeping recommendations which is too 'confusing' and hard to remember. Instead, Red Nose has concentrated on just six safe sleep recommendations.²³

¹⁷ Dr Nathaniel Marshall, Brain and Mind Centre, University of Sydney, *Official Committee Hansard*, Sydney, 5 February 2019, p. 20.

¹⁸ SleepFit, *Submission 47*, p. 4.

¹⁹ National Mental Health Commission, *Submission 62*, p. 2; SleepFit, *Submission 47*, p. 4.

²⁰ National Mental Health Commission, *Submission 62*, pp 1-2.

²¹ Dr Julie Green, Director, Parenting Research Centre, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 28.

²² Dr Julie Green, Parenting Research Centre, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 28.

²³ Mrs Jane Wiggill, Manager, Health and Advocacy, Red Nose, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 51.

- 6.17 Red Nose also explained that its safe sleeping message had been less successful reaching people in 'Indigenous, rural and remote, culturally and linguistically diverse communities'. Red Nose stated that 'Indigenous people were seeing that SIDS was a European problem' and wanted to keep their babies in bed with them. In response, Red Nose developed a targeted program for Aboriginal and Torres Strait Islander communities that aims to provide a safe and separate sleeping space for babies in the parental bed.²⁴

School Hours

- 6.18 As adolescents have a naturally delayed sleep phase than adults, the possibility of delaying school start times has been raised as a means of helping adolescents get adequate sleep.²⁵ The Royal Australasian College of Physicians (RACP), however, stated that the proposals were 'not necessarily translatable to Australia' as the research is mostly from the United States of America (USA), where school start times are earlier than in Australia.²⁶ Let Sleep Happen and the RACP stated that there was a risk that later school start times could create a population with a delayed sleep phase disorder.²⁷
- 6.19 The ASA stated that, rather than changing school start times, the school program could be rescheduled to account for adolescent micro-napping in the morning. The ASA suggested having 'sports classes first in the morning rather than after school' and more academic classes in the afternoon.²⁸

²⁴ Ms Keren Ludski, Chief Executive, Red Nose, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 50.

²⁵ Australasian Sleep Technologists Association, *Submission 98*, p. 2.

²⁶ Associate Professor Garun Hamilton, Royal Australasian College of Physicians (RACP), *Official Committee Hansard*, Canberra, 11 February 2019, Canberra, p. 22.

²⁷ Associate Professor Garun Hamilton, RACP, *Official Committee Hansard*, Canberra, 11 February 2019, Canberra, p. 22; Ms Rosemary Clancy, Director, Let Sleep Happen, *Official Committee Hansard*, Canberra, 11 February 2019, Canberra, p. 22.

²⁸ Dr Maree Barnes, Immediate Past President, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, Canberra, p. 22.

Education and Training for Healthcare Workers

Sleep Medicine as a Field

6.20 The RACP stated that it 'recognises sleep medicine as a subspecialty of internal medicine.'²⁹ Professor Ron Grunstein stated that due to its nature, sleep medicine is a cross-disciplinary field:

Sleep medicine is not an organ-based specialty such as cardiology or respiratory medicine. It is a predominantly cross-disciplinary field where skills need to be drawn from areas such as respiratory medicine, neurology, ... psychiatry, and other specialties.³⁰

6.21 Sleep practitioners are currently categorised by the Australian Health Practitioner Recognition Agency (AHPRA) as 'Respiratory and Sleep Medicine' practitioners.³¹ The Woolcock Institute of Medical Research (WIMR) advocated that AHPRA 'recognise sleep medicine as a truly independent specialty separate from respiratory medicine.'³² The ASA stated that this has not occurred due to the cost of AHPRA recognition:

Three or four years ago we did a lot of work with the College of Physicians and AHPRA trying to get a sleep physician category up and we were told that, yes, it would be possible but it's going to cost us about \$2 million, and we didn't have the \$2 million so we didn't pursue it.³³

6.22 Ms Fiona Mobbs, who is living with narcolepsy, stated that specialised sleep professionals needed to handle sleep disorders such as narcolepsy.³⁴ Ms Eliza Wells, who is also living with narcolepsy, stated that the 'local GPs that I have seen not only have no understanding of narcolepsy, they also appear to have little to no interest in gaining one.'³⁵

²⁹ RACP, *Submission 122*, p. 2.

³⁰ Professor Ron Grunstein, *Submission 112*, p. 10.

³¹ Professor Ron Grunstein, *Submission 112*, p. 10; Medical Board of Australia, *List of specialties, fields of specialty practice and related specialist titles*, 1 June 2018, p. 4.

³² Professor Ronald Grunstein, Head, Sleep and Circadian Research Group, WIMR and Central Clinical School, University of Sydney, *Official Committee Hansard*, Canberra, 11 February 2019, Canberra, p. 2.

³³ Dr Maree Barnes, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 14.

³⁴ Ms Fiona Mobbs, *Official Committee Hansard*, Canberra, 11 February 2019, Canberra, p. 29.

³⁵ Ms Eliza Wells, *Submission 95*, p. 5.

- 6.23 The SHF stated that the USA has ‘a more completely evolved specialty of sleep medicine—they have their sleep medicine boards; they recruit from all sorts of specialties, but it’s unashamedly sleep.’³⁶ Similarly, the Canberra Sleep Clinic (CSC) stated that Australia is ‘out of step with the diversity of sleep physician practice in Europe and the [USA].’ The CSC added that ‘almost all sleep physicians are respiratory physicians’ but there is a need for ‘neurologists, psychiatrists, general physicians, ear nose and throat, and oromaxillofacial surgeons trained in sleep medicine.’³⁷
- 6.24 The WIMR recommended ‘a review of specialist sleep medicine training, involving the relevant colleges and the AHPRA.’³⁸ The SHF stated that an independent sleep speciality would mean that ‘sleep can receive its separate advocacy and its special concentration that the problem needs, for health reasons but also for economic ones.’³⁹

Clinical Training for Sleep Practitioners

Sleep Physicians

- 6.25 After the completion of a medical degree, sleep physician training primarily occurs through teaching hospitals. The Queensland Government reported that there is no formal sleep medicine training offered to medical practitioners through Queensland Health. The Queensland Government stated, however, that the RACP offered Respiratory Medicine and Sleep Medicine training that could be undertaken at one of ten hospitals in Queensland.⁴⁰
- 6.26 The Australian Capital Territory (ACT) Government stated that the Canberra Hospital offers a one year respiratory training program that allows ‘registration as a respiratory and sleep physician.’⁴¹ The ACT Government further stated that this course:

³⁶ Professor David Hillman, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 14.

³⁷ Canberra Sleep Clinic, *Submission 109*, p. 3.

³⁸ Professor Ronald Grunstein, WIMR, *Official Committee Hansard*, Canberra, 11 February 2019, Canberra, p. 2.

³⁹ Professor David Hillman, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 15.

⁴⁰ Queensland Government, *Submission 115*, p. 8.

⁴¹ ACT Government, *Submission 126*, p. 3.

... does not result in accreditation as a sleep medicine physician, which is a separate programme that requires at least two years of core training in sleep medicine. Trainees wishing to take this specialisation often undertake dual training in respiratory medicine, neurology or another subspecialty in addition to sleep medicine training.⁴²

6.27 The WIMR commented on the dominance of respiratory medicine as a pathway to sleep medicine, and stated that this is a ‘lopsided arrangement’ not reflected in other countries.⁴³ The WIMR added:

Virtually all sleep medicine practitioners spend most of their time in respiratory, not sleep, medicine and never get three years training in sleep medicine. Even with sleep training, there was an overwhelming emphasis on respiratory sleep disorders. For example, in a one year training program in sleep medicine, a trainee is only expected to see 30 new patients with non-respiratory sleep disorders—a truly worryingly low number, considering they’re meant to see 500 new and old cases.⁴⁴

6.28 Professor Grunstein added that as a consequence of the respiratory medicine training pathway, sleep physicians receive training that does not equip them to engage in sleep medicine more broadly. Professor Grunstein explained:

... many sleep physicians lack the necessary training to engage in sleep medicine in its broad sense. For example, skills in pulmonary function testing, bronchoscopy, lung cancer or interstitial lung disease management have no relevance to sleep medicine whereas skills in basic neurology, psychiatry or obesity medicine would be far more important.⁴⁵

6.29 The RACP offers Advanced Training in Respiratory and Sleep Medicine to practitioners working towards qualifying as a Fellow of the RACP. The RACP agreed that ‘improved training pathways ... with a better focus on non-respiratory sleep disorders’ is needed.⁴⁶ The MSDC stated that the RACP’s curriculum had become broader in recent years:

With respect to the sleep curriculum for the advanced trainees in respiratory and sleep medicine—those doctors finishing off their training as consultant

⁴² ACT Government, *Submission 126*, p. 3.

⁴³ Professor Ronald Grunstein, WIMR, *Official Committee Hansard*, Canberra, 11 February 2019, p. 15.

⁴⁴ Professor Ronald Grunstein, WIMR, *Official Committee Hansard*, Canberra, 11 February 2019, p. 2.

⁴⁵ Professor Ron Grunstein, *Submission 112*, p. 10.

⁴⁶ Associate Professor Garun Hamilton, RACP, *Official Committee Hansard*, Canberra, 11 February 2019, p. 3.

physicians—the curriculum has changed in recent years to re-emphasise the fact that there [is more to] sleep medicine than just sleep apnoea. It really reflects how our practice has evolved, which is to manage all of the sleep disorders.⁴⁷

- 6.30 Dr Sadasivam Singh stated that the available training places for sleep medicine are limited in comparison to the USA and Canada. Dr Singh added that there is a particular shortage for paediatric sleep medicine places as there are ‘very few paediatric-training centres.’⁴⁸
- 6.31 In the case of adult sleep medicine, the Thoracic Society of Australia and New Zealand (TSANZ) stated that the Royal Adelaide Hospital will no longer be accredited by the RACP to provide respiratory and sleep medicine training due to the loss of the Royal Adelaide Hospital’s sleep laboratory.⁴⁹
- 6.32 The WIMR stated it is attempting to develop a multidisciplinary sleep training structure but that this is ‘difficult to achieve’ as all the funded ‘positions are largely based in hospitals.’⁵⁰ The RACP stated that ‘what happens on the ground within hospital environments’⁵¹ is not conducive for funding outpatient sleep physician positions:
- ... the training largely takes place within public hospitals, which deal with a lot of inpatient work—and sleep being a predominantly outpatient specialty—it has a lot of trouble getting access to resources. So the funding for sleep specific positions is difficult.⁵²
- 6.33 The MSDC stated that it sought to train new practitioners to cope with the ‘the avalanche of demand in this area.’⁵³ The MSDC elaborated that it trains registrars (specialist trainees) in sleep medicine through the Department of Health’s Specialist Training Program. This program ‘funds advanced

⁴⁷ Dr John Swieca, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 39.

⁴⁸ Dr Sadasivam Singh, *Submission 31*, p. 4.

⁴⁹ Professor Bruce Thompson, Director/President-Elect, The Thoracic Society of Australia and New Zealand (TSANZ), *Official Committee Hansard*, Melbourne, 6 February 2019, p. 46.

⁵⁰ Professor Ronald Grunstein, WIMR, *Official Committee Hansard*, Canberra, 11 February 2019, p. 13.

⁵¹ Associate Professor Garun Hamilton, RACP, *Official Committee Hansard*, Canberra, 11 February 2019, p. 13.

⁵² Associate Professor Garun Hamilton, RACP, *Official Committee Hansard*, Canberra, 11 February 2019, p. 13.

⁵³ Dr John Swieca, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 39.

training in private settings’ and provides trainees with experience not available in wholly hospital-based programs. The MSDC stated:

We've formed a joint training network so that we provide the type of training that's not usually available in the public setting, so non-respiratory types of sleep problem like narcolepsy, restless legs, insomnia—the sort of stuff that's not inpatient, government hospital type of work. In the other four-tenths of the week, they're at the state government hospital being exposed to that side of it. We're now in our 11th year of funding. The trainees are really regarded highly.⁵⁴

Sleep Scientists and Technologists

- 6.34 Sleep scientists and technologists are allied health professionals ‘who prepare and record people overnight while they're having their sleep studies.’ In addition to analysing sleep study recordings, sleep scientists and technologists also set up Continuous Positive Airway Pressure (CPAP) devices for patients, and conduct research studies.⁵⁵
- 6.35 The ACT Government stated that the Canberra Hospital provides training to ‘science graduates to become sleep scientists.’ This training ‘aims to ensure that all aspects of sleep polysomnography training are covered.’ Experienced sleep scientists may also seek accreditation with the USA-based Board of Registered Polysomnographic Technologists.⁵⁶

Sleep Health in University Education

- 6.36 The time devoted to sleep health in university medical curricula was viewed to be insufficient.⁵⁷ Ms Hailey Meaklim and colleagues provided research from 2011 which stated an average of 369 minutes (approximately six hours) and median of 300 minutes (five hours) of sleep education was offered in

⁵⁴ Dr David Cunnington, MSDC, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 42.

⁵⁵ Dr Kerri Melehan, President, Australasian Sleep Technologists Association, *Official Committee Hansard*, Sydney, 5 February 2019, p. 6.

⁵⁶ ACT Government, *Submission 126*, p. 3; Board of Polysomnographic Technologists, ‘Who We Are’, <https://www.brpt.org/about/who-we-are/>, accessed 6th March 2019.

⁵⁷ Ms Hailey Meaklim, Dr Melinda Jackson, Associate Professor Bandana Saini, Dr Karen Falloon, Associate Professor Delwyn Bartlett, Mr James Slater, Dr Imogen Rehm, Dr Moira Junge, and Associate Professor Lisa Meltzer (Ms Hailey Meaklim and colleagues), *Submission 21*, p. 1.

medical programs in Australia.⁵⁸ Globally, this research found that an average of approximately two hours was spent on adult sleep education.⁵⁹

- 6.37 The ASA stated that the UWA included one week of sleep training in its medical degree, and suspected that this was ‘probably the most anywhere in Australia.’⁶⁰ The Monash Children’s Hospital stated that there were two hours of training spent at its university.⁶¹
- 6.38 The ASA further stated that changing the university curriculum is difficult, as curriculum is a matter for individual universities.⁶² Similarly for psychology education, the UWA School of Psychological Science stated that it is ‘up to individual schools of psychology to what extent sleep is addressed within the curriculum.’⁶³

Education and Training for the Broader Healthcare Profession

Awareness of Sleep Health Among General Practitioners

- 6.39 The UWA Centre for Sleep Science and the Monash Children’s Hospital stated that General Practitioners (GPs) have an important role as the ‘gatekeepers’ of healthcare,⁶⁴ however opportunities for sleep education are limited. Ms Meaklim and colleagues stated that ‘for those graduates who subsequently choose to enter the General Practice training program, there is no further formal teaching relating to sleep and sleep disorders in Australia or New Zealand.’⁶⁵ Austin Health stated that as a result, it is ‘up to

⁵⁸ Ms Hailey Meaklim and colleagues, *Submission 21*, p. 3.

⁵⁹ J Mindell, A Bartle, N A Wahab, ‘Sleep education in medical school curriculum’, *Sleep Medicine*, vol. 12, no. 9, October 2011, p. 929.

⁶⁰ Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 14.

⁶¹ Dr David Armstrong, Respiratory and Sleep Paediatrician, Monash Children’s Hospital, Monash Health; Department of Paediatrics, Monash University, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 33.

⁶² Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 14.

⁶³ UWA School of Psychological Science, *Submission 25*, p. 3.

⁶⁴ Professor Peter Eastwood, Director, Centre for Sleep Science, UWA, Director, Western Australia Pregnancy Cohort (Raine) Study, The Raine Study, *Official Committee Hansard*, Perth, 29 January 2019, pp 6-7; Dr David Armstrong, Monash Children’s Hospital, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 30.

⁶⁵ Ms Hailey Meaklim and colleagues, *Submission 21*, pp 1-2.

individuals in primary care to say, “I’ve got an interest” and seek out specific education if they want to do that.’⁶⁶

6.40 The AISH stated that the new Medicare Benefits Schedule items, introduced in November 2018, require GPs to ‘have a better understanding of [Obstructive Sleep Apnoea (OSA)] diagnosis, sleep study interpretation and treatment options.’⁶⁷ The TSANZ recognised the pressure on GPs, and stated that ‘GPs have to be an expert at everything’ and that sleep disorders are ‘just another disease that’s going to be thrust on top of them.’⁶⁸

6.41 The role of the Royal Australian College of General Practitioners (RACGP) in GP education was recognised as important. The Queensland Government stated that ‘the RACGP has online resources, including a list of evidence-based non-pharmaceutical treatments and articles, addressing sleep disorders.’⁶⁹

6.42 The RACGP’s *Prescribing Drugs of Dependence in General Practice* guidelines state:

- short-term use of benzodiazepines as hypnotic agents should only be one aspect of general management [of episodic insomnia].⁷⁰
- first-line therapy for chronic insomnia should be non-drug interventions.⁷¹

6.43 Reconnexion stated that ‘despite [the RACGP] guidelines ... benzodiazepines are inappropriately prescribed and dispensed.’⁷²

6.44 Reconnexion further stated that GPs need to be educated on how to manage benzodiazepine prescriptions:

... not just is it simply education for doctors about [benzodiazepines] and their effects but it's also education about how to think about managing the

⁶⁶ Associate Professor Mark Howard, Director, Victorian Respiratory Support Service, Austin Health, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 21.

⁶⁷ AISH, *Submission 100*, pp 4-5.

⁶⁸ Professor Bruce Thompson, TSANZ, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 45.

⁶⁹ Queensland Government, *Submission 115*, p. 9.

⁷⁰ Royal Australasian College of General Practitioners, ‘2.2.2.2 Acute insomnia’, *Prescribing drugs of dependence in general practice, Part B – Benzodiazepines*, 2015, p. 25.

⁷¹ Royal Australasian College of General Practitioners, ‘2.2.2.3 Chronic insomnia’, *Prescribing drugs of dependence in general practice, Part B – Benzodiazepines*, 2015, p. 26.

⁷² Reconnexion, *Submission 43*, p. 1.

prescription and to make sure they have an exit plan right at the beginning. They've actually got to have a plan to stop prescribing after two to four weeks.⁷³

- 6.45 The ASA recommended that a formal assessment of the current knowledge levels of GPs in relation to sleep health be undertaken. The ASA further stated that sleep education should be included in the training course and examination for qualification as a Fellow of the RACGP.⁷⁴
- 6.46 As an example of structured training, Sleep GP provides 'RACGP accredited' training for GPs. This training produces 'GPs with a special interest in sleep' that are capable of managing routine sleep disorders in the primary care setting.⁷⁵
- 6.47 Digital tools were suggested as a potential mechanism for providing GP training. The ASA and the RACGP have produced an online sleep disorders training module for GPs.⁷⁶ The Monash Children's Hospital disseminated information through an online platform, HealthPathways, to 'improve the education of GPs around the diagnosis and management of [OSA].'⁷⁷
- 6.48 The Sleep Management Group similarly suggested digital tools as a solution, and stated that software used by GPs 'is starting to move closer to' flagging patients to be at risk of a sleep disorder 'based on their [body mass index].'⁷⁸ The AISH stated that they are investigating decision support systems for GPs that incorporate the:

... standard questionnaires and tools that ... screen an individual for the particular sleep problem or sleep disorder they might have and recommend a personalised therapy that they can pursue to deal with that particular problem.⁷⁹

⁷³ Ms Janet Shaw, Reconnexion, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 13.

⁷⁴ ASA, *Submission 118*, pp 4-5.

⁷⁵ Sleep GP, *Submission 41*, p. 2.

⁷⁶ ASA, *Submission 118*, p. 5.

⁷⁷ Dr David Armstrong, Monash Children's Hospital, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 30.

⁷⁸ Mr Robert Leslie, Founder and Director, Sleep Management Group, *Official Committee Hansard*, Sydney, 5 February 2019, p. 13.

⁷⁹ Dr Andrew Vakulin, NHMRC Career Development Fellow, AISH, Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 35.

Awareness of Sleep Health Among Psychologists

- 6.49 Psychologists deliver the recommended first-line treatment of insomnia, Cognitive Behavioural Therapy for insomnia (CBT-I). The AISH stated ‘we need to train more people and make them more available’ to meet demand for CBT-I.⁸⁰ The AISH also suggested that there would never be ‘enough trained psychologists available to manage entirely the behavioural side of the therapy’ and that for this reason patients should be provided with tools they can use at home before being referred to a psychologist.⁸¹
- 6.50 Sleep Matters stated that delivery of CBT-I requires specific sleep training due to the important distinctions from other types of CBT:
- ... anybody who's done a postgraduate master's degree in clinical psychology will be really well versed in CBT. What they're not well versed in is behavioural sleep medicine. ... There are lots of similarities with CBT for depression or an anxiety disorder, but ... in the case of insomnia, things like the regulation of sleep, so having that sleep-science background, are actually really important for getting the treatment to be effective.⁸²
- 6.51 The Australian Psychological Society provides a Practice Certificate in Sleep Psychology, which is a four module program designed to train psychologists in assessing and managing sleep disorders, such as insomnia.⁸³ Emeritus Professor Dorothy Bruck and Dr Moira Junge stated that only 121 psychologists in Australia have completed the full certificate, with a further 800 psychologists completing only the introductory module.⁸⁴ Professor Bruck and Dr Junge added that the certificate should be made more rigorous:
- [The certificate] is offered purely online and has a simple open-book multiple choice test as its only assessment. There is scope to improve the rigour of this training and also the uptake of enrolments.⁸⁵

⁸⁰ Professor Danny Eckert, AISH, *Official Committee Hansard*, Sydney, 5 February 2019, p. 34.

⁸¹ Professor Doug McEvoy, Professor of Sleep Medicine and Director, AISH, Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 34.

⁸² Dr Melissa Ree, Director, Sleep Matters, *Official Committee Hansard*, Perth, 29 January 2019, p. 9.

⁸³ Ms Hailey Meaklim and colleagues, *Submission 21*, p. 2.

⁸⁴ Emeritus Professor Dorothy Bruck and Dr Moira Junge, *Submission 8*, p. 6.

⁸⁵ Emeritus Professor Dorothy Bruck and Dr Moira Junge, *Submission 8*, p. 6.

Awareness of Sleep Health Among Nurses

6.52 Ms Meaklim and colleagues stated that nurses are aware of the importance of sleep, but are constrained by limited knowledge about sleep interventions:

... intensive care unit nurses display an overall awareness of the importance of sleep and are interested in helping to promote sleep in their patients. However, a lack of knowledge, as well as the pressures of caring for critically ill patients, may limit these nurses' ability to deliver evidence-based sleep-promoting interventions.⁸⁶

6.53 The SHF stated that the United Kingdom has been successful in training 'nurses to deliver treatments for insomnia.'⁸⁷ Professor Grunstein stated that a CBT-I program based in Tamworth delivered by nurses in GP practices had positive outcomes, and highlighted that the 'training of rural practice nurses would be an important strategy for insomnia management in rural areas.'⁸⁸ Further, Ms Meaklim and colleagues stated that while digitally delivered CBT-I is useful, nurses can 'play an effective and integral role' when delivering interventions to older populations where 'there is a need for more face to face treatment.'⁸⁹

6.54 The Queensland Nurses and Midwives Union stated that the education that nurses and midwives 'receive on sleep should include how they handle their own sleep health and how to cope with working shift work.'⁹⁰

Awareness of Sleep Health Among Dentists

6.55 Dentists are involved in the management of OSA through the provision of Mandibular Advancement Splints (MAS). Absolute Sleep stated 'the problem is that within dentistry [the provision of MAS] is considered in the normal scope of practice, which is unfortunate because' dentists providing MAS do not just treat a dental condition, they treat a medical condition.⁹¹ As

⁸⁶ Ms Hailey Meaklim and colleagues, *Submission 21*, p. 3.

⁸⁷ Emeritus Professor Dorothy Bruck, Chair, SHF, *Official Committee Hansard*, Canberra, 11 February 2019, p. 15.

⁸⁸ Professor Ron Grunstein, *Submission 112*, p. 7.

⁸⁹ Ms Hailey Meaklim and colleagues, *Submission 21*, p. 3.

⁹⁰ Queensland Nurses and Midwives Union, *Submission 49*, p. 4.

⁹¹ Dr Christopher Pantin, Principal Dentist, Absolute Sleep, *Official Committee Hansard*, Perth, 29 January 2019, p. 13.

such, Absolute Sleep stated that appropriate sleep medicine training is required. Absolute Sleep stated:

... We're talking upper airway mechanics and we're manipulating them. You have to know what you're treating. You have to know what sleep apnoea is. You have to be able to read a sleep report or a sleep study, et cetera, which is more science and medicine.⁹²

- 6.56 The Australian Dental Association (ADA) stated that any dentist will have the 'pathophysiology training' and 'prosthodontics expertise to manipulate the device,' however, specialised expertise would be developed over time.⁹³ Further, the ADA stated the level of dentist involvement will vary depending on whether a sleep physician knowledgeable about MAS is also involved in the patients care:

It depends on which level a dentist wants to get involved. ... If the patient is managed very well by a sleep physician who is knowledgeable with the whole scheme of these devices then that is going to be a different take [than] when taking on the whole case without such an informed sleep physician involved.⁹⁴

- 6.57 The principal dentist of Absolute Sleep, Dr Christopher Pantin, was involved in the development of the Graduate Diploma in Dental Sleep Medicine at the University of Western Australia. Dr Pantin stated that the Graduate Diploma 'was the first of its kind in the world and has over 24 graduates.'⁹⁵

- 6.58 The Dental Sleep Medicine Council of the ASA stated that while this is the benchmark program, 'this program has a limited capacity of places and the fees can be prohibitive.'⁹⁶ Further, Dr Pantin stated that due to the difficulty of the Graduate Diploma, 'a more palatable version that will still tick all the boxes for qualified dentists' is needed.⁹⁷

⁹² Dr Christopher Pantin, Absolute Sleep, *Official Committee Hansard*, Perth, 29 January 2019, p. 13.

⁹³ Mrs Eithne Irving, Deputy Chief Executive Officer, Australian Dental Association (ADA), *Official Committee Hansard*, Melbourne, 6 February 2019, p. 2.

⁹⁴ Dr Andrew Gikas, Member, ADA, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 2.

⁹⁵ Dr Christopher Pantin, Absolute Sleep, *Official Committee Hansard*, Perth, 29 January 2019, p. 12.

⁹⁶ Dental Sleep Medicine Council of the ASA, *Submission 48*, p. 2.

⁹⁷ Dr Christopher Pantin, Absolute Sleep, *Official Committee Hansard*, Perth, 29 January 2019, p. 14.

Awareness of Sleep Health Among Pharmacists

- 6.59 Ms Meaklim and colleagues stated that limited training for pharmacists in sleep health results in ‘a missed opportunity for early interventions that can be provided to the Australian public seeking help for their sleep issues and presenting at pharmacies for treatments and help.’⁹⁸
- 6.60 The Pharmaceutical Society of Australia (PSA) in collaboration with the ASA developed a ‘blended training program for sleep apnoea services, combining online modules and a practical workshop’ for pharmacists.⁹⁹ The PSA stated that pharmacists are providing services for OSA:

... as people have come into pharmacies, there's an unmet need where either people have not been aware that they're snoring or other complaints are a signal of a health concern. So the pharmacy service will screen these people and either facilitate their management by referring them to a medical person for a proper medical assessment or put them through a structured model of care that is supported by practice guidance and supported by standards and expertise to provide support through CPAP machines to assist the management of their sleep apnoea.¹⁰⁰

Research, Investment and Data Collection on Sleep Health and Sleep Disorders

- 6.61 Inquiry participants described the successes achieved by the Australian sleep research community, including the invention of CPAP devices to treat OSA by Professor Collin Sullivan.¹⁰¹ The NeuRA stated the success was due to the collaborative nature of the Australian sleep community:

We are collegial, we work with multidisciplinary field teams across the country to solve these big problems and that is why we are on the world stage at the forefront, leading the biggest trials in the world.¹⁰²

⁹⁸ Ms Hailey Meaklim and colleagues, *Submission 21*, pp 2-3.

⁹⁹ Pharmaceutical Society of Australia, *Submission 81*, p. 3.

¹⁰⁰ Mr Robert Buckham, Manager, Strategic Policy, Pharmaceutical Society of Australia, *Official Committee Hansard*, Canberra, 11 February 2019, p. 4.

¹⁰¹ Dr Peter Cistulli, Professor of Sleep Medicine, Charles Perkins Centre, University of Sydney, and Department of Respiratory and Sleep Medicine, Royal North Shore Hospital, *Official Committee Hansard*, Sydney, 5 February 2019, p. 17.

¹⁰² Professor Danny Eckert, NeuRA, *Official Committee Hansard*, Sydney, 5 February 2019, p. 25.

- 6.62 The Cooperative Research Centre for Alertness, Safety, and Productivity stated that there has been a 'push recently to improve the capacity of researchers to commercialise and innovate.'¹⁰³ Professor Grunstein stated that 'Australia has a relatively large medical device sector in sleep health', including 'ResMed, Compumedics, Somnomed, Oventus.'¹⁰⁴
- 6.63 Opportunities for translating research into policy or clinical application were thought to exist. The Monash Children's Hospital stated that 'there's a lot of evidence out there that just sits there because there's no mechanism or money to implement it so that it makes a difference.'¹⁰⁵
- 6.64 The Public Health Association of Australia stated 'it is currently unknown what types of community-based interventions can improve the sleep of the community, and funding to support the evaluation of such public health programs is required.'¹⁰⁶ Considering the workplace, 'collaborative industry-driven research' into shift working environments was also recommended. Associate Professor Jillian Dorrian, Dr Stephanie Centofanti, Dr Amy Reynolds and Professor Kurt Lushington stated that this research and resulting solutions should consider roster design and other workplace considerations to limit fatigue.¹⁰⁷
- 6.65 Australian sleep research, however, was described as heavily concentrated on investigating OSA.¹⁰⁸ The USyd-BMC stated, however, that there are a 'hundred sleep disorders, many of which have never really been studied at all.'¹⁰⁹

¹⁰³ Mr Anthony Williams, Chief Executive Officer, Cooperative Research Centre for Alertness, Safety, and Productivity, Canberra, *Official Committee Hansard*, Canberra, 11 February 2019, p. 19.

¹⁰⁴ Professor Ron Grunstein, *Submission 112*, p. 12.

¹⁰⁵ Dr David Armstrong, Monash Children's Hospital, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 36.

¹⁰⁶ Public Health Association of Australia, *Submission 64*, p. 6.

¹⁰⁷ Associate Professor Jillian Dorrian, Dr Stephanie Centofanti, Dr Amy Reynolds and Professor Kurt Lushington, *Submission 85*, pp 1-2.

¹⁰⁸ Professor Ron Grunstein, *Submission 112*, p. 12.

¹⁰⁹ Dr Nathaniel Marshall, Brain and Mind Centre, University of Sydney, *Official Committee Hansard*, Sydney, 5 February 2019, p. 17.

6.66 Mr Aaron Schokman stated that he had difficulty in finding PhD opportunities in Sydney to study sleep disorders other than OSA.¹¹⁰ The WIMR added that:

Narcolepsy and the probably much more prevalent hypersomnia are an area where we have real weakness in research. That's an effect of both training—having the scientists and clinicians who can work in the area—as well as obviously the funding that would follow if you had people doing quality work in that area.¹¹¹

6.67 Table 6.1 provides a breakdown of NHMRC research funding for specific sleep conditions.

Table 6.1 NHMRC supported research for specific sleep conditions 2000 to 2018

Sleep Conditions	Expenditure 2000 to 2018 (\$)	Per cent of Total Sleep Research
Sleep apnoea	74 412 821	54
Insomnia	14 688 457	11
Sudden Infant Death Syndrome	8 303 428	6
Narcolepsy	1 121 282	1
Sleep research not attributed to the conditions above	39 137 292	28
Total	137 663 280	100

Source: Department of Health, Submission 131, p. [6].

6.68 Professor Grunstein stated that there is limited basic science research looking at sleep in Australia.¹¹² Professor Grunstein stated that this has flow-on consequences to university and high school education:

¹¹⁰ Mr Aaron Schokman, *Submission 108*, p. 3.

¹¹¹ Professor Ronald Grunstein, WIMR, *Official Committee Hansard*, Canberra, 11 February 2019, p. 18.

¹¹² Professor Ron Grunstein, *Submission 112*, p. 12.

Without such scientists, the opportunity for developing new biomarker tests or pharmacotherapy is limited. This also results in lack of teaching on sleep health and sleep biology in science faculties. In turn, this reduces the number of people progressing to sleep research and also there is less background on sleep for science teachers in high schools.¹¹³

6.69 The WIMR stated that the sleep field has an ageing workforce, which creates a lot of problems in succession planning for clinical research.¹¹⁴ Professor Grunstein stated that ‘many young specialists who have PhDs and have had research experience are often discouraged from working actively in research as this is seen as lower value than clinics or ward work.’¹¹⁵

Research Funding

6.70 The NHMRC is a major funding source for sleep researchers. The Department of Health stated that \$137.7 million has been provided for research into sleep or sleep disorders between 2000 and 2018 through the NHMRC.¹¹⁶

6.71 Table 6.2 provides a breakdown of NHMRC funding for sleep research by broad research area.

Table 6.2 NHMRC supported research relating to sleep or sleep disorders 2000 to 2018

Broad Research Area	Expenditure 2000 to 2018 (\$)	Per cent of Total	Number of Grants
Clinical Medicine and Science	97 075 614	71	222
Basic Science	27 135 151	20	61
Public Health	11 203 124	8	29
Health Services Research	2 249 391	2	6

¹¹³ Professor Ron Grunstein, *Submission 112*, p. 13.

¹¹⁴ Professor Ronald Grunstein, WIMR, *Official Committee Hansard*, Canberra, 11 February 2019, p. 20.

¹¹⁵ Professor Ron Grunstein, *Submission 112*, p. 13.

¹¹⁶ Department of Health, *Submission 131*, p. [6].

Total	137 663 280	100	318
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Source: Department of Health, Submission 131, p. [6].

- 6.72 The NHMRC Centres of Research Excellence (CRE) program has also provided funding to establish CREs for five year periods, including: the Centre for Integrated Research and Understanding of Sleep, NeuroSleep, the CRE to Optimise Sleep in Brain Ageing and Neurodegeneration, and National Centre for Sleep Health Services Research.¹¹⁷
- 6.73 The NeuRA stated there has been a decline in research funding over the last five years.¹¹⁸ Professor Grunstein agreed there appears ‘to be a decline in NHMRC and [Australian Research Council] funding in sleep health.’ Professor Grunstein stated that sleep is not recorded in the categories used to classify research funding and so ‘it is difficult to have an accurate understanding’ of the amount of funding for sleep health research.¹¹⁹
- 6.74 Similarly, the TSANZ stated that:
- NHMRC data shows that in 2017 respiratory and sleep medicine combined received only five per cent of NHMRC funding, with one-third of that going to asthma and the remainder going to research for all other respiratory and sleep disorders. Importantly, sleep funding data alone is minimal and not reported.¹²⁰
- 6.75 Professor Robert Adams, Professor Gary Wittert and Dr Sarah Appleton stated that ‘sleep research is underfunded relative to the prevalence and scope of sleep problems and its importance to health in general.’¹²¹ Associate Professor Darren Mansfield stated that sleep medicine ‘shares a [NHMRC] funding panel with respiratory medicine and pharmacology. It is the smallest of these three fields in terms of research grant applications and hence only a small number of research ideas are funded, regardless of overall quality.’¹²²

¹¹⁷ Department of Health, *Submission 131*, pp 8-10.

¹¹⁸ NeuRA, *Submission 101*, p. 2.

¹¹⁹ Professor Ron Grunstein, *Submission 112*, p. 12.

¹²⁰ Dr Denise O’Driscoll, Board Director, TSANZ, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 44.

¹²¹ Professor Robert Adams, Professor Gary Wittert and Dr Sarah Appleton, *Submission 78*, p. 12.

¹²² Associate Professor Darren Mansfield, *Submission 50*, p. 6.

- 6.76 The ASA stated that the collaborative nature of the sleep research community results in expert sleep reviewers having conflicts of interest with other researchers, requiring the reviewers to absent themselves from many of the NHMRC peer assessment processes.¹²³ The ASA stated that while the NHMRC 'has really transparent and exceptional processes, [it] works against a smaller field like sleep.'¹²⁴
- 6.77 The Australian Epidemiological Association (AEA) stated that sleep researchers have yet to convince the wider medical research community that sleep is an important area of research:
- It is just a very competitive funding environment. I think part of our job, really, as sleep researchers who deal in epidemiology, is to try and convince other people who assess our [grants] as worth funding. Part of it is on us to try and convince the research community in general that sleep is important, but we haven't quite got there yet. I think, as others have mentioned, we're still trying to convince our colleagues that sleep is important for health conditions and not just for sleep conditions.¹²⁵
- 6.78 The ASA called for investment into sleep research, and stated an interest in funding via the Medical Research Future Fund.¹²⁶ The TSANZ stated that 'we don't really want to take money [for sleep research] from the other respiratory disorders. We need separate or more funding across the board for sleep in general.'¹²⁷
- 6.79 The NeuRA and the ASA stated that \$200 million over the next five to 10 years should be allocated to the following research priorities:
- Sleep-specific research fellowships;
 - Targeted therapies for sleep disorders;
 - Understudied and underrepresented populations;
 - Translation research studies into combination therapies;
 - New cross-disciplinary approaches to clinical care and health care delivery models for sleep problems;

¹²³ Dr Maree Barnes, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 18.

¹²⁴ Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 19.

¹²⁵ Dr Yu Sun Bin, Australasian Epidemiological Association (AEA), *Official Committee Hansard*, Sydney, 5 February 2019, p. 30.

¹²⁶ Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 19.

¹²⁷ Dr Denise O'Driscoll, TSANZ, *Official Committee Hansard*, Melbourne, 6 February 2019, p. 46.

- Cross-disciplinary research to understand bidirectional links between inadequate sleep and sleep disorders, and other medical conditions; and
- Sleep awareness programs for children, and health care professionals.¹²⁸

Data Collection

- 6.80 Inquiry participants stated that existing data about sleep collected from large-scale cohort and longitudinal studies could be better capitalised upon.¹²⁹
- 6.81 The Charles Perkins Centre stated that ‘extensive time and expertise is required to undertake the analysis of such data, but there is limited funding support to carry out such studies.’¹³⁰ Current longitudinal studies that asked questions about sleep included:
- Longitudinal Study of Indigenous Children (LSIC);
 - Australian Longitudinal Study on Women’s Health;
 - Australian Longitudinal Study on Male Health;
 - Australian Breakthrough Cancer Study;
 - Household Income and Labour Dynamics in Australia Survey;
 - 45 and Up Study (NSW);
 - West Australian Sleep Health Study;
 - Sydney Sleep Biobank;
 - West Australian Pregnancy Cohort (Raine) Study; and
 - Busselton Health Study.¹³¹
- 6.82 The ASA stated they would like to see questions about sleep ‘asked more in some of the administrative datasets coming out from the Department of Health.’¹³² Similarly, the AEA recommended that existing labour and social surveys that collect data on shift work should ‘monitor sleep behaviours and practices to provide national and occupation-specific information on current

¹²⁸ ASA, *Exhibit 14: Description of Targeted Research Areas, January 2019*, p. 1; NeuRA, *Submission 101*, p. 4.

¹²⁹ Charles Perkins Centre, *Submission 46*, p. 6; Australasian Epidemiological Association, *Submission 15*, pp 2-3.

¹³⁰ Charles Perkins Centre, *Submission 46*, p. 6.

¹³¹ Charles Perkins Centre, *Submission 46*, p. 6; Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 19.

¹³² Professor Peter Eastwood, ASA, *Official Committee Hansard*, Canberra, 11 February 2019, p. 19.

practice.’¹³³ Collecting data on workers who cope well with shift work was another recommended focus area.¹³⁴

- 6.83 Australia was described as a challenging environment for successful epidemiological studies. The USyd-BMC stated Australia’s ‘unusual urban geography’ creates challenges in obtaining national population estimates. The USyd-BMC added that ‘we don’t have enough people trained in public health’ to undertake this research.¹³⁵
- 6.84 Professor Sarah Blunden, Dr Yaqoot Fatima, Dr Stephanie Yiallourou, and Associate Professor Chris Magee called for ‘high standard epidemiological studies to gather data on sleep health on Indigenous people.’ Professor Blunden and colleagues added ‘continued access to longitudinal studies such as LSIC can include a more precise focus on sleep health to inform our understanding of childhood sleep in Indigenous children but a broader understanding is needed.’¹³⁶
- 6.85 Datasets are also used to understand medication and prescribing trends by GPs. The USyd-BMC stated that the Bettering the Evaluation and Care of Health study was a ‘rolling cross-sectional study of GPs’ used to understand GP behaviour, however ‘it was defunded a few years ago.’¹³⁷ The AISH stated that they are conducting ‘another population survey to assess what the 2018 situation is like.’¹³⁸ In addition, the Pharmaceutical Benefits Schedule (PBS) dataset can be used to understand what medication is being used in Australia, and the AEA stated from 2012 onwards the data should be ‘relatively complete’ because it ‘covers all medications.’¹³⁹

¹³³ AEA, *Submission 15*, p. 3.

¹³⁴ Associate Professor Jillian Dorrian, Dr Stephanie Centofanti, Dr Amy Reynolds and Professor Kurt Lushington, *Submission 85*, pp 1-2.

¹³⁵ Dr Nathaniel Marshall, Brain and Mind Centre, University of Sydney, *Official Committee Hansard*, Sydney, 5 February 2019, p. 21.

¹³⁶ Professor Sarah Blunden, Dr Yaqoot Fatima, Dr Stephanie Yiallourou, and Associate Professor Chris Magee, *Submission 22*, p. 10.

¹³⁷ Dr Nathaniel Marshall, Brain and Mind Centre, University of Sydney, *Official Committee Hansard*, Sydney, 5 February 2019, p. 20.

¹³⁸ Professor Robert Adams, Professor of Sleep Medicine, AISH, Flinders University, *Official Committee Hansard*, Sydney, 5 February 2019, p. 34.

¹³⁹ Professor Julie Byles, Member, AEA, *Official Committee Hansard*, Sydney, 5 February 2019, p. 29.

6.86 Commenting on the impact of prescribing sleep medication, NeuRA drew attention to the limitations of some sleep health data. The NeuRA stated that most of the data consisted of ‘associations’ and was not obtained from ‘randomised control trials.’¹⁴⁰ The NeuRA explained, as an example, that it does not know the answer to whether ‘sleeping pills cause harm versus benefit in certain groups’:

... people in general who are taking more sleeping pills have more risk of falls, and falls are a huge issue in the medical system in the elderly. So there are groups that you need to be very careful with and monitor what is used. These are associations. They probably have other medical ailments going on as well. They try to control for that as best they can but is there gold-quality evidence on whether sleeping pills cause harm versus benefit in certain groups? We don't know.¹⁴¹

6.87 Professor Grunstein recommended that a ‘Sleep Health Monitoring Centre similar [to] the Asthma Monitoring Centre’ be established. Professor Grunstein stated that funding should ‘be provided for an initial 5 year period to provide data cross-sectional and longitudinal data on sleep health and sleep disorders in Australia.’¹⁴²

Concluding Comment

6.88 Sleep is a crucial element in the maintenance of health and wellbeing. Despite this, sleep receives far less attention than nutrition and exercise in current healthcare and policy settings. The Committee is concerned that the Department of Health does not have any policy or community awareness programs on sleep health.

6.89 Four in every ten people in Australia are regularly not getting enough *quality* sleep. Many of these people may not be prioritising sleep as highly as other activities in their lives and this could be because they are unaware of the health risks associated with inadequate sleep. The Committee agrees with many of the organisations who contributed to the Inquiry that there is a need for a government-led awareness campaign focussed on the risks of inadequate sleep with the communication and education of practical steps individuals can take to improve their sleep hygiene.

¹⁴⁰ Professor Danny Eckert, NeuRA, *Official Committee Hansard*, Sydney, 5 February 2019, p. 27.

¹⁴¹ Professor Danny Eckert, NeuRA, *Official Committee Hansard*, Sydney, 5 February 2019, p. 27.

¹⁴² Professor Ron Grunstein, *Submission 112*, p. 3.

- 6.90 The Committee heard that medical students receive very limited education in relation to sleep. Elevating the status of sleep health and hygiene within medical degrees would improve the awareness of sleep health among new medical students.
- 6.91 There is also a need for primary care practitioners, in particular general practitioners (GPs) to take on an expanded role in the diagnosis, treatment and management of sleep health. This requires the development and delivery of additional training material targeted at increasing the knowledge of sleep health issues among GPs, nurses, and psychologists. Enabling primary healthcare practitioners to deliver sleep health services would assist in relieving the burden of lengthy wait times and help address issues around access to sleep medicine in regional and rural Australia.
- 6.92 The Committee is concerned that the integration of sleep medicine with respiratory medicine may be hindering the operation and development of the sleep health field in Australia. Whilst Obstructive Sleep Apnoea is a highly prevalent breathing-related condition, sleep practitioners also encounter a number of other linked non-respiratory health conditions. At both the clinical and research level, a broader understanding of sleep-related conditions could result in new approaches to diagnosis, management and treatment that may improve care for patients.
- 6.93 Since the development of the Continuous Positive Airway Pressure technology by Professor Colin Sullivan, Australia has been a leader in the field of sleep health research and innovation. The Committee is pleased to hear that the Australian sleep research community continues to promote collaboration between organisations and across disciplines.
- 6.94 Given the significance of sleep to health and wellbeing, and the innovative companies that have emerged from the Australian sleep health research sector there is value in ensuring that the sector is appropriately funded.

Recommendation 8

- 6.95 The Committee recommends that the Australian Government, in partnership with the states, territories and key stakeholder groups, work to develop and implement a national sleep health awareness campaign. The campaign should:**
- **Promote sleep as the foundation of ensuring positive health and wellbeing outcomes in combination with nutrition and exercise;**

- Provide practical information in relation to sleep hygiene and measures an individual can use to improve their sleep;
- Provide information on the symptoms, causes, and health impacts of sleep disorders and available medical support for sleep disorders; and
- Communicate that improved sleep health can reduce the risk of: developing a serious health condition, impaired judgement and mental functioning, and decreased productivity and performance.
- Consider the proposed education campaign developed by the Australasian Sleep Association and the Sleep Health Foundation as part of their 2019 budget submission as a solid basis and estimate of costs for such a campaign.

Recommendation 9

6.96 The Committee recommends that the Australian Government in consultation with the Royal Australian College of General Practitioners and other key stakeholders:

- Assess the current knowledge levels of general practitioners, nurses and psychologists in relation to sleep health, and
- Develop effective training mechanisms to improve the knowledge of primary healthcare practitioners in diagnosing and managing sleep health problems.

Recommendation 10

6.97 The Committee recommends that the Australian Government investigate options to separate the existing 'Respiratory and Sleep Medicine' speciality into independent 'Respiratory' and 'Sleep Medicine' specialities under the Australian Health Practitioners Regulation Agency framework.

Recommendation 11

6.98 The Committee recommends that the Australian Government fund research focussed on:

- **The prevalence of sleep disorders with a particular focus on under-researched population groups such as women and Aboriginal and Torres Strait Islander peoples;**
- **The prevalence, causes, and mechanisms of rare or not well understood sleep disorders, including narcolepsy and idiopathic hypersomnia;**
- **Further analysis of existing population health and longitudinal studies that have collected data relating to sleep;**
- **The impact of long-term shift work on sleep health and potential measures to minimise the associated health risks; and**
- **The effects of digital devices and electronic media on sleep health, especially among children and adolescents.**

**Mr Trent Zimmerman MP
Chair**

1 April 2019

A. Submissions

- 1 Dr Subash Heraganahally
- 2 Sleep Disorders Australia & Hypersomnolence Australia
 - 2.1 Supplementary to submission 2
- 3 UWA Public Policy Institute
- 4 Professor David Hillman
- 5 *Confidential*
- 6 *Name Withheld*
- 7 Mr Allen Salter
- 8 Dr Moira Junge & Emeritus Professor Dorothy Bruck
- 9 Associate Professor Mark Howard & Associate Professor Clare Anderson
- 10 *Name Withheld*
- 11 *Name Withheld*
- 12 Victorian Government
- 13 Ms Sandra Kirby
- 14 *Name Withheld*
- 15 Australasian Epidemiological Association
 - 15.1 Supplementary to submission 15
- 16 Ms Janet Milford
- 17 Miss Laura Thompson
- 18 Dr Sutapa Mukherjee

-
- 19 Dr Gemma Paech
- 20 Adjusta Mattress Australia
- 21 Ms Hailey Meaklim
- 22 Professor Sarah Blunden
- 23 *Confidential*
- 24 Well Spoken
- 25 School of Psychological Science, University of Western Australia
- 26 Ms Monica Kurth
- 27 *Name Withheld*
- 28 *Name Withheld*
- 29 Ms Jennifer Adams
- 30 Dr Giselle Withers
- 31 Dr Sadasivam Suresh
- 32 Ms Jodie Donnelly
- 33 Turning Point
- 34 Ms Kerry Young
- 35 *Confidential*
- 36 Stop Smart Meters Australia Inc
- 37 *Name Withheld*
- 38 Absolute Sleep
- 39 *Name Withheld*
- 40 *Name Withheld*
- 41 SleepGP Pty Ltd
- 42 Mrs Pamela Bird
- 43 Reconnexion a service of EACH
- 44 *Confidential*
- 45 Royal Australian College of General Practitioners
- 46 Charles Perkins Centre, University of Sydney
- 47 SleepFit

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- 48 Dental Sleep Medicine Council Australasian Sleep Association
- 49 Queensland Nurses and Midwife's Union
- 50 Associate Professor Darren Mansfield
- 51 World Sleep Society
- 52 Mr John Malouf
- 53 *Name Withheld*
- 54 Sleep Health Foundation
- 55 Professor Karen Waters
- 56 *Name Withheld*
- 57 *Name Withheld*
- 58 Health Business Solutions
- 59 American Thoracic Society
- 60 Ms Noeline Bakels
- 61 Dr Don Maisch
- 62 National Mental Health Commission
- 63 Office of the National Rail Safety Regulator
- 64 Public Health Association of Australia
- 65 The Sleep Management Group
- 66 Mrs Christine Jelbart
- 67 *Name Withheld*
- 68 Wellbeing in Schools Australia
- 69 Professor Rosemary Horne
- 70 Australian Psychological Society
- 70.1 Supplementary to submission 70
- 71 West Australian Pregnancy Cohort (Raine) Study
- 72 Ms Sumaia Abass
- 73 Dr David Cunnington
- 74 Ms Catherine Buchan
- 75 FatigueSafety

-
- 76 Flinders University Sleep Psychology Research Group
- 77 The Thoracic Society of Australia and New Zealand
- 78 Professor Robert Adams, Professor Gary Wittert & Dr Sarah Appleton
- 79 Institute for Social Science Research
- 80 GenesisCare
- 81 Pharmaceutical Society of Australia
- 82 Ms Crystal Grant and Associate Professor Siobhan Banks
- 83 Associate Professor Siobhan Banks and Professor David Hillman
- 84 Austin Health and Institute for Breathing and Sleep
- 85 Associate Professor Jillian Dorrian
- 86 Ms Fiona Mobbs
- 87 Oventus Medical Ltd
- 88 Appleton Institute, CQUniversity Australia
- 89 *Confidential*
- 90 Mrs Melissa Jose
- 91 Australian Dental Association
- 92 Cooperative Research Centre for Alertness, Safety and Productivity
- 93 Mr James Field
- 94 Parenting Research Centre
- 95 Ms Eliza Wells
- 96 Ms Mikala Mihaljevic
- 97 Narcolepsy Australia
- 98 Australasian Sleep Technologists Association
- 99 *Name Withheld*
- 100 Adelaide Institute for Sleep Health
- 101 NeuRA
- 102 *Confidential*
- 103 Jeffery&Ree Psychology and Sleep Matters
- 104 *Confidential*

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- 105 Sleep and Brain Ageing Researchers, University of Sydney, Brain and Mind Centre
- 106 Australian Industrial Wind Turbine Awareness Network
- 107 Mr Graham Revill
- 108 Mr Aaron Schokman
- 109 Canberra Sleep Clinic
- 110 Ms Ann Gardner
- 111 Air Liquide Healthcare Australia
- 112 Professor Ron Grunstein
- 113 Carers Australia
- 114 Australian Longitudinal Study on Women's Health
- 115 Queensland Government
- 116 Mrs Angela Stewart
- 117 SafeWork NSW
- 118 Australasian Sleep Association
- 118.1 Supplementary to submission 118
 - 118.2 Supplementary to submission 118 - *Confidential*
- 119 Red Nose
- 120 Waubra Foundation
- 121 Ms Melissa Ware
- 122 Royal Australasian College of Physicians
- 123 Australian Council on Children & the Media
- 124 Mr Robert Riethmuller
- 125 *Name Withheld*
- 126 ACT Government
- 127 Rail, Tram and Bus Union Australia
- 128 Waverton Wollstonecraft Rail Noise Action Group
- 129 Well Spoken and the Canberra Sleep Clinic
- 129.1 Supplementary to submission 129

130 Safe Work Australia

131 Department of Health

- 131.1 Supplementary to submission 131

B. Exhibits

- 1 LetSleepHappen Pty Ltd
Athletes' insomnia, mental health & prescription sleep medication reliance, Rosemary Clancy BA(Hons) MAppPsych MAPS FCCLP, 3 September 2018
 - a) Coroners Court of Victoria, *Pharmaceutical drugs in fatal overdose: A coroner's perspective*, International Medicine in Addiction Conference, 21 March 2015
 - b) Information brochure: *LetSleepHappen Sleep CBT Awareness Initiatives*
- 2 Professor David Hillman
Wake up Australia: The Value of Healthy Sleep, Access Economics, October 2004
 - a) *Re-awakening Australia: The Economic Cost of Sleep Disorders in Australia 2010*, Deloitte Access Economics, October 2011.
 - b) *Asleep on the Job: Costs of Inadequate Sleep in Australia*, Deloitte Access Economics, 2017.
 - c) *The economic cost of inadequate sleep*, SLEEP, Vol. 29, 2006
 - d) *Public health implications of sleep loss: the community burden*, Medical Journal of Australia, October 2013
 - e) *The economic cost of inadequate sleep*, SLEEPJ Vol. 41, 2018
 - f) *Sleep health of Australian adults in 2016: results of the 2016 Sleep Health Foundation national survey*, Journal of the National Sleep Foundation, 2017

3 Mr Allen Salter

Electro Hypersensitivity: Talking to your doctor - Health Issues associated with smart meters.

a) Email alert from Stop Smart Meters Australia

4 Ms Janet Milford

The role of sleep dysfunction in the occurrence of delusions and hallucinations: A systematic review, Clinical Psychology Review 42, 2015

a) *Clinician perceptions of sleep problems, and their treatment, in patients with non-affective psychosis, Psychosis - Psychological, Social and Integrative Approaches, July 2016*

5 Related to submission 27

Article: Reservoir retiree blames smart meter for health issues, Preston Leader, page 5, 18 September 2018

6 Canberra Sleep Clinic

The Mysterious Answer to My Unrelenting Insomnia: Nothing helped—until one day my dentist told me I had the so-called "young, thin, beautiful women's sleep disorder." By Rachael Combe, April 2017

7 Absolute Sleep

Contact details, credentials and information on Absolute Sleep and Dr Christopher Pantin

8 Ms Jodie Donnelly

Review article: Self-reporting of symptom development from exposure to radiofrequency fields of wireless smart meters in Victoria, Australia: A Case Series, Nov/Dec 2014

9 Waubra Foundation

Wind Farm Noise: Paper ICA2016-440, Physiological effects of wind turbine noise on sleep - Proceedings of the 22nd International Congress on Acoustics, September 2016

a) *World Health Organization Europe: Environmental Noise Guidelines for the European Region 2018*

10 Professor Peter Eastwood

- Fatigue experiences and culture in Australian commercial air transport pilots, Australian Transport and Safety Bureau - Transport Safety Report, 22 January 2019*
- 11 Sleep Health Foundation and Australasian Sleep Association
Pre Budget Submission 2019-20 - Addressing Inadequate Sleep in the Australian Community, A Vital National Health, Societal and Economic Issue
- 12 Australian Epidemiological Association
Trends in Sleep Medication Use in Australian Adults, 1977-2007, Yu Sun Bin, Nathaniel S. Marshall, Nick Glozier
- 13 Sleep Health Foundation
Health and Wellbeing of Adults in Western Australia 2017: Overview and Trends, Government of Western Australia, 2018
- 14 Australasian Sleep Association
Description of Targeted Research Areas, January 2019
- 15 Professor Peter Eastwood
Impact of Health Behaviours and Deprivation on Well-Being in a National Sample of English Young People, Aswathikutty Gireesh, Shikta Das, Russell M Viner, in BMJ Paediatrics Open, August 2018
- 16 Mrs Sharon Moore
Sleep Wrecked Kids: Helping parent raise happy, healthy kids one sleep at a time
- 17 Confidential
- 18 Australian Psychological Society
Sleep and mental wellbeing: Exploring the links, Technical report, prepared by Kate Bartel, Cele Richardson and Michael Gradisar, Victorian Health Promotion Foundation 2018
- 19 Dr Barry Clark
Sleep Health Inquiry: Public Submission

C. Hearings and Witnesses

Tuesday, 29 January 2019 – Perth

University of Western Australia

- Professor Peter Eastwood, Director, Centre for Sleep Science; Director, West Australian Pregnancy Cohort (Raine) Study
- Professor Romola Bucks, Head of School of Psychological Science, and Professor
- Dr Ian Dunican, Director/Principal Consultant, Melius Consulting

Sleep Matters

- Dr Melissa Ree, Director

Absolute Sleep

- Dr Christopher Pantin, Principal Dentist

Sir Charles Gairdner Hospital

- Professor Bhajan Singh, Head of Department, Pulmonary Physiology and Sleep Medicine; and Director, West Australian Sleep Disorders Research Institute
- Dr David Hillman, Sleep Physician, Sleep Health Foundation

Professor Adams, Professor Wittert and Dr Appleton

- Professor Robert Adams, Professor of Respiratory and Sleep Medicine, Flinders University
- Professor Gary Wittert, Director, Freemasons Foundation Centre for Men's Health, University of Adelaide
- Dr Sarah Appleton, Postdoctoral Research Fellow, Adelaide Medical School, University of Adelaide

Tuesday, 5 February 2019 – Sydney

SleepFit

- Ms Melissa Webster, Chief Executive Officer

Australasian Sleep Technologists Association

- Dr Kerri Melehan, President

Sleep Management Group

- Mr Robert Leslie, Founder and Director

Charles Perkins Centre, University of Sydney

- Dr Peter Cistulli, Professor of Sleep Medicine; and Department of Respiratory and Sleep Medicine, Royal North Shore Hospital
- Dr Kate Sutherland, Research Fellow

Brain and Mind Centre, University of Sydney

- Dr Christopher Gordon, Associate Professor, Sydney Nursing School, and Centre for Sleep and Chronobiology, Woolcock Institute of Medical Research
- Dr Nathaniel Marshall, Associate Professor, Sydney Nursing School, and Centre for Sleep and Chronobiology, Woolcock Institute of Medical Research

Neuroscience Research Australia (NeuRA), University of New South Wales

- Professor Danny Eckert, Director, Sleep Research Program; and Matthew Flinders Fellow, Adelaide Institute for Sleep Health

Australasian Epidemiological Association

- Professor Julie Byles, Member
- Dr Yu Sun Bin, Member

Adelaide Institute for Sleep Health, Flinders University

- Professor R Doug McEvoy, Professor of Sleep Medicine, Director
- Professor Danny Eckert, Mathew Flinders Fellow
- Professor Robert Adams, Professor of Sleep Medicine
- Dr Andrew Vakulin, NHMRC Career Development Fellow

Office of the National Rail Safety Regulator

- Ms Sue McCarrey, Chief Executive
- Ms Julie Bullas, Executive Director Policy, Reform and Stakeholder Engagement

Wednesday, 6 February 2019 – Melbourne*Australian Dental Association*

- Ms Eithne Irving, Deputy Chief Executive Officer
- Mr Andrew Gikas, Member

Australian Psychological Society

- Ms Ros Knight, President

Reconnexion

- Ms Janet Shaw, Manager
- Dr Jane Anderson-Wurf, Program Support Coordinator

Austin Health and Institute for Breathing and Sleep

- Professor Christine McDonald, Director, Department of Respiratory and Sleep Medicine
- Associate Professor Mark Howard, Director, Victorian Respiratory Support Service
- Associate Professor Fergal O'Donoghue, Respiratory and Sleep Physician, Department of Respiratory and Sleep Medicine

Parenting Research Centre

- Dr Julie Green, Director
- Mr Derek McCormick, Principal Specialist

Department of Paediatrics, Monash University

- Professor Rosemary Horne, Senior Principal Research Fellow
- Dr David Armstrong, Respiratory and Sleep Paediatrician, Monash Children's Hospital
- Dr Gillian Nixon, Paediatric Respiratory and Sleep Physician, Monash Children's Hospital

Melbourne Sleep Disorders Centre

- Dr David Cunnington, Sleep Physician and Director

- Dr John Swieca, Medical Director

Thoracic Society of Australia and New Zealand

- Professor Bruce Thompson, Director/President Elect
- Dr Denise O’Driscoll, Board Director

Red Nose

- Ms Keren Ludski, Chief Executive Officer
- Mrs Jane Wiggill, Manager, Health and Advocacy

Monday, 11 February 2019 – Canberra

Australasian Sleep Association

- Professor Peter Eastwood, President
- Dr Maree Barnes, Immediate Past President

Canberra Sleep Clinic

- Dr Stuart Miller, Director
- Mrs Sharon Moore, Speech Pathologist; Well Spoken

Carers Australia

- Tammy Wolffs, Senior Policy Officer

CRC for Alertness, Safety and Productivity

- Mr Anthony Williams, Chief Executive Officer

Department of Health

- Dr Jane Cook, First Assistant Secretary, Medicines Regulation Division
- Mr David Weiss, Assistant Secretary, Preventive Health Policy Branch
- Mr Michael Ryan, Director, Medical Benefits Division

Let Sleep Happen

- Ms Rosemary Clancy, Director

Pharmaceutical Society of Australia

- Mr Robert Buckham, Manager, Strategic Policy

Public Health Association of Australia

- Mr Malcolm Baalman, Senior Policy Officer
- Dr Yu Sun Bin, Member

Royal Australasian College of Physicians

- Associate Professor Garun Hamilton

Safe Work Australia

- Ms Bianca Wellington, Acting Branch Manager, Legal and Workplace Health and Safety Strategy Branch
- Ms Pamela Binnington, Director, Strategic Work Health and Safety Policy

Sleep Disorders Australia

- Mrs Michelle Chadwick, Director

Sleep Health Foundation

- Emeritus Professor Dorothy Bruck, Chair
- Professor David Hillman, Deputy Chair

Woolcock Institute of Medical Research

- Professor Ronald Grunstein, Head, Sleep and Circadian Research Group; Central Clinical School, University of Sydney

Mrs Pamela Bird, Private Capacity

Ms Monica Kurth, Private Capacity

Ms Fiona Mobbs, Private Capacity

Ms Laura Thompson, Private Capacity