NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

Overview

Continuous positive airway pressure for the treatment of obstructive sleep apnoea/hypopnoea syndrome

The overview is written by members of the Institute's team of technical analysts. It forms part of the information received by the Appraisal Committee members before the first committee meeting. The overview summarises the evidence and views that have been submitted by consultees and evaluated by the Assessment Group, and highlights key issues and uncertainties. To allow sufficient time for the overview to be circulated to Appraisal Committee members before the meeting, it is prepared before the Institute receives consultees' comments on the assessment report. These comments are therefore not addressed in the overview.

A list of the sources of evidence used in the preparation of this document is given in appendix A.

1 Background

1.1 The condition

Apnoea is defined as temporary absence or cessation of breathing. Obstructive sleep apnoea/hypopnoea syndrome (OSAHS) is a condition in which a person experiences repeated episodes of apnoea due to partial or complete collapse of the pharyngeal airway during sleep. The narrowing or closure of the airway is caused by a decrease in the tone of the muscles supporting the airway during sleep. Complete closure or obstruction stops airflow (apnoea) and partial obstruction decreases airflow (hypopnoea). OSAHS results in episodes of brief awakening from sleep to restore normal breathing.

The symptoms of OSAHS include impaired alertness, cognitive dysfunction, excessive daytime sleepiness and snoring. Cognitive function, mood and quality of life can be adversely affected due to excessive daytime sleepiness, and OSAHS is also associated with high blood pressure, thereby affecting the

risk of cardiovascular disease and stroke, and with an increased risk of road traffic accidents.

People with OSAHS have described how exhaustion and problems with staying awake during the day lead to an inability to interact with family members during the evenings, and that loud snoring and restless movements at night can be annoying for bed partners. They have also described the adverse impact on their social and working lives of falling asleep during events/meetings, and difficulties in concentrating due to daytime sleepiness. They also describe experiences of falling asleep while driving and road traffic accidents or near misses.

Diagnosis of OHASA involves referral to a sleep unit for an overnight polysomnography, which records multiple physiological signals during sleep.

The severity of OSAHS is usually defined by the apnoea/hyponoea index (AHI), which classifies disease severity by the number of episodes of apnoea/hypopnoea per hour of sleep (mild OSAHS, AHI = 5–14; moderate, AHI = 5–30; severe, AHI = over 30).

The risk of developing OSAHS increases with age. Major risk factors are obesity and being male. OSAHS is also associated with certain craniofacial abnormalities (such as retrognathia), enlarged tonsils and enlarged tongue. Lifestyle choices such as use of alcohol or sedatives can also increase the risk or severity of OSAHS.

OSAHS has been reported to affect around 4% of middle-aged men and 2% of middle-aged women in the UK, but the prevalence may be underestimated because of undiagnosed OSAHS. It is estimated that at least 1% of men in the UK have severe OSAHS.

1.2 Current management

Treatments aim to reduce the number of episodes of apnoea/hypopnoea experienced during sleep and so reduce daytime sleepiness. There are currently four options available for treating OSAHS, including continuous positive airway pressure (CPAP); the other three are as follows:

Conservative management: This involves helping people to lose weight if applicable (as return to an ideal body weight can lessen the severity of OSAHS) or helping them to stop smoking or decrease alcohol consumption.

Surgery: One of the most common surgical procedures performed is uvulopalatopharyngoplasty, which involves resection of the uvula as well as redundant retrolingual soft tissue. Other surgical techniques available are genioglossus advancement, maxillary–mandibular advancement and radiofrequency ablation. Surgery is only considered if non-surgical techniques are inappropriate. There is a lack of consensus among clinicians as to whether surgery is appropriate, and there is a lack of evidence for its clinical effectiveness.

Dental devices: A number of devices are available that are designed to keep the upper airway open during sleep. The efficacy of dental devices has been established in clinical trials, but they are usually considered to be a treatment option only for mild and moderate OSAHS.

2 The technology

CPAP therapy first became available in 1981, and is the predominant treatment for OSAHS. A CPAP device consists of a unit that generates airflow which is directed to the person via a mask. Positive pressure is generated by the airflow, which prevents upper airway collapse. CPAP devices must always be worn when the person is asleep in order to be effective.

There are thought to be wide variations in the provision of CPAP treatment across the UK. Devices available in the UK are listed in table 1.

Table 1 Summary description of technology

Manufacturer	Product	Acquisition cost
Fisher & Paykel Healthcare Ltd	Sleep apnoea therapy equipment: HC230, HC600	Standard CPAP device: £250 Combined CPAP/humidifier: £330
ResMed (UK)	Sleep apnoea therapy equipment: S7 Elite, S7 Lightweight, S6 Lightweight, S6 Plus, S6 Elite Full face mask system: UltraMirage FFM, Model Mirage Swift, Model Mirage Activa Clinical interface kit	CPAP device: £300 Nasal mask: £80–150 Full face mask: £115–120
Sunrise Medical Ltd	Sleep apnoea therapy equipment: RPM BiLevel 9055, Horizon 9000, Horizon 9001 RPM 9054 AutoAdjust FlexAire Mask, Serenity Mask	Not available
Tyco Healthcare Ltd	Sleep apnoea therapy equipment: GoodKnight 420G, GoodKnight 420S, GoodKnight 420 Evolution, GoodKnight 425/425ST Heated humidifier: GoodKnight H2O Sleep therapy patient interfaces	GK420G (most commonly purchased): £300 Basic mask: £25 Breeze headgear: £60 GK H2O humidifier: £150 (all prices are exclusive of VAT)
Vital Signs Ltd	Sleep apnoea therapy equipment: Breas PV10, Breas PV10 i	CPAP device: £250–350
Respironics UK Ltd	Sleep apnoea therapy equipment: REMstar Pro M Series with C-Flex and REMstar Auto M Series with C-Flex	REMstar Pro M Series with C-Flex: £325 REMstar Auto M Series with C-Flex: £550

Compliance with CPAP treatment has been identified as a problem. Studies of compliance have identified several reasons for non-use, including poor mask fit, pressure intolerance and, more commonly, upper airway symptoms such as nasal dryness, nasal bleeding and throat irritation. Humidification devices are now commonly used in conjunction with CPAP devices in order to reduce these side effects.

A fixed CPAP device delivers a single pressure throughout the night, and the person will continue to receive this pressure until a further titration study is performed to determine whether this pressure is still appropriate. Auto-titrating CPAP devices continuously adjust the delivered pressure throughout the night, with the aim of improving comfort and thus compliance.

The Scottish Intercollegiate Guidelines Network (guidance No 73, updated in July 2003) has recommended that CPAP is the first choice therapy for patients with moderate or severe OSAHS that is sufficiently symptomatic to require intervention; that persistent low CPAP use (less than two hours per night) over 6 months, following effort to improve patient comfort, should lead to a review of treatment; and that intra-oral devices are an appropriate therapy for snorers and patients with mild OSAHS with normal daytime alertness.

3 The evidence

3.1 Clinical effectiveness

The assessment report included 44 randomised controlled trials (RCTs) that compared the efficacy of CPAP with placebo/usual care or dental devices. Submissions were obtained from three manufacturers. Fisher & Paykel Healthcare included one RCT that compared CPAP with placebo/usual care. This study was excluded by the Assessment Group on grounds of study quality. Respironics did not carry out a review of clinical effectiveness, and Resmed presented the findings of a Cochrane systematic review carried out in 2000.

3.1.1 Daytime sleepiness

CPAP compared with placebo/usual care

The Assessment Group identified 23 RCTS that compared CPAP with placebo/usual care using the Epworth sleepiness scale (ESS). A meta-analysis of these studies identified a significantly greater reduction in daytime sleepiness with CPAP compared with placebo/usual care (weighted mean difference in ESS score −2.7; 95% confidence interval [CI] −3.5 to −2.0), but heterogeneity between studies was high (I^2 = 71%).

A meta-analysis of the 13 parallel-group studies identified showed a statistically significantly greater reduction in daytime sleepiness with CPAP compared with placebo/usual care (weighted mean difference in ESS score −3.5; 95% CI −4.8 to −2.3). A meta-analysis of the seven crossover studies identified did not find a statistically significantly greater reduction in daytime sleepiness with CPAP compared with placebo/usual care (weighted mean difference in ESS score −2.0; 95% CI −4.5 to 1.7).

The Assessment Group concluded that although moderate heterogeneity was identified (with the exception of two studies), a consistent benefit was found in favour of CPAP in reducing levels of daytime sleepiness compared with placebo/usual care.

The Cochrane systematic review submitted by Resmed included 36 RCTs. A meta-analysis of the parallel-group studies found a statistically significantly greater reduction in daytime sleepiness with CPAP compared with control (weighted mean difference in ESS score −3.83; 95% CI −4.57 to −3.09). A meta-analysis of the crossover studies showed a statistically significantly greater reduction in daytime sleepiness with CPAP compared with control (weighted mean difference in ESS score −1.84; 95% CI −2.57 to −1.11).

The RCT included by Fisher & Paykels compared CPAP with placebo, and reported improvements in subjective sleepiness (measured by ESS) and in objective wakefulness (measured by the 'modified maintenance of wakefulness' test) with CPAP.

CPAP compared with dental devices

The Assessment Group identified six RCTs that compared the effects on daytime sleepiness (ESS score) of CPAP and dental devices. A meta-analysis of these studies did not identify a statistically significant difference between the two treatments (weighted mean difference in ESS score −0.9; 95% CI −2.1 to 0.4).

The Assessment Group also found that removing individual trials from the analysis, use of a fixed-effect model or conducting subgroup analysis by study

design (parallel group or crossover) did not result in any statistically significant differences in daytime sleepiness between CPAP and dental devices.

A meta-analysis from the Cochrane systematic review identified statistically significant improvements in the AHI and in sleeping minimum oxygen saturation in favour of CPAP compared with dental devices (weighted mean difference −7.3; 95% CI −10.0 to 4.7).

Comparison of different populations

The Assessment Group undertook a series of meta-analyses that compared the effect of CPAP on levels of daytime sleepiness among different populations. This showed that significantly better reductions in daytime sleepiness were seen with CPAP compared with control for all categories of OSAHS, but that the effect was larger for severe than for mild OSAHS (table 2)

Table 2 Results from meta-analyses of the effect of CPAP on daytime sleepiness

OSAHS severity		Meta-analysis of n studies	Reduction in daytime sleepiness with CPAP compared with control (weighted mean difference in ESS score)
Mild	AHI 5–14	3	−1.5 (95% CI −3.4 to −0.4)
Moderate	AHI 15–30	7	−2.04 (95% CI −2.99 to −1.09)
Severe	AHI > 30	13	−3.41 (95% CI −4.56 to −2.26)
Mild	ESS 0–9*	2	−1.07 (95% CI −1.82 to −0.31)
Moderate	ESS 10–15*	16	−2.33 (95% CI −3.04 to −1.62)
Severe	ESS 16–24*	5	−4.99 (95% CI −6.51 to −3.47)
* Baseline score			

3.1.2 Blood pressure outcomes (daytime mean arterial pressure)

The Assessment Group identified six RCTs that measured daytime mean arterial pressure. A meta-analysis of these trials found that CPAP reduced arterial blood pressure compared with placebo/usual care (mean difference –2.1 mmHg; 95% CI –4.3 to 0.0 mmHg). However, when these RCTs were analysed by severity of OSAHS, a statistically significant treatment effect in favour of CPAP was identified only for severe OSAHS (mean difference –4.2

mmHg; 95% CI –6.4 to –2.0 mmHg), but not for mild (mean difference 1.1 mmHg; 95% CI –2.9 to 5.1 mmHg) or moderate (mean difference –3.4 mmHg; 95% CI –7.9 to –1.2 mmHg) OSAHS.

3.1.3 Driving ability and road traffic accidents

The Assessment Group identified seven RCTs that evaluated the effect of CPAP treatment on driving ability, using the Steerclear computerised driving simulator program. A meta-analysis of the studies that reported the number of obstacles hit (n = 4) did not identify a statistically significant difference between CPAP treatment and placebo (weighted mean difference −5.74; 95% CI −14.75 to 3.27). A meta-analysis of the two trials that reported percentage of obstacles hit did not identified a statistically significant difference in favour of CPAP (weighted mean difference 0.00; 95% CI −3.35 to 3.35).

The Assessment Group identified one trial that used a computerised simulated driving program that assessed night-time driving ability. Statistically significant improvements in position on road (p = 0.03) , length of drive (p = 0.02) and standard deviation of deterioration (p=0.007)) were identified in favour of CPAP compared with placebo.

The assessment group identified two studies which estimated the impact of CPAP therapy on road traffic accidents. The first study (a meta-analysis of 8 before and after studies) estimated that use of CPAP reduced the odds of road traffic accident by 75% (OR= 0.15, variance 0.0094). The second study showed reduced odds of road traffic accident with CPAP therapy (OR= 0.33, variance 0.02075). A meta-analysis of these two studies identified an 83% reduction in road traffic accidents (OR=0.17, variance 0.00098). Resmed reported the findings of a case control study which estimated the annual number of RTA amongst people with OSAHS was 0.18 before and 0.06 after initiation of CPAP therapy, over a three year period.

3.1.4 Health-related quality of life

The Assessment Group identified 37 trials that reported effects on health-related quality of life, of which 28 compared CPAP with placebo/usual care

and nine compared CPAP with dental devices. The Assessment Group pointed out that the findings for quality of life were contradictory, but this may have been caused by differences in study quality, measurement instrument used and study design. Most of the studies involved people with moderate baseline OSAHS.

CPAP compared with placebo/usual care

Six studies were identified that used the SF-36 instrument for measuring health-related quality of life. None of these studies found a statistically significant difference between CPAP and placebo/usual care in any of the subscales, but there was a trend towards an improvement in favour of CPAP in the vitality and physical role subscales. The Assessment Group pointed out that there was moderate to high variation or inconsistency in the treatment effect (statistical heterogeneity) for most of the subscales; therefore some caution needs to be exercised in generalising these findings to all populations receiving CPAP.

Four studies were identified that used the Functional Outcomes of Sleep Questionnaire. A statistically significant benefit in favour of CPAP was identified for the activity level and social outcome subscales, but not for the general productivity, intimacy and sexual activity or vigilance subscales, or total scores. Only two studies reported the Sleep Apnoea Quality of Life Index total score: one reported a significant benefit with CPAP compared with control, but in the other study there was no statistically significant difference.

CPAP compared with dental devices

The Assessment Group noted that there were an insufficient number of studies in order to perform meta-analyses for most of the quality-of-life outcome measures. There was no statistically significant difference between CPAP and dental devices when the results from two studies reporting the Functional Outcomes of Sleep Questionnaire and two studies reporting the Sleep Apnoea Quality of Life Index were pooled. Three studies used the SF-36 instrument, but they each used different scores and the findings were not consistent.

3.1.5 Compliance with CPAP therapy

The assessment group referred to an observational study which was carried out over 6 years in a cohort of Scottish patients and in which compliance rates were 84% at one year, 74% at two years, 73% at three years and 68% after four years.

Resmed identified seven studies which reported short and longer term rates of compliance with CPAP therapy (Table 3).

Table 3 Compliance with CPAP (fixed) among patients with OSAHS

Study	N	Follow-up (months)	Rate of compliance
Finley et al 2000	50	24	0.72
McArdle et al 1998	1,211	60	0.68
Kiely & McNicholas	91	2-12	0.78
Peppin 1999	121	1	0.77
Peppin 1999	121	2	0.82
Peppin 1999	121	3	0.78
Krieger et al 1998	575	36	0.90
Krieger et al 1998	575	84	0.85
Stradling et al 1997	122	1.5	0.64
Stradling et al 1997	122	1.5	0.23
Sin et al 2002	296	3	0.83
Sin et al 2002	296	6	0.79

The estimated mean rate of compliance from these studies was 71% at less than twelve months and 79% at twelve months or more.

3.2 Cost effectiveness

Four published economic evaluations were identified by the Assessment Group, all of which compared CPAP with a “do nothing” alternative. These studies are summarized in table 3.

Table 4 Summary of the characteristics of the economic evaluations identified in the Assessment Group's systematic review

Study	Base case	Time horizon	Utility gains	ICER[b]	Sensitivity analysis
Ayes et al. (2006)	People aged 25–54 years	5 years	Average utility gain was 0.23 (valued by standard gamble and patient preferences, rather than societal preferences)	$3354 per QALY from a third party payer perspective and $314 from a societal perspective.	ICERs robust to changes in parameter estimates. Probabilistic sensitivity analyses found that CPAP was always cost effective based on societal willingness to pay at $50,000 per QALY.
Mar et al. (2003)	People aged 50 years with moderate to severe OSAHS	5 years	Baseline EQ-5D=0.74 Post treat EQ-5D = 0.81	€ 7861 per QALY over a 5-year time horizon, and € 4938 per QALY for a lifetime horizon.	Changes in the parameter estimates did not have a significant effect on the ICERs, but when the lowest utility estimate and a 5-year time horizon was used the ICER exceeded € 20,000 per QALY.
Chilcott et al. (2000) CPAP compared with dental devices	Not available	5 years	Indirect approach was undertaken to estimate utilities	£99,000 per QALY at 1 month £8,300 per QALY at 1 year. £5,200 per QALY at 2 years. £3,200 per QALY at 5 years.	Several univariate sensitivity analyses were undertaken. All ICERs over one year were less than £16,000 per QALY gained.
Tousignant et al. (1994)	People with an average age of 57 years with moderate or severe OSAHS.	lifetime	Mean utility gain Pre-treatment health state=0.63 Mean utility gain nCPAP treatment health state=0.87	Can $ 9,809 per QALY for the high cost estimate and Can $ 3,523	Not reported

Fisher & Pakyel Ltd and Respironics Ltd did not submit their own cost-effectiveness analyses. The Assessment Group therefore only carried out an evaluation of the economic model submitted by ResMed.

3.2.1 The ResMed model

ResMed Model structure

- A cost–utility analysis comparing fixed CPAP and auto-titrating CPAP devices with a 'do nothing' alternative, in people aged 55 years with severe OSAHS (AHI > 30 and ESS score >12), with a 14-year time horizon and from a UK NHS perspective.

- Events (and Relative Risk associated with fixed CPAP) included: cardiovascular event (55%), stroke (57%) and road traffic accident (36%). The probability of survival and of event-free survival was increased by CPAP by 26% and 100% respectively.

- People remained in one of the four health states for 1 year before moving to another state. People who have a cardiovascular event or road traffic accident in one year could have a stroke, cardiovascular event or road traffic accident in a later year, and there was no limit in the number of events they could undergo in subsequent years.

- Assumptions were: people who have had a stroke can no longer drive; there are no complications with fixed or auto-titrating CPAP; compliance with treatment will be 79% for fixed and 84% auto-titrating CPAP, and these rates would not change throughout the lifetime of the model; the CPAP device will last for 7 years.

ResMed Results

- Base-case costing estimates: CPAP was cost-saving by £1559 (fixed) and £2023 (auto-titrating).

- Utility estimates were obtained from the EQ-5D data in the study of Mar et al (2003). The average utility associated with untreated OSAHS was 0.738, and that for CPAP-treated OSAHS was 0.811; the average incremental utility gain from using CPAP was 0.07.

- Both fixed and auto-titrating CPAP dominated 'non-treatment' after a minimum of 2 years of treatment. When cardiovascular and road traffic accidents were excluded from the model, the cost per quality-adjusted

life year (QALY) gained was £4551 and £4219 for fixed and auto-titrating CPAP respectively.

ResMed Sensitivity analysis

The following changes to the model resulted in incremental cost-effectiveness ratios (ICERs) of more than £20,000 per QALY gained:

- the utility for untreated OSAHS is more than 0.89
- the utility for treated OSAHS is 0.68 but the utility for untreated OSAHS remains unchanged
- the time horizon is reduced to 1 year.

Critique of the ResMed model

The Assessment Group identified the following limitations of the Resmed model.

- The ResMed did not include the full range of comparators; it is not clear whether 'no treatment' represents routine clinical practice for people with moderate/severe OSAHS. Because OSAHS is a chronic condition, a lifetime time horizon rather than a 14-year time horizon would be more appropriate.
- The impact of CPAP or of no treatment on health-related quality of life (in terms of utilities) associated with sleepiness was obtained from one 'before and after' study, rather than the available RCT literature. There are weaknesses associated with before and after data that might undermine the results, for example a placebo effect, a Hawthorne effect, regression to the mean and/or co-intervention. The study used did not report the change in ESS score or any other measure in the utility study that would have allowed comparison with the results of the systematic review of RCT evidence.
- There were shortcomings in the internal validity of the electronic model that may have led to inaccurate estimates of costs and QALYs.

3.2.1 The Assessment Group model

Assessment Group Model structure

- A cost–utility analysis comparing CPAP with dental devices and with conservative management in men aged 50 years with moderate OSAHS (base case), with a lifetime time horizon. The model is from a UK NHS perspective.

- Events in the model were coronary heart disease (CHD), stroke (both mediated by blood pressure), and road traffic accident. Treatment effects for CPAP compared with conventional management used in the model are shown in table 4.

Table 5 Treatment effects used to populate the York economic model

	CPAP vs. Conservative Management Mean (SD)
ESS (mean difference)	-
Overall	-2.7 (0.38)
Mild baseline severity (mean difference)	-1.07 (0.39)
Moderate	-2.33 (0.36)
Severe	-4.99 (0.76)
Blood pressure (mean difference)	-
Systolic BP	-1.06 (1.17)
Diastolic BP	-1.20 (0.88)
Road Traffic Accident (odds ratio)	0.17 (0.001)

- Health states in the model were OSAHS, OSAHS post-CHD, OSAHS post-stroke, and death.

- People remained in one of the health states for 1 year, and could remain in the initial OSAHS state until death or until they experience CHD. Those in the latter group who survived moved to the OSAHS post-CHD state, which incorporates the increased mortality and morbidity associated with having a first CHD event. They could remain in the post-CHD state until death or until they have a stroke which could result in disability.

- Assumptions were as follows: people who have had a stroke can no longer drive, the CPAP device will last for 7 years, and a dental device will last for 2 years (based on clinical expert opinion); the compliance rates for CPAP were based on an observational study from Scotland and were 84% at 1 year, 74% at 2 years, 73% at 3 years and 68% after 4 years; there is no difference in the rate of compliance with CPAP and dental devices; there are no complications associated with treatment.

- The majority of CPAP costs and resource use were obtained from the ResMed submission; other relevant data were obtained from published studies and from correspondence with clinical experts.

Assessment Group Results

- The Assessment Group linked the data on clinical efficacy, in the form of the disease-specific ESS, to utility, using two sets of individual patient data that measured ESS and SF-36 profile in the same patients and one set of individual patient data that measured ESS, SF-36 profile and EQ-5D in the same patients. The SF-36 data were used to calculate utility values based on the SF-6D, using an algorithm developed by Brazier et al based on UK public preferences. The EQ-5D data were used to calculate utility based on general UK population tariff values. The three datasets were then used to develop prediction models to estimate the relationship between ESS and utility values based on SF-6D and EQ-5D. A simple linear regression model was fitted to predict absolute utility scores from absolute ESS, controlling for baseline utility and baseline ESS for CPAP. This utility mapping was then applied to data on mean difference in ESS between CPAP and placebo (23 studies) and between CPAP and dental devices (6 studies). A drop in ESS score of one point resulted in a decline in utility of 0.01.
- In general, conservative management resulted in the lowest cost and the lowest number of QALYs, followed by dental devices, with CPAP resulting in the highest cost and the highest number of QALYs. In the base-case analysis for the overall population, the ICER for dental

devices compared with conservative management was £2000 per QALY gained, and the ICER for CPAP compared with dental devices was £3899 per QALY gained. The corresponding ICERs for women were £2532 per QALY gained for dental devices compared with conservative management, and £4335 per QALY gained for CPAP compared with dental devices. The probability of CPAP being more cost-effective than dental devices and conservative management at a threshold of £20,000 per QALY was 0.78 and 0.80 for men and women, respectively.

- The Assessment Group undertook a series of subgroup analyses based on baseline severity of OSAHS as measured by ESS score, and the results are shown in table 5.

Table 5 Subgroup analysis by OSAHS severity

OSAHS severity		Cost per QALY gained for CPAP compared with conventional management[a]
Mild	ESS score 7	£20,585
Moderate	ESS score 13	£9,391
Severe	ESS score 16	£4,413
[a] Dental devices were externally dominated for moderate OSAHS, and no data for dental devices were available for mild and severe OSAHS.		

Assessment Group One-way sensitivity analysis

The only changes that had a significant effect on the ICERs were as follows.

- When the estimated lifespan of the CPAP device was changed to 5 years, the ICER was £16,362 per QALY gained.

- When cardiovascular events and road traffic accidents were excluded from the model, the ICER for the overall population was approximately £8000 per QALY gained.

4 Issues for consideration

The one way sensitivity analyses indicate that the lifetime of the CPAP device is an important driver of the ICER of CPAP compared with dental devices: For a lifetime of 7 years the ICER was £3899 per QALY gained, for a lifetime of 5 years the ICER was £16,362 per QALY gained.

The patient and professional consultees expressed concerns that future OSAHS services cannot be delivered effectively unless more healthcare scientists are recruited and trained to diagnose and treat OSAHS. Furthermore, it was stated that for an improved management of OSAHS in primary care, an education and training programme on the appropriate identification, diagnosis and referral of people with OSAHS is vital so that healthcare resources are used effectively.

5 Authors

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Appendix A: Sources of evidence considered in the preparation of the overview

A The assessment report for this appraisal was prepared by NHS Centre for Reviews and Dissemination, University of York

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- Mc Daid, C et al. The Continuous Positive Airway Pressure for the treatment of obstructive sleep apnoea-hypopnoea syndrome: a systematic review and economic analysis, June, 2007.

B The following organisations accepted the invitation to participate in this appraisal. They were invited to comment on the draft scope and the assessment report. Organisations listed in I and II were also invited to make written submissions.

I Manufacturers/sponsors:

- Fisher & Paykel Healthcare Ltd (SleepStyle™)
- Respironics UK Ltd (REMstar)
- ResMed (UK) (S8 Series)
- Sunrise Medical Ltd (DeVilbiss)
- Tyco Healthcare Ltd (GoodKnight 420 series)
- Vital Signs Ltd (Breas)

II Professional/specialist and patient/carer groups:

- Sleep Apnoea Trust
- Association for Respiratory Technology & Physiology
- British Sleep Society
- British Society of Dental Sleep Medicine
- British Thoracic Society
- Cochrane Airways Group
- General Practice Airways Group
- Royal College of Anaesthetists
- Royal College of General Practitioners
- Royal College of Nursing
- Royal College of Physicians
- Royal College of Physicians of Edinburgh
- Royal Society of Medicine – Sleep Medicine Section

III Commentator organisations (without the right of appeal):

- Welsh Assembly Government

- Department of Health, Social Services and Public Safety for Northern Ireland
- NHS Quality Improvement Scotland

C Additional references used: Not applicable