Respiratory Health Network

Sleep Disorders Model of Care

Prepared by the Sleep Disorders Working Party
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Table of Contents

Index of Tables

Index of Figures

Acknowledgements

The Respiratory Health Network, Sleep Disorders Working party chaired by Dr David Hillman, has developed the Sleep Disorders Model of Care

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The Sleep Disorders model of care has been developed by members of the Working Party. The Respiratory Health Network executive acknowledges the contribution and commitment of Dr David Hillman, Dr Helen Bell, and Belinda Whitworth, Senior Development Officer, Health Networks Branch, Office of the Chief Medical Officer in the development of this model of care.

Executive Summary

The field of Sleep Medicine is broad and the spectrum of Sleep Disorders include sleep related breathing disorders(such as obstructive sleep apnoea, sleep related hypoventilation and central sleep apnoea syndromes), insomnia hypersomnias of central origin, circadian rhythm disorders, parasomnias and sleep related movement disorders.

This model of care focuses on respiratory sleep disorders, which are widely prevalent and provide a useful basis on which to consider care of sleep disorders generally. The model was developed by the Respiratory Health Network, Sleep Disorders Working Party with representation made up of paediatric and adult sleep physicians and consumer participation through Sleep Disorders Australia, Western Australian Branch and consultation with key Respiratory Health stakeholder groups.

The prevalence of respiratory sleep disorders is high with obstructive sleep apnoea affecting 4% of the adult population and 3% of children to a clinically significant degree. Sleep disorders are also significant in people with Chronic Obstructive Pulmonary Disease (COPD) and heart failure.

Sleep disorders have long-term implications for the health, safety and productivity of affected patients. Effective treatments are readily available which resolve symptoms and associated morbidity.

The sleep disorders model of care seeks to improve equity of access for all Western Australians to high quality diagnostic and treatment services using best practice, efficient uses of resources and creating opportunities to maximise clinical support. Teaching excellence and rigorous research programs are an important component of the model.

The proposed WA sleep disorders service delivery framework encompasses a continuum of care which includes the following elements:

- Primary care: screening for sleep disorders, identification and referral for further investigation and ongoing monitoring and management.
- Secondary referral centres: Community-based centres, integrated with general hospitals.
- Tertiary care: Centres of excellence, linked to metropolitan general hospitals and regional centres.
- Private sector providers, sleep physicians with access to and supervision of ambulatory and private sleep laboratory diagnostic facilities and private sector therapy provision.
- Rural and remote services: using telemedicine and/or specialist visits where local specialist care is not available.

The recommendations set out the key areas and priorities to build the capacity and ensure a sustainable service model to meet the growing demand for diagnostic and treatment services for sleep disorders. They address clinical practice, proposed governance model, investment in infrastructure, workforce, education/professional development and research.

Methodology

The Respiratory Health Network identified Sleep Disorders as a priority area for the development of a model of care. A Working Party was convened in 2008 with representation from paediatric and adult sleep physicians and consumer participation through Sleep Disorders Australia, Western Australian Branch. The Working Party was chaired by Dr David Hillman and Dr Helen Bell.

The Working Party identified the key issues and gaps in service delivery in the management of sleep disorders and developed a model of care to meet these needs through a continuum of care.

The draft model of care was broadly distributed to relevant WA Health Networks Clinical Leads, clinical staff, health service providers, consumers and the Respiratory Health Network Advisory Group for comment and feedback.

The Respiratory Health Network Executive Advisory Group endorses the model of care for Sleep Disorders.

The model of care was endorsed by the WA Health Networks Clinical Leads in November 2009.

1. Overview of Sleep Disorders

This paper focuses on respiratory sleep disorders which are widely prevalent and provide a useful basis on which to model care of sleep disorders more generally. In this overview other common sleep disorders are briefly mentioned, to provide an insight into the spectrum of sleep disorders present in the community. Sleep disorders have long-term implications for the health, safety and productivity of affected patients. Effective treatments are readily available and resolve symptoms and associated morbidity. The current total economic cost to the Australian community of sleep disorders is over $10 billion per annum [1].

1.1 Spectrum of Disease

The field of Sleep Medicine is broad and the major Sleep Disorders include:

- Sleep related breathing disorders – including obstructive sleep apnoea, sleep related hypoventilation and central sleep apnoea syndromes.
- Insomnia
- Hypersomnia of central origin – including narcolepsy and idiopathic hypersomnia
- Circadian rhythm disorders
- Parasomnias (e.g. Sleep walking, Rapid Eye Movement (REM) behaviour disorder)
- Sleep related movement disorders – (e.g. restless legs syndrome, periodic limb movement disorder, bruxism)

1.1.1 Sleep Related Breathing Disorders

Obstructive sleep apnoea (OSA) is a very common primary sleep disorder, affecting 4% of adults to a clinically significant degree [2] and is also an important paediatric condition [3]. This chronic disorder is associated with disabling daytime somnolence and substantial morbidity including increased motor vehicle crashes (estimated 2-5 times increased risk of accidents compared to the normal population) [4] and work accident risk [5] as well as lost productivity (due to sleepiness and impaired vigilance), hypertension [6], heart attack, stroke [7], type 2 diabetes mellitus [8] and mental illness, such as depression [9]. Long-term observational studies show patients with severe OSA have higher mortality than the normal population whereas patients treated appropriately have similar mortality to the normal population [10]. OSA is notoriously under-diagnosed with less than 25% of cases in the community identified clinically [11].

Sleep hypoventilation is an important forerunner to and accompaniment of type 2 respiratory failure and right heart failure and may occur in the setting of severe respiratory muscle weakness, chest wall deformity, obstructive sleep apnoea, morbid obesity and advanced lung disease.

Coexistent OSA and COPD is a relatively common cause of type 2 respiratory failure (the “overlap syndrome”) and failure to recognise and treat the OSA component of the problem is the cause of persistent ill health and recurrent hospital admission in such patients.

1.1.2 Insomnia

Insomnia is characterised by repeated difficulty with sleep initiation or maintenance despite adequate time and opportunity for sleep. **Insomnia** is an important sleep disorder that occurs in approximately 10% of the general population and is associated with impaired quality of life and work performance and increased health costs. Sedative medications are used for acute insomnia but are not appropriate where insomnia is chronic and intractable. Much insomnia is secondary to other health issues or to stress-related factors and responds to addressing these underlying disorders. Approximately, 1.25% of the community has chronic primary insomnia and this responds best to cognitive behavioural therapies which are the domain of trained General Practitioners, therapists and psychologists.

1.1.3 Narcolepsy

Narcolepsy is a rare but disabling disorder characterised by unstable switching between wakefulness and sleep. Diagnosis requires specialised investigation within a sleep laboratory, using laboratory polysomnography and the Multiple Sleep Latency Test (MSLT).

1.1.4 Circadian Rhythm Disorders

Circadian rhythm disorders are characterised by disordered timing of sleep and wakefulness and include sleep disorders associated with shift work, delayed sleep phase disorder and advance sleep phase disorder.

1.1.5 Sleep Disorders in Children

Sleep disorders are very common in children with up to 25% affected at some age. They range from the common conditions encountered by every paediatrician (such as the sleepless toddler or the teenager with delayed sleep phase syndrome who can not fall asleep early enough to get up on time for school) to those that are rare and life threatening (such as congenital central hypoventilation syndrome). Effective treatments are available for most sleep disorders but they rely on the accurate identification of the disorder and health professionals who are skilled in their application.

As in adults, OSA is common in childhood with up to 3% affected by the disorder. It is associated with potentially serious adverse affects including behavioural problems, and adverse effects on learning and intellectual development. While most children with OSA are non-obese, OSA is much more frequent in morbidly obese children, and is likely to increase in frequency as childhood obesity increases. As opposed to adults, the first line treatment for most children with OSA is adenotonsillectomy. There is therefore a very high demand for diagnostic sleep services in children before progression to a surgical intervention.

Increasingly paediatric sleep physicians are seeing children with other complex medical problems, such as neuro developmental disabilities, where sleep problems are very common. Furthermore there is also increasing recognition that sleep is important in a range of medical conditions. Neuromuscular disease is a significant source of sleep hypoventilation in children. The institution of CPAP and non-invasive ventilation in children is rapidly increasing. Commencement of such treatment presents unique challenges in infancy and childhood, and requires access to a specialised paediatric sleep service.

1.2 Burden of Disease

The Practice of sleep medicine internationally has evolved over the last 25 years from the involvement of a very limited number of practitioners and relatively low number of patients to a major speciality. This evolution, in which Australia has had a leading influence, has been driven by a growing understanding of the high prevalence of primary sleep disorders and the major adverse impacts they have on health and well being, safety and productivity and the availability of effective treatments. It has been estimated (Access Economics, 2005) that the economic cost of primary sleep disorders in Australia, predominantly OSA, exceeds $10 billion per annum while the direct health expenditure on their investigation and management is less than $200 million pa [1].

Sleep related breathing disorders are strongly linked to **obesity.** The prevalence of obesity is rising in Western societies and represents a major public health problem. **Obesity** predisposes to sleep apnoea and sleep hypoventilation. It is estimated that a 10% increase in body weight increases the odds of developing moderate to severe obstructive sleep apnoea 6-fold. The prevalence of sleep related breathing disorders is also increasing with **ageing** of the population.

In turn these sleep-related breathing disorders compound the adverse effects of obesity, independently contributing to cardiovascular disease (hypertension, heart attacks, stroke), diabetes and metabolic syndrome. Other co-morbidities of sleep apnoea include depression, and increased accident risk. Preventative management of patients with these disorders has the potential for large savings in health costs.

1.3 Diagnosis and Treatment of Sleep Disordered Breathing

1.3.1 Diagnosis

The following discussion focuses on OSA as there are important new charges in the approach to investigation of OSA. Similar principles apply to a number of other sleep disorders. OSA diagnosis requires clinical assessment and an investigative study of ventilation during sleep. The table below sets out the types of diagnostic sleep studies in descending order of complexity and diagnostic accuracy.

Table 1. Diagnostic Investigations for Obstructive Sleep Apnoea

Type of Investigation	Description
Type 1	Polysomnography in an attended laboratory setting
Type 2	Unattended polysomnography conducted outside the laboratory setting (for example at home or in a ward setting)
Type 3	Assessment of two or more cardiopulmonary parameters
Type 4	Assessment of one cardiopulmonary parameter

Note: Type 1 study = laboratory based study; Types 2, 3 and 4 = home sleep study options.

The most sensitive and specific investigation is polysomnography in an attended laboratory setting (Type 1" studies). This permits the collection of high fidelity signals in a supervised setting, which allows breathing during sleep to be comprehensively assessed in relation to sleep stage, posture and arousals. This provides a gold standard of investigation and is the diagnostic mainstay for these disorders in Australia and internationally.

Limited availability of Type 1 studies relative to a burgeoning demand for diagnosis and treatment of OSA and related disorders has driven the development of simpler alternatives to laboratory-based polysomnography. These systems are less costly [12] as they involve less healthcare resources and have lower staffing requirements.

The unattended nature of Types 2, 3 and 4 studies means that technical deficiencies and failures are not detected and corrected at the time of study. The more limited parameters monitored mean that they are also less sensitive and specific than Type 1 tests and their use is therefore only applicable to a proportion of referrals.

The clinical place for these more limited unattended sleep studies is still being defined. However, it is likely that investigation for sleep disorders will increasingly utilise studies carried out in the home [13]. In order for simpler systems to be utilised effectively it is essential that they be ordered by practitioners with the training that enables them to select appropriate patients, adequately interpret the results and understand the limitations of the test. In some situations unattended studies may be inappropriate, such as in young children, or in those with significant co-morbidities or behavioural problems.

It is envisaged that many suspected cases of non-complex sleep disordered breathing will be investigated and managed in an ambulatory setting utilising home based sleep studies, with an increased role for appropriately trained primary care based clinicians, under the oversight of Sleep Physicians. Sleep laboratories at tertiary facilities and in the private sector will continue to cater for the management of cases involving complex sleep disordered breathing.

> *Note:*
> *"Complex" sleep patients = patients with suspected complex sleep disordered breathing that required laboratory based sleep studies, e.g. patients with suspected sleep related hypoventilation. Complex is also used to describe patients with specific circumstances that dictate a laboratory based study as the most appropriate initial diagnostic test eg severe physical disability, frail elderly.*
>
> *"Non-complex" sleep patients = patients with suspected uncomplicated OSA who, in the majority of cases can have a home sleep study as the initial diagnostic test.*

1.3.2. Treatment

The treatment options for sleep disordered breathing include:

a) Lifestyle modifications

Obesity management, reduction in alcohol and sedative intake and smoking cessation are all important generic health issues with wider implications than simply for sleep disorders. Depending on severity and response to treatment they require the involvement of general practice, other health professionals such as dieticians' and clinical psychologists; and, in the case of intractable morbid obesity, bariatric surgeons.

b) Dental Devices

Dental devices are an important aspect of the management of sleep disordered breathing in adults, particularly snoring and the mild to moderate forms of OSA. Following referral from a sleep physician or other appropriately trained and credentialed practitioner, assessment and construction of these appliances requires specific dental expertise.

Positive Airways Pressure Therapies

There are a variety of types of positive airway pressure therapies available to treat sleep disordered breathing.

Continuous positive airways pressure (CPAP) therapy is the mainstay of treatment for OSA and is available in fixed pressure and auto titrating modes. CPAP therapy treats degrees of OSA severity from mild to very severe. Adaptive servo ventilation is a more complex therapy designed to treat complex sleep apnoea and periodic breathing. Non-invasive positive pressure ventilation is a method to treat sleep related hypoventilation with or without an OSA component.

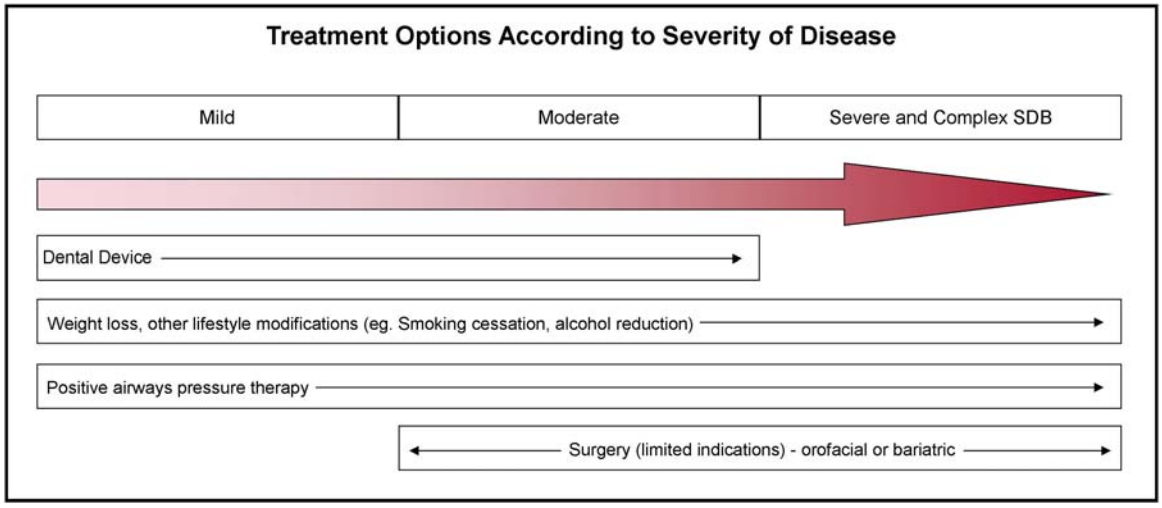
These therapies require supervised clinical trials before final prescription to provide training in their use, familiarisation and assessment of efficacy and tolerability. This supervision requires skilled people and is most appropriately performed under the supervision of a sleep physician. In particular more complex cases require the particular expertise available through multidisciplinary sleep clinics. Non physician-led providers are appropriate where the diagnosis has been made by an appropriately trained and credentialed medical practitioner (currently, with few exceptions, a sleep physician) who provides oversight of the trial and clinical outcomes. Establishment of CPAP or other non-invasive positive pressure therapy in children requires access to a specialised paediatric sleep service.

Surgery

Upper airway surgery has an important role in the treatment of certain sleep-related breathing disorders. It is a mainstay of treatment of OSA in children where tonsillar and adenoidal hypertrophy are commonplace causes.

It has a more limited role in adult OSA management but is important in all ages where a surgically correctable predisposition to OSA exists. Orofacial surgery also has a role in this context. Bariatric surgery should be considered where there is severe obesity unresponsive to more conservative methods.

Figure 1. Treatment Options According to Severity of Disease (Adult OSA)



2. Current Service Provision of and Gaps in Sleep Services in Western Australia

This section provides a snapshot of the current service provision in sleep services and identified gaps across the continuum of care from prevention to treatment services in primary, ambulatory, secondary and tertiary settings.

2.1 Hospital Utilisation Data

Figure 2 (below) sets out the number of WA public sector separations for sleep apnoea between 2000 and 2006. Information prior to 2004 for PMH is not available and the separations for the WA Sleep Disorders Research Institute (WASDRI) are based on their records and are not recorded in the National Minimum Data Set. The discrepancies in data collections and records may have contributed to the lack of recognition of the magnitude and extent of sleep disorders in the WA community and thus provision of service to meet existing and future demand.

Figure 2. WA Public Sector Separations for Sleep Apnoea between 2000 and 2006

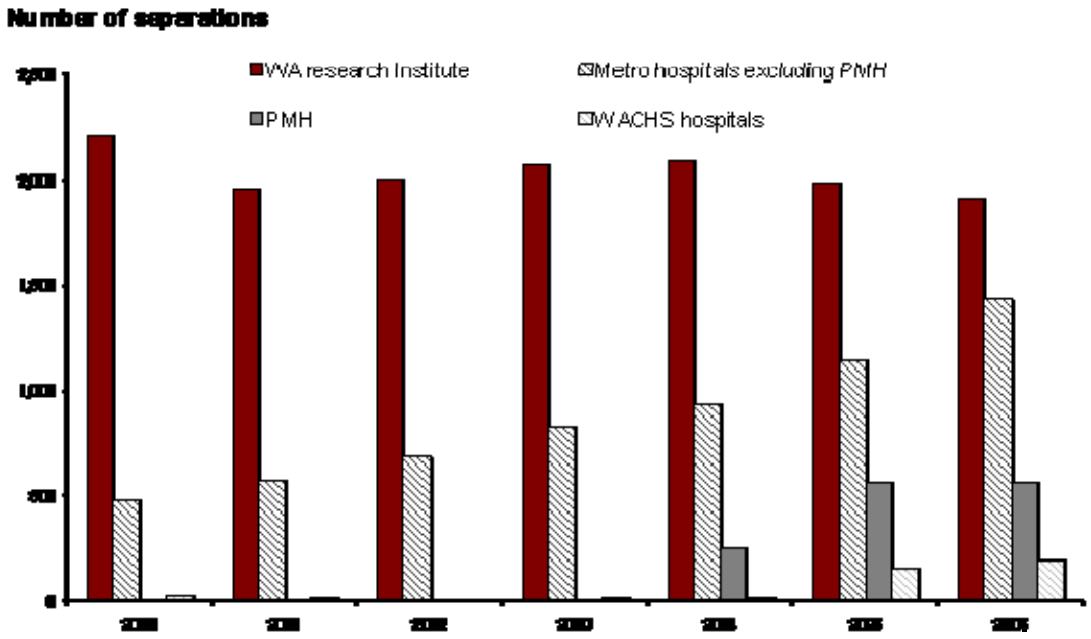
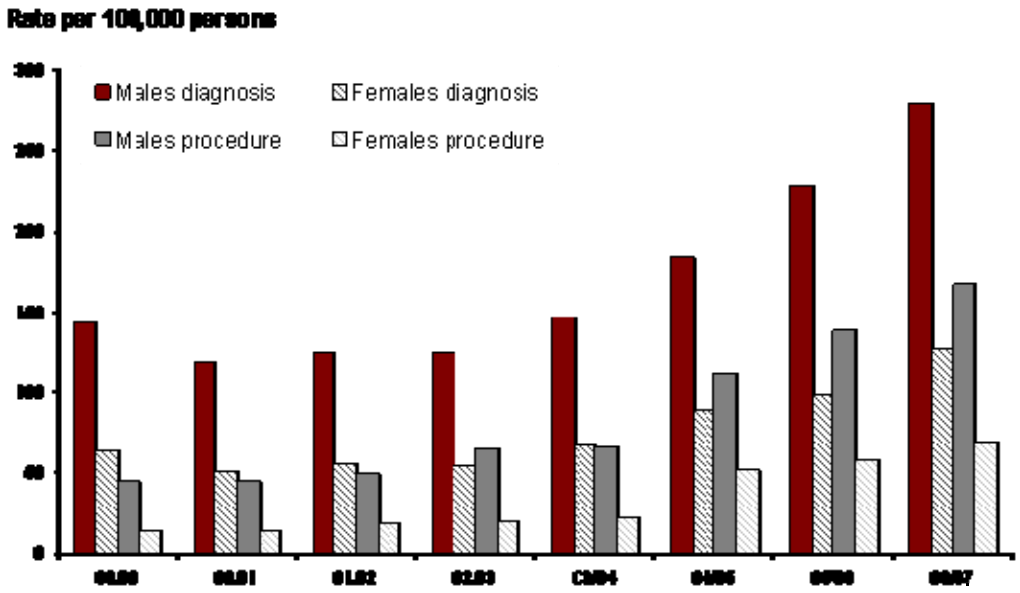


Figure 3 (below) shows the age standardised rates by gender diagnosed with sleep apnoea or having a procedure for a sleep disorder in the public and private health system in WA between 1999 and 2007. It should be noted that Princess Margaret Hospital procedures were not recorded prior to 2004. These data reflect a steadily increasing demand for diagnosis and treatment of sleep apnoea in WA over the last 5 years.

Figure 3. Age Standardised Rates by Gender Diagnosed with Sleep Apnoea between 1999 and 2007



2.2 Current Prevention Strategies

The WA Health Promotion Strategic Framework 2007-2011 sets out the state wide directions to reduce the burden of chronic disease and injury through a comprehensive approach to health promotion and prevention. The key strategic approach is healthier lifestyles through preventing smoking, healthy eating, physical activity, healthy weight and low risk alcohol use. In addition there are national strategies and health promotion campaigns to address overweight and obesity. These lifestyle issues are directly applicable to respiratory sleep disorders where obesity is an important predisposing condition and alcohol and smoking are significant aggravating factors

2.3 Current Diagnostic and Treatment Services

2.3.1 Primary Care

The majority of people with sleep-disordered breathing, and those at risk of developing sleep disordered breathing, initially present to primary care services.

Currently there is limited primary care involvement in definitive diagnosis and management of these disorders. Given the high prevalence of Sleep Disordered Breathing (SDB) and technological advances for both diagnosis and treatment, we believe simplified diagnostic and treatment algorithms need to be developed for non-complex sleep apnoea. Such methods are likely to involve an increased role for primary care in service delivery. This will necessitate considerable investment to train primary care providers in the investigation and management of SDB.

Gaps in Primary Care Services

- Access to information, education and training for GPs in screening for respiratory sleep-related breathing disorders and underlying predisposing factors.
- Clear referral pathways for assessment and management of suspected sleep-related breathing disorders and clinical support by Sleep Physicians for primary care.
- Improved access to and availability of psychology, nutrition/weight loss clinics in primary care settings is required
- Research to establish evidence-based primary care pathways for treating sleep-related breathing disorders

2.3.2 Current Specialist Diagnostic Services

The table below sets out the sleep disorders services by public and private hospital and providers and the funding source currently provided in WA.

Table 2. Sleep Disorders Services in WA by Funding Source

		Diagnostic Services	Therapeutic Services	Funding Source
Public/ Private Metro	**RPH**	Type 1 studies: 2 beds, 2 nights a week	Outsourced CPAP trials to commercial providers	State
	SCGH	Type 1 studies: 7 beds, 6 nights a week Limited type 3 and 4 studies	In-house CPAP trials	State/Commonwealth (Medicare)
	PMH	Type 1 studies: 4 beds, 3 nights a week Limited type 2 studies	In-house CPAP trials	State
	SKHS	Type 2 studies: 3 studies per night	In-house CPAP trials	Privately run service Predominantly medicare funded with state subsidy
Private Metro	**SJOG**	Type 1 studies: 6 adult beds, 6 night/week; 4 paediatric beds 1 night/week Type 2 studies: >4 studies/ week	In-house CPAP trials	Medicare/Private fund/Individual
	Mount Hospital	Type 1 studies: 3 adult beds, 6 nights per week Type 2 studies 6type 2 study units, capacity for 5 nights/ week	In-house CPAP trials	Medicare/Private fund/Individual
	Ambulatory Providers	Metro wide Type 2,3,4 Studies	In-house CPAP trials	Medicare/Private fund/Individual
Rural	**Bunbury SJOG**	Type 1 studies: 2 beds 3 nights per week Type 2 studies: 4-8 per week	In-house CPAP trials for complex cases. CPAP trials to commercial providers for non complex	Medicare/Private fund/Individual
	Ambulatory Providers	Albany, Geraldton, Northam Type 2 studies	Outsourced CPAP trials to commercial providers	Medicare/Private fund/Individual

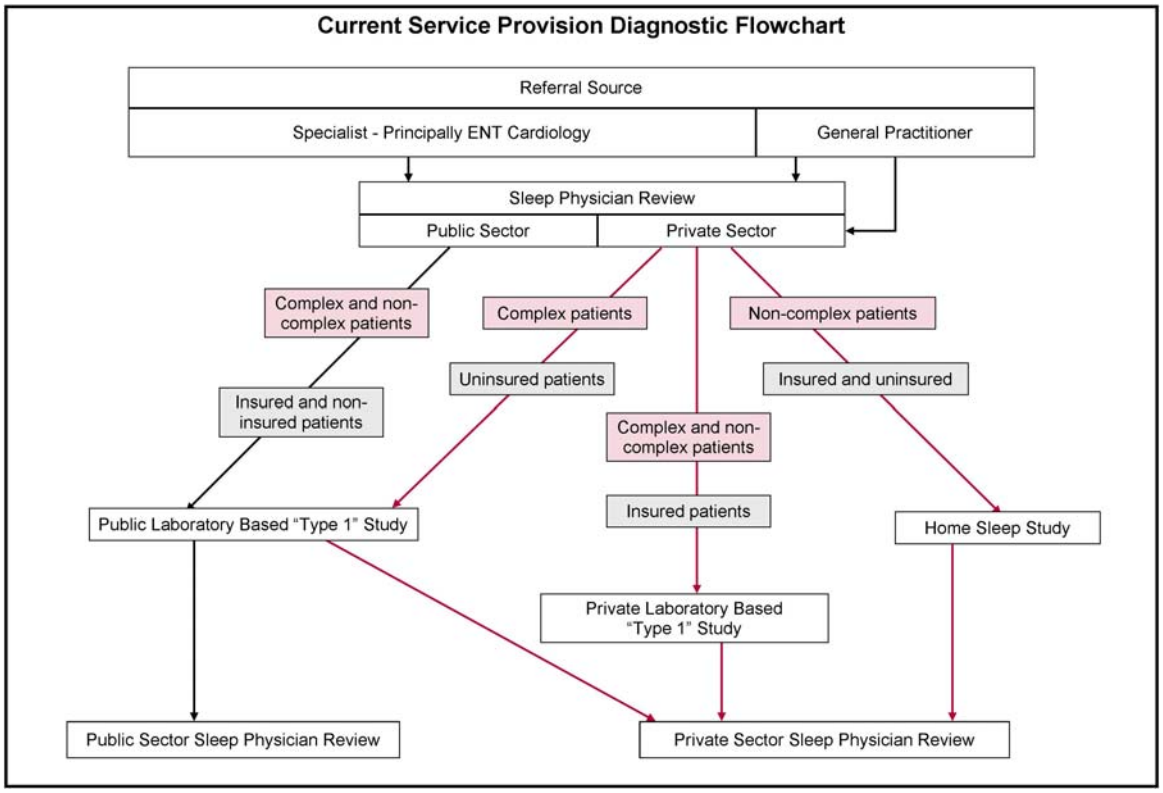
Adult sleep services in WA are provided at two tertiary hospitals and by private providers. Royal Perth Hospital (RPH) is a limited, state funded service for public patients that provides investigations for the diagnosis of sleep disorders and referral to private providers for therapeutic trials eg. CPAP therapy. It is a 2 bed facility that runs 2 nights per week. The West Australian Sleep Disorders Research Institute (WASDRI) situated at Sir Charles Gairdner Hospital is a private, predominantly Medicare funded service, with limited State funding, that provides services to public patients. WASDRI provides a comprehensive sleep service for the management of the whole spectrum of sleep disorders. This includes supervised therapeutics trials of CPAP therapy. It has a 7 bed facility for overnight investigation of sleep disorders that operates 6 nights per week. There is limited state funding for the inpatient component.

There are a number of **private providers** in WA providing sleep medicine services. These include overnight sleep studies in sleep laboratories (Type 1 Studies), at St John of God Hospital in Subiaco and in Bunbury and at the Mount Hospital. These practices also provide **ambulatory sleep study** services (Type 2 Studies) as do sleep physicians at Midland, Albany, Northam and the Joondalup Health Campus. One private provider operates in metropolitan and some regional centres and accepts referrals directly from General Practitioners. There are no WA based sleep physicians involved in this service. There is a limited interim Medicare rebate for these type 2 studies and, minimal bulk billing is undertaken for them.

Children's sleep services are provided at Princess Margaret Hospital (PMH) at the inpatient sleep laboratory and through their ambulatory Hospital in the Home service. There are a number of **private providers** in WA providing sleep medicine services to children, including overnight sleep studies in sleep laboratories (Type 1 Studies), at St John of God Hospital in Subiaco. Children with suspected SDB are commonly seen in first instance by ENT surgeons, who will assess the need for diagnostic procedures and refer as necessary, or who may elect to proceed directly to treatment (surgery).

Residents in **rural WA** are at particular disadvantage as there are only limited diagnostic and sleep medicine services in rural locations. There are private adult services in Bunbury, Albany, Northam and paediatric outreach services in Bunbury, Kalgoorlie, Port Hedland and Karratha. A private provider provides an ambulatory diagnostic service in Geraldton and Kalgoorlie with no local (WA) sleep physician input. Where these services are not available, or not utilised, rural patients suspected of having OSA are referred to a metropolitan based specialist Sleep Physician, either in the public or private sector and undergo one or two laboratory based sleep studies, on separate occasions. The first study is for diagnosis and the second study is to optimise the CPAP therapy. This generally requires at least two trips to Perth with an intervening relatively poorly supervised trial of treatment.

Figure 4. Current Service Provision Diagnostic Flowchart for Adult SDB



The following information describes patient flow and service delivery issues related to the pathways set out in Figure 4.

Some non-complex patients with private insurance elect to have home studies. There are some technically non-complex patients who for specific reasons (eg age or general frailty) require a laboratory based study. Laboratory-based studies are the gold standard and inadequate home-based studies (e.g. technical difficulty) will require a subsequent laboratory study. Under the current treatment paradigm, public sector equates to tertiary/quaternary level care and the default for all patients seen in the public sector is to have laboratory based studies. Greater use of home-based studies could increase the availability of this resource for the management of complex patients. Under some circumstances (patient pre-screened by questionnaire and/or other information and/or living in remote location) physician consultation may immediately precede laboratory polysomnography. Where the referral for investigation is from a specialist with specific relevant expertise (eg ENT surgeon) direct access to laboratory polysomnography occurs provided the sleep physician has determined necessity for the study from the referral. Study interpretation is facilitated by this and questionnaire feedback in such circumstances. Children with uncomplicated OSA related to adenoidal/ tonsillar hypertrophy may not require sleep physician review following sleep study but proceed directly to surgery.

2.3.3 Current Treatment Services

Lifestyle Modifications

The single most effective lifestyle modification applicable to treatment of sleep apnoea in overweight patients is weight loss. This particularly applies to morbidly obese patients. Pathways currently exist for access to these services which can be used in the context of sleep disorders. Multidisciplinary clinics with dietician, psychologist and physician input would advantage the management of more complex cases and should be promoted. There is currently minimal integration of these services.

Dental

Currently this is available from a limited number of private practitioners in the metropolitan area and in Bunbury. There are no subsidised services for the financially disadvantaged and as a result financially disadvantaged patients with mild to moderate OSA who may be adequately treated with a dental device do not have this treatment modality as an option. This is particularly problematic when the person is intolerant of CPAP therapy. Promotion of this expertise in the public sector and in major rural centres would substantially increase the availability of this treatment modality. Expert dental involvement in multidisciplinary sleep clinics would be highly desirable.

Positive Airway Pressure Therapies

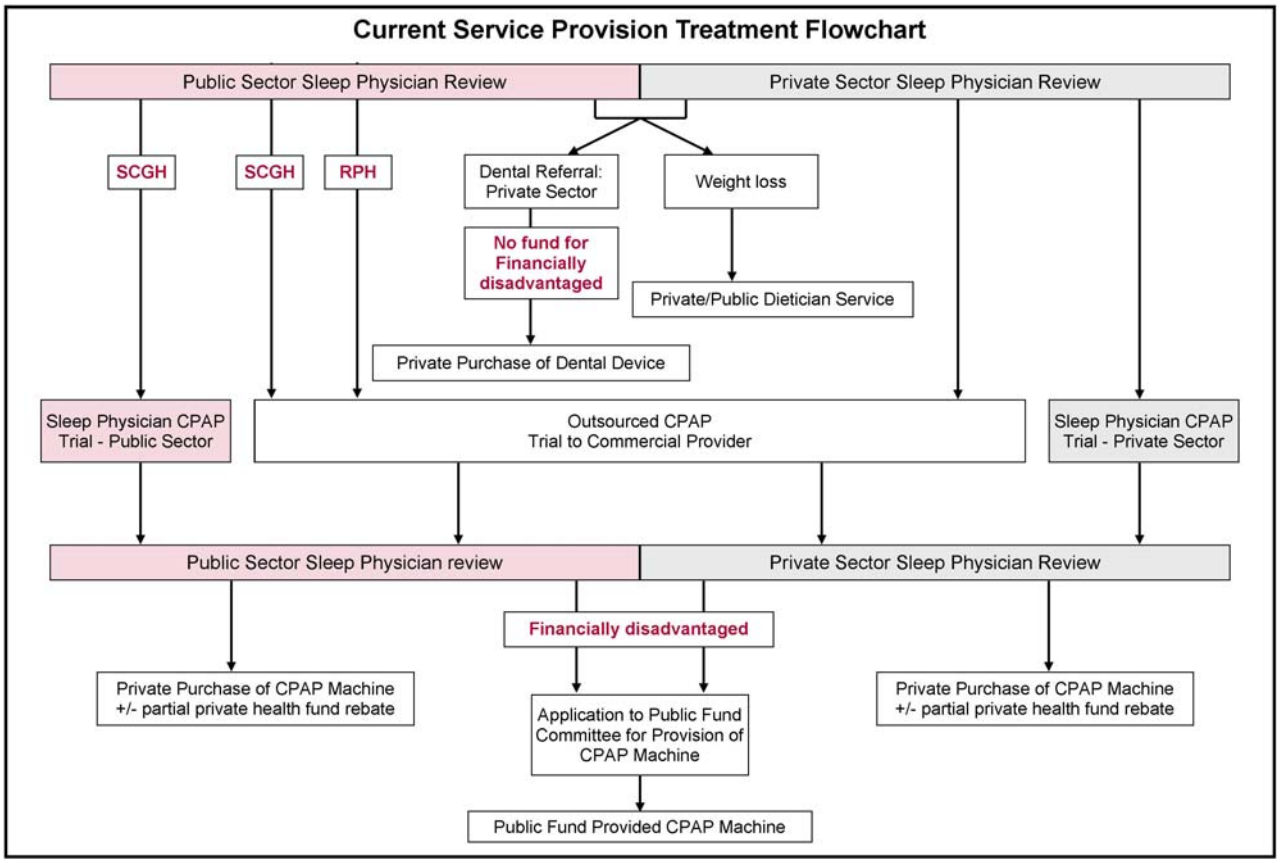
The mainstays of treatment of sleep disordered breathing of at least moderate severity are positive airway pressure therapies: CPAP for OSA, non-invasive positive pressure ventilation for sleep hypoventilation and adaptive servo ventilation for complex sleep apnoea. These therapies are prescribed by sleep physicians after a trial of therapy during which the optimal therapeutic mode, settings, mask interface and adjunctive therapies, including humidification and oxygen therapy are established. These trials of therapy are conducted under the indirect or direct supervision of a sleep physician, by public or private providers skilled and experienced in these modes of therapy. On completion of a successful trial a prescription is written. Non-health care card holders then purchase their appliance from a private provider, with their own resources, subsidised (where applicable) by assistance from their health care fund. Health care card holders are eligible for assistance from a limited Department of Health fund which lends the CPAP pump or ventilator to them (on an indefinite basis, provided it is used effectively); they are expected to purchase and maintain their own mask (see “Funding Equipment” below).

In children the institution of positive airway pressure therapies is more complex, and requires access to a specialised paediatric sleep service. Currently this is only conducted at PMH, and private providers refer children requiring CPAP to this service. Particularly in young children a multidisciplinary approach including physician, nurse, psychologist and social worker is often required.

Surgery

There are well established pathways in existence for surgical referral, both in the public and private systems. The development of multidisciplinary surgeon/physician clinics in major centres would improve assessment, planning and coordination of the management of more complex cases.

Figure 5. Current Service Provision Treatment Flowchart



Funding equipment to treat OSA in the financially disadvantaged

Treatment using dental devices and CPAP equipment must be purchased by consumers and/or their private health insurers. Since 2000, the Department of Health, WA has provided limited public funds to subsidise the purchase of CPAP equipment for financially disadvantaged West Australians. The current funding is $235,000 per annum and does not meet the demand. The funds are held by the North Metropolitan Health Service on behalf of the state and are administered by a small committee. There is no subsidised scheme for dental devices.

Gaps in Diagnostic and Treatment Services

- Current services for uninsured patients are tertiary based (which has become equated to “public” services).
- Tertiary services are inadequately resourced to cope with increasing patient numbers and patient complexity.
- No community based public services exist either in the metropolitan or rural settings.
- Limited number of Sleep Physicians.
- No public dental services expert in management of OSA.
- Inadequate resources to provide treatment services for non-respiratory sleep disorders eg pharmacotherapy for narcolepsy or psychologists providing cognitive behavioural therapy for chronic primary insomnia.
- Inadequate funding of schemes to subsidise the purchase of equipment to treat sleep apnoea in the financially disadvantaged with no readily identifiable central authority with which to negotiate growth in funds to meet current and future need.

2.4 Workforce resources and professional development

There is significant medical clinical expertise and knowledge within the WA health system, however there are few dedicated resources in the public health sector in both medical and allied health in the field of sleep medicine in WA. The public/private funding mix and existing under resourced service models do not support the recruitment of medical and scientific staff to manage sleep disorders.

Currently in WA there is one funded adult sleep medicine training position, with none in Paediatrics.

Formalisation of training for Sleep Technologists is required, consistent with the evolving national guidelines for sleep medicine.

Gaps in Workforce Resources

- Insufficient teaching and training positions in sleep medicine, which requires increased resources.
- Inadequate workforce numbers to meet present and future demand
- Failure to develop models for the diagnosis and management of sleep disorders that simplify management of non-complex patients and promote greater involvement of non-sleep physician personnel
- Underdeveloped multidisciplinary sleep centres to manage non-OSA sleep disorders
- Poorly defined training pathways for Sleep Technologists

2.5 Current Research

A comprehensive, world standard Sleep Service encompasses research into these disorders as well as the diagnosis and management of patients with them. Research into understanding the relationship between sleep disorders and cardio respiratory disease is one of the important areas of research undertaken in WA by sleep clinicians. This research has the potential to result in effective preventative approaches to these common and serious diseases. Sleep disorders are also strongly implicated in avoidable morbidity and mortality through accidents on the

road and in the workplace. It is therefore important that our sleep services are appropriately funded to allow this research to continue.

Gaps in Research

- Research is urgently required to define the role of unattended sleep studies in the diagnosis of SDB. This would inform the evidence base and clinical practice in the assessment and diagnosis of SDB.

2.6 Quality of Care

Evidence based standards of practice in sleep medicine have been established for the conduct of sleep studies and for prescription of treatments by the Australasian Sleep Association (ASA), the peak national body of sleep physicians, other health professionals and scientists involved in the management of sleep disorders. These are consistent with guidelines developed by equivalent bodies internationally. These form the basis of clinical practice in sleep medicine and the development of simplified models of care will require careful research to ensure their cost effectiveness and safety.

3. Proposed Model of Care for Sleep Services in Western Australia

3.1 Model of Care

The scope of the Sleep Disorders model of care is limited to the assessment diagnosis and treatment of OSA and other sleep disorders that require specialist assessment and treatment, both for children and adults. The model embraces best practice principles and seeks to improve access to services through the establishment of a state wide service delivered at tertiary centres of excellence, supporting general hospital/community based centres and regional health services to provide diagnostic and treatment services. The model of care aims to ensure patients receive:

> "The right care, at the right time, by the right team, in the right place"

3.1.1 Guiding Principles

The rationale and overarching principles that guide the development of the Sleep Disorders model of care and other chronic diseases are:

- Prevention, health promotion and screening of the well population, e.g. smoking cessation and opportunistic screening, targeted secondary prevention, early diagnosis and intervention to manage chronic disease, resulting in reduced burden of disease.
- Integration between primary, secondary and tertiary sector providers across State and Commonwealth jurisdictions to reduce communication barriers and improve access to services in community settings.
- Provision of management plans to all people with chronic disease to maximise their health and wellbeing.
- Development of consistent protocols and consumer pathways between health care providers supported by e-health records and shared information.
- Building the capacity of the workforce to meet the need to manage complex health service requirements of people with chronic disease within the community. This includes education and training and encouraging multi-skilling and shared care models.

3.1.2 Overview

The Sleep Disorders model of care is an integrated service model to improve equity of access for all Western Australians. It advocates a structure to provide high quality diagnostic and treatment services. The model recognises the importance of General Practitioners and primary care clinicians in the diagnosis and management of sleep disorders. It promotes integration across the health care settings and opportunities to develop clinical support and build the capacity of primary care and other clinicians. Teaching and rigorous research programs are fundamental to the service model.

The basic framework includes:

- Primary care provider identification and referral for further investigation and pathways for ongoing monitoring and management
- Provision for up-skilling of General Practitioners to take a greater role in the initial and ongoing management of non-complex sleep disordered breathing. This will require substantial investment in training and research to test the safety and cost-effectiveness of such a model

- Access to secondary community based and ambulatory diagnostic services.
- Multi-disciplinary teams will be developed to manage non-complex sleep disorders in this setting that will include a sleep physician, sleep technologist, CPAP therapist, General Practitioner administrative support, nurse, dietician and psychologist.
- Rural and remote services, with an emphasis on building local capacity within the medical and allied health services of regional centres
- Tertiary based sleep centres with fully equipped sleep laboratories, responsible for management of complex sleep disorders, education and research
- Referral pathways, clinical guidelines and procedures between primary, secondary and tertiary level services with clinical leadership and support provided by Sleep Physicians to other specialist doctors and GPs involved in the diagnosis and assessment of sleep disorders.
- A funding model that focuses on equitable and timely access to sleep medicine services through clear delineation and responsibility of the Individual, State, Commonwealth and private insurer contribution.

3.1.3 Service Model

Figure 6. Proposed Pathway for Sleep Apnoea Management for Adults

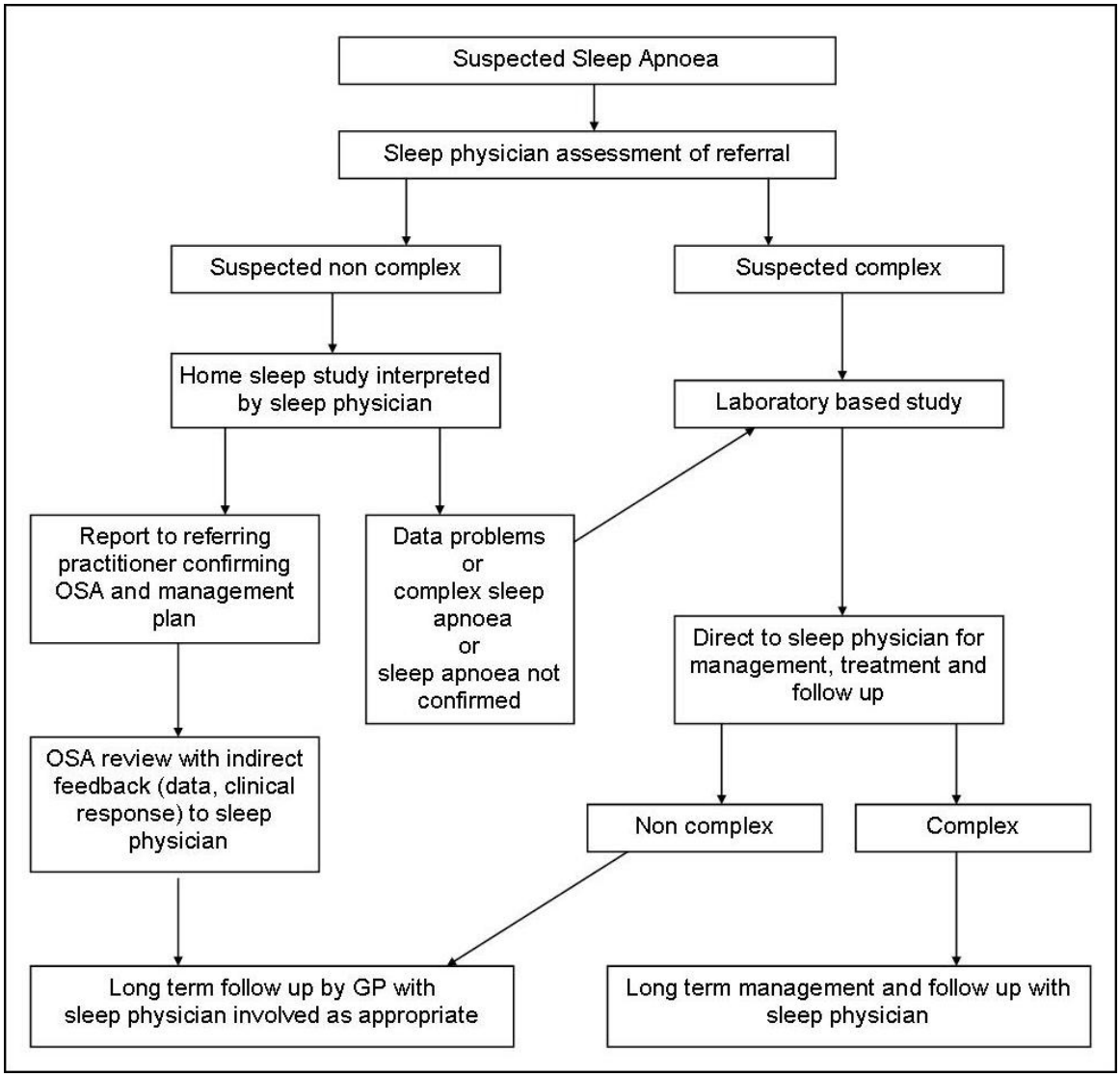


Figure 6 outlines a proposed pathway for the management of patients with suspected sleep disorders. It should be noted that the pathway for suspected non-complex sleep apnoea awaits rigorous study. Comprehensive audit and research needs to be undertaken to ensure the appropriate clinical outcomes are achieved, comparable with or an improvement on the traditional laboratory-based approach. The research should include clinical effectiveness, cost-effectiveness and safety.

Common to the paths described here is the direct or indirect involvement of a sleep physician in each case to, at a minimum, assess each referral for investigation, oversee the quality of the investigation, review the results from each case and determine the course of further action. Each referral will require a minimum amount of information, perhaps by structured questionnaire, to allow pretest probability of SDB and necessity for sleep study to be determined. The reporting physician must have access to the raw data from the sleep study and a keen awareness of the potential limitations of the study, so that type 2 errors are avoided. In the case of children: a) implementation of positive airway pressure therapy requires specialised expertise; and b) in the case of uncomplicated OSA secondary to adenoidal/tonsillar

hypertrophy the patient may proceed to surgery after sleep study without the need for further sleep physician involvement.

3.1.3.1 Community Specialist (Secondary) Services

A large proportion of the population with non-complex SDB or few co-morbid conditions will be able to be catered for adequately by community-based sleep services using ambulatory diagnostic studies and CPAP trial services, under the governance of a sleep physician.

This service will provide less complex general hospital based and ambulatory studies (level 2 – 4 above), with access to specialist management and clinical support to ensure appropriate use of sleep studies services to those who are unable to access private services and do not the meet criteria for tertiary level investigation. Referral pathways to tertiary centres will ensure access to Type 1 studies as clinically required. Opportunities for partnerships with private practice will ensure sustainable service delivery in the outer metropolitan and regional centres. It is recognised that the WACHS does not generally fund outpatient services and funding models will require development. General hospital and ambulatory centres will provide:

- Specialist consultation services
- Home based diagnostic services
- Supervised trials of treatment including CPAP for obstructive sleep apnoea
- Medical/technical support for therapy
- Access to clinical psychology service for chronic insomnia
- Close linkage with GPs and other primary health care providers
- Access to multi-disciplinary team to assist management of patients with chronic co-morbidities who need more intensive support
- Capacity for in-centre overnight CPAP titration studies on an as needed basis

3.1.3.2 Tertiary Hospital based Sleep Centres

Clinical expertise and governance of the integrated service delivery model for adults will be provided at the **tertiary hospital centres** based at SCGH and Royal Perth Hospital (Fiona Stanley Hospital (FSH) in the future) and, for children, at Princess Margaret Hospital. It is estimated that, consistent with interstate experience and precedents (see Appendix 1), these three sites will provide a comprehensive sleep services for the public sector and training capacity for sleep physicians and sleep technologists for Western Australia for the foreseeable future.

Tertiary services will cater for patients who are clinically assessed as having complex sleep disorders; which require Type 1 sleep studies with full PSG monitoring in a sleep laboratory. These include: complex sleep apnoea; sleep apnoea associated with substantial co-morbidities such as heart failure; sleep hypoventilation and type 2 respiratory failure requiring long term non-invasive ventilatory assistance from various aetiologies including neuromuscular disease and morbid obesity; hypersomnia from other causes including narcolepsy; nocturnal movement disorders including periodic limb movement disorder; and parasomnias.

The tertiary service will provide:

- Specialist medical consultations
- Laboratory based polysomnographic sleep studies
- Outpatient and inpatient care of complex problems related to respiratory and non-respiratory sleep disorders

- Capacity for non-laboratory based studies to service local community (see also under general centres, below)
- Supervised trials of treatment (medications, CPAP therapy, non-invasive ventilation)
- Medical and technical support for therapy
- Clinical psychology services for chronic primary insomnia
- Close linkage with GPs and other primary health care providers
- A referral destination for other providers

They will provide outreach services, teaching and a clinical resource for education, technical quality assurance for secondary and regional health services. Their teaching role will necessitate an ongoing involvement in management of some uncomplicated sleep disorders, drawn largely from their local areas.

Sleep services for children will continue to be provided from PMH, its outreach clinics and by private practitioners. In the future FSH will provide a secondary paediatric sleep service. PMH will continue to provide similar services to the adult tertiary centres as described above.

3.1.3.3 Rural and Regional Centres

Large regional centres are suitable for consideration of establishment of secondary "general hospital" centres and/or specialist private services. The minimum requirement for regional centres is a trained resident local technologist backed by a visiting specialist and a local general practitioner with a special interest and expertise in sleep disorders. The technologist and GP would have ready access to the visiting specialist who visits the centre periodically with visits supplemented by telehealth consultations with patients and with local practitioners. The service would have direct access to type 3, 4 portable monitoring equipment and positive airway pressure therapies (see 2.3 above) to allow local diagnosis and treatment of straightforward cases. Complex cases would be referred to metropolitan centres for further diagnosis and treatment where deemed necessary by local medical expertise or the visiting specialist. Such regional centres exist or are required (at a minimum) in Albany, Bunbury/Busselton, Kalgoorlie, Geraldton, Karratha/Port Hedland and Broome. Currently there is a resident sleep physician in Bunbury and visiting sleep physician expertise in Albany. A visiting role for metropolitan sleep physicians should be developed for major centres without sleep physician services.

3.1.3.4 Private Providers

There are opportunities to work with existing **private sector providers** and develop partnerships to build the capacity of the service particularly in the outer metropolitan and regional centres.

Currently private providers operate in Western Australia at several levels including ambulatory services and comprehensive sleep centres (see table 2). It is envisaged that they will continue to make a substantial contribution to management of sleep disorders of privately referred patients, including (at St John of God Subiaco) children.

3.2 Resource Requirements

To deliver a comprehensive integrated model of care for sleep disorders across the continuum of care requires investment in additional resources including staffing, physical facilities, equipment and upskilling of health professionals across primary, secondary and tertiary health sectors to ensure sustainable service delivery models.

It is believed that substantial savings would accrue from: use of simpler diagnostic tests for a high proportion of patients with non-complex sleep apnoea; reduced travel re-imbursement for patients from regional centres; and reduction in costs related to the co-morbidities of sleep apnoea, including from reduced health costs, accident risk and productivity losses.

3.2.1 Workforce

The provision of an integrated service model creates opportunities for State health staff being appointed across health service sites and within private practice. To maintain high standards of clinical practice, clinical support, education and training will be managed through the tertiary centres.

There is scope, with appropriate training, to develop the roles of other health professionals such as general practitioners, nurse practitioners and sleep technologist practitioners to have greater autonomy and responsibility, under the supervision of a sleep physician.

There are opportunities to develop partnerships with general practice to improve access to psychology services for the treatment of chronic insomnia in community and ambulatory care settings.

3.2.2 Training and Professional Development

Teaching of medical and technical and ambulatory care providers is a vital role of the sleep medicine service in WA.

Sleep medicine is an independent speciality. More training positions for Sleep physicians in WA are required. At present there is one adult position at Sir Charles Gairdner Hospital. Development of a second large centre at Royal Perth Hospital/Fiona Stanley Hospital should be associated with provision of a further adult sleep physician training position. In addition a paediatric sleep physician training position should be established at the Princess Margaret Hospital sleep medicine centre. Limited sleep training is also a core component of Respiratory Medicine training that provides al respiratory physician trainees with a basic exposure to the discipline. This requires all Respiratory Trainees to complete 3 months training in sleep medicine, necessitating access to a sleep laboratory. The service delivery model will ensure that Respiratory Trainees can rotate across different sites. This will ensure they can meet the accreditation requirements of the course through access to a public hospital with sleep laboratory facilities. The proposed tertiary sleep laboratories will also provide a basic resource for the training of sleep technologists to populate the public and private sectors, including for rural centres. In addition, a training pathway for Sleep Technologists will be provided aligned with the evolving national guidelines for sleep medicine.

3.2.3 Funding

It is proposed that the Commonwealth, State and private insurance **funding sources** be clearly identified within the comprehensive service model and mechanisms put in place to ensure the funding sources do not limit access or compromise the delivery of sleep services.

Much of sleep medicine can be managed on an outpatient basis and remuneration for this outpatient component could use the privately referred non-inpatient (PRNI) model or similar. While aspects of sleep medicine services (consultations, investigations can be funded on a fee-for-services basis, substantial infrastructure is required which, in the public health system will require State funding to consolidate existing facilities and develop proposed new sites. In private medicine infrastructure

support is commonly provided by the operators of private hospitals and recouped through bed charges to patients and their insurers. Funds are also required to provide equipment to financially disadvantaged people and there is an existing small Department of Health fund to do this which requires review to ensure it is equipped to meet future demand.

Funding Investigation and Treatment

Most sleep-medicine services in the public domain [consultations, investigations (including overnight sleep laboratory studies), initiation of treatment] are conducted on an outpatient basis delivered on a fee-for-service basis through Medicare or through hospital outpatient services. Services involving Telehealth and/or PATS require additional expenditure, according to well established precedents. Facilities to conduct investigations on patients without private health insurance will require capital support from within the state health budget. Such expenditure requires specific accounting in the base budget of hospitals designated to conduct this work. Currently Western Australia is poorly resourced for public-sector sleep beds (Appendix 1). The facilities required are articulated in Appendix 2.

The situation differs in private sleep medicine in respect to overnight sleep laboratory studies as these are provided on an inpatient basis incurring overnight bed charges through private insurance or personal funds.

Existing state and federal government arrangements suffice where the patient is suffering from an acute illness related to sleep disorders requiring inpatient care.

Equipment to Treat Sleep Disorders

Treatment of breathing disorders of sleep often requires expensive equipment. Where means permit this is provided by individual contribution subsidised by co-contribution by private health funds, where applicable. The state operates small funds to support provision to the financially disadvantaged (through the Department of Health) and to the long-term disabled (through the Disability Services Commission). These funds require annual review to ensure that they are appropriately resourced for current need. Applications for equipment (which are carefully vetted) have exceeded funds in recent years. The Department of Health Fund has not been significantly increased despite increasing demand driven by population growth, increased obesity and ageing of the community and better identification of the condition.

3.3 A Consumer Perspective

Mr Ron Edmiston, President, Sleep Disorders Australia, WA Branch has contributed the following statement.

I was originally diagnosed with Obstructive Sleep Apnoea in January 1995 after several years of progressively feeling tired all the time. It was common for me to have an afternoon sleep in the weekend to try and catch up. It was not uncommon for me to go to sleep in the evening before bedtime even if we had visitors I often went to sleep while they were there. I just put this down to getting older and the pressure of the job I was doing managing a small manufacturing company.

After being diagnosed with Sleep Apnoea and prescribed the use of a CPAP machine for treatment I can honestly say my life was changed and I have also had this said to me many times by others who have been diagnosed and treated.

In 1996 a support group for those with Sleep Disorders was set up in Western

Australia to inform our members and the public about the effects on general health to those who have poor quality sleep. I have been a member of this group since it was formed and been President for about 10 years. In this time I have spoken to many hundreds of people about sleep problems and treatments and formed the opinion that sleep disorders are under diagnosed and that we as a support group need to continue to create awareness in the community of sleep disorders and the effect on an individuals health and quality of life and that the Health System needs to provide broader support to diagnose and treat sleep disorders particularly in the outer metropolitan and country Public Health systems.

3.4 Horizon Scanning

With the high prevalence of OSA, increasing evidence of the health consequences of OSA and emergence of home-based diagnostic tools, the method of delivery of Sleep Services will change significantly in the medium term. This model of care allows for this change. Workforce diversification will be fundamental to the capacity of the health system to meet demand. This will require substantial investment in workforce education and up skilling. It is anticipated that there will be a need to train more sleep physicians, up skill General Practitioners, nursing and allied health staff to take on more of the clinical lead for uncomplicated sleep disorders and the role of the Sleep Specialist will be to provide governance and education of these practitioners and to manage complex sleep disorders. Governance structures need to be clearly defined to ensure the provision of high quality care and patient safety.

Sleep medicine is a highly technologically based speciality and is ideally placed to take advantage of electronic data transmission. Telehealth methods could be applied to both diagnostic and therapeutic aspects of Sleep Services. Such technologies should be incorporated into the service model to enhance linkages between community based Sleep Practitioners, including in rural areas, and tertiary centres of excellence.

4. Key Recommendations

Recommendation 1: Endorsing the model of care

That the Respiratory Health Network Sleep Disorders model of care for WA Health be endorsed.

Recommendation 2: State-wide structure

That Area Health Services develop and implement a State-wide sleep disorders clinical governance model to deliver the model of care for Sleep Disorders in WA Health

Recommendation 3: Secondary and Tertiary services

That tertiary sleep disorders services are provided at the State's type 6 hospitals as set out in the WA Clinical Services Framework and a number of general hospitals establish secondary sleep centres coordinated and integrated with the tertiary services.

3.1 Increase publically funded sleep laboratory beds to at least the Australian national average

3.2 Establish secondary sleep services at metropolitan general hospitals to promote care in the community setting including development of home-based diagnostic services

3.3 Explore methods of collaboration between secondary hospitals and the private sector to provide these secondary sleep services

3.4 Consolidate tertiary services at Sir Charles Gairdner Hospital, Royal Perth/Fiona Stanley Hospital and Princess Margaret Hospital to ensure adequate facilities for management of complex sleep disorders and of major co-morbidities (including development of multidisciplinary clinics) and to provide a training resource for sleep physicians and technologists

3.5 Develop multidisciplinary clinics at major centres

3.6 Encourage the development of more private sector sleep physician services

Recommendation 4: Rural and regional services

Investigate expanding Sleep Service provision in rural WA based on the Sleep Disorders Model of Care to provide equality of access to rural patients and reduce travel costs.

4.1 Identify rural areas where a local diagnostic and therapeutic Sleep Service can be sited. These might include Albany (existing visiting service); Bunbury/Busselton (existing resident sleep physician and attendant services); Kalgoorlie, Geraldton, Karratha/Port Hedland and Broome (no existing specialist services in these latter regions).

4.2 Encourage the development of local sleep physician services in these centres or failing that, a visiting service by metropolitan based sleep physicians

4.3 Ensure Telehealth is a key component of the rural service. In areas where it is not possible to site services locally Telehealth should be investigated as a means to improve the link with Metropolitan based Sleep Services to improve access and efficiency of service delivery.

4.4 Consult current providers of Sleep Services to rural areas to inform this process

4.5 Investigate collaborations with the private sector

4.6 Allocate resources to up skill rurally based General Practitioners, nurses and allied health staff in all aspects of sleep disorders management

Recommendation 5: Workforce

That the capacity of the community based workforce be enhanced through the expansion of multidisciplinary team with clearly defined roles and responsibilities.

5.1 Increase capacity to train sleep physicians and sleep technologists through further development of tertiary centres

5.2 Up skill General Practitioners, nursing and allied health professionals in all aspects of complex Sleep Disorders

5.3 Encourage Sleep medicine as a special interest in general practice

5.4 Recruit and train Sleep nurse practitioners, Sleep technologist practitioners to assist in the management of sleep apnoea, including data collection and implementation of treatment, particularly in rural and remote locations

5.5 Increase role for home visiting nurses to support therapy, at least in part through developing links with community based Chronic Disease Management Teams (CDMT)

5.6 Expand support for clinical psychology in management of chronic insomnia.

5.7 Expand access to Medicare funded psychology services to include referral from sleep physicians.

Recommendation 6: Funding support for therapy for the disadvantaged

6.1 Review the State funded subsidy scheme for equipment to treat sleep apnoea for financially disadvantaged consumers, to ensure its governance and resources are appropriate for current and future demand.

6.2 This subsidy scheme be extended to other treatment modalities for sleep apnoea, in particular dental devices.

Recommendation 7: Relationship to obesity and chronic disease

7.1 Develop pathways that ensure appropriate screening, referral and linkages between obesity management, chronic disease and sleep disorders services across the continuum of care using a multidisciplinary approach including surgical, dietician and psychological services.

7.2 Improve access to self management programs for people with SDB

7.3 Develop links and integration with chronic disease management programs.

Recommendation 8: Teaching, Training and Research

That active teaching and research programs be encouraged as an important aspect in promoting and equipping sleep services to meet community requirements.

8.1 Encourage increase in undergraduate training in sleep medicine

8.2 Increase funded training positions in adult sleep medicine in WA from one to two

8.3 Consider involving the private sector in sleep physician and allied health training

8.4 Establish a training position in paediatric sleep medicine

8.5 Provide competency based training for Sleep Technologists to meet evolving national guidelines for sleep medicine

8.6 Encourage development of active sleep medicine research programs across sleep medicine services in WA health and in private practice

Recommendation 9: Infrastructure

Tertiary and Secondary centres

9.1 Establish and/or enhance infrastructure to support or develop tertiary and secondary services as outlined in Appendix 2.

9.2 Ensure extent of these services be in accord with need as defined by the WA Clinical Services Framework and national benchmarks

Information, Communication and Technology Requirements

9.3 Establish dedicated clinical support services including telehealth options within secondary and tertiary centres to improve support for outer-urban, rural and remote services

9.4 Support the development of Information and Communication Technology to enable care planning to be integrated across hospital and community public health services and facilitate appropriate data exchange between health care providers to enable the provision of high quality care in the most appropriate setting.

9.5 Improve access to and control of personal health information of all patients with sleep disorders. This should include consumer hand held records and/or e-health records and shared databases for patient and service provider management.

The Sleep Disorders Working Party understands these recommendations require different resource and time allocations for implementation. Given this, a strategy for the phased implementation of recommendations will be developed using the following parameters:

- **Phase 1:** Early implementation of those recommendations that are achievable within existing resources and current service provision.
- **Phase 2:** Delayed implementation of those requiring further planning and development.
- **Phase 3:** Later implementation of those requiring additional human resources, funding and endorsement.

Appendix 3 sets a table with the recommendations and the 3 phases of implementation. An implementation group will be convened to determine priorities and achievable outcomes, commencing with those that can be undertaken within the existing resources and in partnership with health service providers across the continuum of care and jurisdictional boundaries.

5. Evaluation

An evaluation of the implementation of service delivery in metropolitan and rural areas will be undertaken. Ongoing research and evaluation of the sleep disorders service is integral to the proposed service delivery model.

Glossary

ASA	Australian Sleep Association
COPD	Chronic Obstructive Pulmonary Disease
CDMT	Chronic Disease Management Teams
CPAP	Continuous Positive Airways Pressure
FHHS	Fremantle Hospital and Health Service
FHS	Fiona Stanley Hospital
MH	Mount Hospital
MSLT	Multiple Sleep Latency Test
OSA	Obstructive Sleep Apnoea
PMH	Princess Margaret Hospital
PRNI	Privately referred non- inpatient
PSG	Polysomnography
REM	Rapid Eye Movement
RPH	Royal Perth Hospital
SCGH	Sir Charles Gairdner Hospital
SDB	Sleep disordered breathing
SJOG	St John of God
SKHS	Swan Kalamunda Health Service
SSA	Sleep Studies Australia
TSANZ	Thoracic Society of Australia and New Zealand
WACHS	West Australian Country Health Service
WASDRI	West Australian Sleep Disorders Research Institute

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Appendices

Appendix 1. Number of Adult Sleep Beds (Total/Private/Public) in Each State. *

						Beds/Million Population		
State	Private Beds	Public Beds	Private:Public Bed Ratio	Total Beds	Population, millions	Private	Public	Total
WA	15.5	5	3.1	20.5	2.05	7.6	2.4	10.0
VIC	24.5	35.5	0.7	59	5.1	4.8	6.8	11.6
TAS	6	5	1.2	11	0.49	12.2	10.2	22.4
SA	21	9	2.3	30	1.55	13.5	5.8	19.3
QLD	28	32	0.9	60	4.05	6.9	7.9	14.8
NSW	44.5	31.5	1.4	76	6.83	6.5	4.6	11.1
Total	**139.5**	**117**	**1.2**	**256.5**	**20.1**	**6.9**	**5.8**	**12.7**

* Based on Australian Sleep Association Sleep Clinic Listing 2007 and 2006 census data.

Appendix 2. Facilities, equipment and workforce requirements for sleep disorder services in WA

	Tertiary Centres	Secondary Centres
Equipment		
Diagnostic	1. Full polysomnographic equipment including C02 monitoring, oesophageal monitoring.	1.Portable diagnostic unit
	2.Arterial Blood Gas machine	2.Arterial Blood Gas machine
	3. Computing equipment with networking facilities which allow remote log in	3. Computing equipment with networking facilities which allow remote log in
Therapeutic	CPAP and NIV trial equipment	CPAP and NIV trial equipment
Facilities		
	Single rooms for overnight studies. Used as clinic rooms for CPAP therapy trials during the day	Clinic rooms for CPAP therapy trials. Used for patient set-ups in late afternoon/early evening
	Sleep technologist reporting room	Sleep technologist reporting room
	Storage space for trial equipment	Storage space for trial equipment
	Consulting rooms	Consulting rooms
	Telehealth facilities	Telehealth facilities
Workforce		
	Sleep Physician	Sleep Physician
	Sleep Technologists	Sleep Technologists
	Psychologist	Psychologist*
	Dietician	Dietician*
	Nurse for home visits for complex patients*	Administrative staff
	Administrative staff	
* Either sited at Centre or with strong links to community based providers		

Appendix 3: Recommendations Implementation Plan for Model of Care

Recommendation	Achieve Now	Further Planning Required	Additional Resource Required	Partnership	Responsible person (to be allocated by Implementation group once noted by SHEF)
1. Endorsing the model of care	☐	☐	☐		SHEF
2. State-wide structure	☐	☒	☐	Area Health Services	
3. Secondary & tertiary services					
3.1 Increase publically funded sleep laboratory beds to at least the Australian national average.	☐	☐	☒	Area Health Services	
3.2 Establish secondary sleep services at metropolitan general hospitals to promote care in the community setting including development of home-based diagnostic services.	☐	☒	☐	Area Health Services Private providers	
3.3 Explore methods of collaboration between secondary hospitals and the private sector to provide these secondary sleep services.	☐	☒	☐	Area Health Services Private providers	
3.4 Consolidate tertiary services at SCGH, RPH, Fiona Stanley Hospital and PMH to ensure adequate facilities for management of complex sleep disorders and of major co-morbidities (including development of multidisciplinary clinics) and to provide a training resource for sleep physicians and technologists.	☐	☒	☐	Sleep Physicians Area Health Services Private providers	
3.5 Develop Multidisciplinary clinics at major centres	☐	☐	☒	Sleep Physicians Area Health Services Private providers	

Recommendation	Achieve Now	Further Planning Required	Additional Resource Required	Partnership	Responsible person (to be allocated by Implementation group once noted by SHEF)
3.6 Encourage the development of more private sector sleep physician services	☐	☒	☐	Sleep Physicians Area Health Services Private providers	
4. Rural and regional services					
4.1 Identify rural areas where a local diagnostic and therapeutic sleep service can be sited. These might include Albany (existing visiting service); Bunbury/Busselton (existing resident sleep physician and attendant services); specialist services in these latter regions).	☐	☒	☐	WA Country Health Service (WACHS) and metropolitan Area Health Services	
4.2 Encourage the development of local sleep physician services in these centres or failing that, a visiting service by metropolitan based sleep physicians	☐	☒	☐	Public and private sleep physicians and sleep technologists	
4.3 Ensure Telehealth is a key component of the rural service. In areas where it is not possible to site services locally Telehealth should be investigated as a means to improve the link with Metropolitan based Sleep Services to improve access and efficiency of service delivery.	☐	☒	☐	WACHS and metropolitan Area Health Services	
4.4 Consult current providers of Sleep Services to rural areas to inform this process	☒	☐	☐	Public and private sleep physicians and sleep technologists	
4.5 Investigate collaborations with the private sector	☒	☐	☐	Public and private sleep physicians and sleep technologists	
4.6 Allocate resources to up skill rurally based General Practitioners, nurses and allied health	☒	☐	☐	Public and private sleep physicians and	

Recommendation	Achieve Now	Further Planning Required	Additional Resource Required	Partnership	Responsible person (to be allocated by Implementation group once noted by SHEF)
staff in all aspects of sleep disorders management				sleep technologists WAGP Network Divisions of General Practice Rural Health West	
5. Workforce					
5.1 Increase capacity to train sleep physicians and sleep technologists through further development of tertiary centres	☐	☐	☒	Area Health Services	
5.2 Up skill General Practitioners, nursing and allied health professionals in all aspects of complex sleep disorders	☒	☐	☐	Sleep Physicians Australian Sleep Association	
5.3 Encourage Sleep medicine as a special interest in general practice	☐	☒	☐	Australasian Sleep Association WAGP Network RACGP	
5.4 Recruit and train Sleep nurse practitioners, Sleep technologist practitioners to assist in the management of sleep apnoea, including data collection and implementation of treatment, particularly in rural and remote locations	☐	☒	☐	Area Health Services Private practitioners	
5.5 Increase role for home visiting nurses to support therapy, at least in part through developing links with community based services for people with chronic disease.	☐	☒	☐	Silver Chain Area Health Services	
5.6 Expand support for clinical psychology in management of chronic insomnia.	☐	☒	☐	Area Health Services Divisions of General Practice	

Recommendation	Achieve Now	Further Planning Required	Additional Resource Required	Partnership	Responsible person (to be allocated by Implementation group once noted by SHEF)
				Psychologists Professional Body	
5.7 Expand access to Medicare funded psychology services to include referral from sleep physicians	☒	☐	☐	Department of Health & Ageing Australasian Sleep Association	
6. Funding support for therapy for the disadvantaged					
6.1 Review the State funded subsidy scheme for equipment to treat sleep apnoea for financially disadvantaged consumers, to ensure it's governance and resources are appropriate for current and future demand	☐	☒	☐	Area Health Services	
6.2 This subsidy scheme be extended to other treatment modalities for sleep apnoea, in particular dental devices.	☐	☐	☒	Area Health Services	
7. Relationship to obesity and chronic disease					
7.1 Develop pathways that ensure appropriate screening, referral and linkages between obesity management, chronic disease and sleep disorders services across the continuum of care using a multidisciplinary approach including surgical, dietician and psychological services.	☒	☐	☐	Area Health Services Allied health professionals Bariatric surgeons	
7.2 Improve access to self management programs for people with SDB	☒	☐	☐	WAGP Network ABHI self management programs	

Recommendation	Achieve Now	Further Planning Required	Additional Resource Required	Partnership	Responsible person (to be allocated by Implementation group once noted by SHEF)
				Area Health Services Peer support groups	
7.3 Develop links and integration with chronic disease management programs	☒	☐	☐	WAGP Network Community organisations Area Health Services Peer support groups	
8. Teaching, training & research					
8.1 Encourage increase in undergraduate training in sleep medicine	☐	☒	☐	Australasian Sleep Association University of WA	
8.2 Increase funded training positions in adult sleep medicine in WA from one to two	☐	☐	☒	Area Health Services Department of Health	
8.3 Consider involving the private sector in sleep physician and allied health training	☐	☒	☐	Public and Private Sleep Physicians	
8.4 Establish a training position in paediatric sleep medicine	☐	☒	☐	Area Health Services Department of Health	
8.5 Provide competency based training for Sleep Technologists to meet national guidelines for sleep medicine	☐	☒	☐	Australasian Sleep Association	
8.6 Encourage development of active sleep medicine research programs across sleep medicine services in WA health and in private practice	☐	☒	☐	Area Health Services WA Institute of Medical Research Australasian Sleep Association	
9. Infrastructure					

Recommendation		Achieve Now	Further Planning Required	Additional Resource Required	Partnership	Responsible person (to be allocated by Implementation group once noted by SHEF)
9.1	Establish and/or enhance infrastructure to support or develop tertiary and secondary services as outlined in Appendix 2	☐	☐	☒	Department of Health	
9.2	Ensure extent of these services be in accord with need as defined by the WA Clinical Services Framework and national benchmarks	☐	☒	☐	Department of Health Area Health Services	
9.3	Establish dedicated clinical support services including telehealth options within secondary and tertiary centres to improve support for outer-urban, rural and remote services	☐	☒	☐	WACHS and metropolitan Area Health Services	
9.4	Support the development of Information and Communication Technology to enable care planning to be integrated across hospital and community public health services and facilitate appropriate data exchange between health care providers to enable the provision of high quality care in the most appropriate setting	☐	☒	☐	Department of Health	
9.5	Improve access to and control of personal health information of all patients with sleep disorders. This should include consumer hand held records and/or e-health records and shared databases for patient and service provider management.	☐	☒	☐	Department of Health	

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