

Australian Government

Department of Health

RATIFIED PICO

Application 1595:

Closed-loop upper airway stimulation (UAS) for moderate to severe obstructive sleep apnoea (OSA), for patients who have failed or are intolerant to continuous positive airway pressure (CPAP)

1 Page RATIFIED PICO – FEBRUARY 2020 Application 1595: Closed Loop Upper Airway Stimulation (UAS) for Moderate to Severe Obstructive Sleep Apnoea (OSA) for patients who have failed or are intolerant to Continuous Positive Airway Pressure (CPAP) Summary of PICO/PPICO criteria to define the question(s) to be addressed in an Assessment Report to the Medical Services Advisory Committee (MSAC)

Component	Description
Patients	Patients aged \geq 18 years with a BMI \leq 32 kg/m ² and moderate to severe obstructive sleep apnoea (OSA), defined as having an Apnoea Hypopnea Index (AHI ^a) \geq 15 and \leq 65, and who have been confirmed to have failed or cannot tolerate continuous positive airway pressure (CPAP) therapy or bi-level positive airway pressure (BIPAP) therapy. Patients with total concentric collapse at the soft palate level are not eligible.
Intervention	Implantation of an Upper Airway Stimulator System, including a respiratory sensing lead that senses breathing patterns, which is linked to an implantable pulse generator that delivers mild stimulation to the hypoglossal nerve via a stimulation lead.
Comparator	Main comparator: Conservative medical management (e.g. weight and alcohol reduction; sleep hygiene). Supplementary comparator: Upper airway surgical procedures, such as uvulopalatopharyngoplasty (UPPP).
	Note: PASC determined that bariatric surgery ^b is <u>not</u> adjunctive in the treatment of OSA in obese patients, given the restriction of the eligible population to those with a BMI \leq 32 kg/m ² .
Outcomes	Efficacy/effectiveness
	Apnoea Hypopnoea Index (AHI)
	Oxygen Desaturation Index (ODI)
	Quality of Life
	• Epworth Sleepiness Scale (ESS)
	 Functional Outcomes of Sleep Questionnaire (FOSQ) Sefety
	• Precedure related adverse events
	Procedule related adverse events Device related adverse events
	Other adverse events
	Healthcare resources
	Cost to deliver intervention
	 Subcutaneous placement of electrical pulse generator
	 Surgical placement of lead and connection to hypoglossal nerve
	 Surgical placement of respiratory sensing lead
	 Surgical repositioning or removal of electrical pulse generator
	Total Australian Government Healthcare costs
	Total cost to the Medicare Benefits Schedule (MBS)
	Total cost to other healthcare services

^a Apnoea Hypopnea Index measures the number of apnoea episodes per hour of sleep
 ^b Australian Guidelines for bariatric surgery suggest individuals with a BMI of 40kg/m2, or with a BMI of 35kg/m2 and one or more obesity-related complications should be eligible for surgery (1)

PICO or PPICO rationale for therapeutic and investigative medical services only

Population

PASC and the applicant agreed the population should be revised to patients aged \geq 18 years (down from the originally proposed \geq 22 years). The applicant has confirmed that use of AHI in patients \geq 15 years will be justified in the assessment report. It has been noted that the volume of estimated population is likely to change, due to the change in age restriction.

PASC and the applicant agreed the population should be restricted to patients with a BMI \leq 32 kg/m², aligning with the clinical evidence base for the proposed intervention.

PASC queried whether the lower bound of the patient's AHI should be \geq 15 (as suggested by the applicant), or \geq 20 (as indicated in the clinical trials, where the main reason for patients being excluded from the pivotal trial was because they had AHI <20). The applicant confirmed their intention to include AHI \geq 15, and PASC noted this will need to be supported by evidence in the submission (with the economic evaluation including both thresholds).

The proposed population for the Inspire[®] Upper Airway Stimulation (UAS) System is adult patients (aged ≥18 years) who are confirmed as having moderate to severe obstructive sleep apnoea (OSA). These patients will also be confirmed as having failed (or not tolerating) continuous positive airway pressure (CPAP) therapy or bi-level positive airway pressure (BIPAP) therapy, and without concentric collapse at the soft palate level.

Background

OSA is a disorder of sleep, characterised by repeated upper airway obstructions during the night, with resultant oxygen desaturations and arousals. OSA occurs when breathing is repetitively interrupted during sleep because of collapse of the upper airway. An apnoea is defined as a complete cessation of breathing that lasts 10 seconds or longer. Approximately 10% of middle-aged men and 5% of middle-aged women in the general population are likely to have OSA (defined as > 10 obstructed breathing events/hour of sleep) (2).

Moderate to severe OSA is defined as having an Apnoea Hypopnea Index (AHI) \geq 15 and \leq 65. AHI measures the number of apnoea episodes per hour of sleep.

Failure of CPAP therapy is defined as continued AHI >20 despite appropriate CPAP usage. CPAP intolerance is defined as

- Inability to use CPAP (>5 nights per week of usage: usage defined as >4 hours of use per night), or
- 2. Unwillingness to use CPAP (for example, a patient returns the CPAP system after attempting to use it).

Cross sectional and longitudinal studies have suggested that moderate to severe OSA is independently associated with greater risk of all-cause mortality after adjustment for age, gender, mean arterial pressure, total cholesterol, high density lipo-protein cholesterol, body mass, diabetes, angina and smoking status (3) and a higher incidence of fatal and non-fatal cardiovascular events in patients with severe disease (4). OSA is also associated with daytime sleepiness and an increased incidence of road accidents (5). Overall OSA that is unable to be treated by CPAP represents a significant societal burden.

The applicant stated that, while OSA is associated with a high body mass index (BMI), the majority of clinical evidence relates to patients with a BMI $<32 \text{ kg/m}^2$.

It was noted that the main clinical trial (6) for UAS <u>excluded</u> patients with moderate to severe OSA with a BMI >32 kg/m2 (among other co-morbid conditions). Results of the ADHERE UAS Stimulation Registry indicate improved outcomes are associated with a lower BMI (7).

Work-up of patients with suspected OSA

Patients are likely to initially present to a general practitioner (GP) with one or more of a variety of symptoms. These may include: excessive daytime sleepiness; loud snoring; observed episodes of stopped breathing during sleep; abrupt waking with gasping or choking; waking with a dry mouth or sore throat; morning headache; difficulty in concentration; mood changes, depression or irritability; night-time sweating; or decreased libido. The patient may then be referred to a sleep specialist, or the GP may refer the patient directly for a diagnostic sleep study (if validated screening questionnaires suggest a high pre-test probability for diagnosis of moderate to severe OSA).

The patient is then likely to undergo a Level 1 sleep investigation (MBS item 12203) <u>or</u> a Level 2 investigation (MBS item 12250). If the result of the investigation determines the patient has OSA, a trial of CPAP is instigated.

If the trial of CPAP is unsuccessful in treating OSA, or the patient is unable to tolerate CPAP (due to claustrophobia or a similar reason), the patient may be considered for UAS.

Prevalence of OSA and size of population eligible for intervention

In 2011, Deloitte Access Economics estimated the Australian prevalence of OSA (with ≥15 AHI) was 2.2% for women and 7.2% for men, with an overall prevalence of 4.7% (8). In 2016, the Sleep Health Survey of Australian Adults estimated that doctor-diagnosed sleep apnoea was 8.3% overall (men 12.9% and women 3.7%) (9).

OSA is more likely to occur in men than women, with a variety of prevalence studies consistently finding the disorder is more common in men. An Australian study, of men only, found OSA was associated with older age, obesity, chronic obstructive airway disease, diabetes, asthma, hypercholesterolemia and hypertension, and other lifestyle-related disorders (10).

The applicant estimates 22,610 patients may be eligible for closed loop UAS annually. Table 1 lists assumptions and calculations used for the basis of this estimation. *As highlighted above, the volume of estimated population is likely to change, due to the change in age restriction.*

Description	Source	Estimated Population
Annual Sleep Studies	MBS items 12203 and 12250	182,965
55.8% with diagnosis of	Gray et al. 2017	102,094
moderate to severe OSA		
50% failure of CPAP	Australasian Sleep Association	51,047

Table 1: Estimated size of population

Description	Source	Estimated Population
98.5% > 18 years	Medicare Australia Statistics	49,542
45.1% BMI < 30	Gray et al. 2017	22,343
10% adjustment for patients	Assumption	24,577
with BMI ≥ 30 < 32 kg/m2		
Exclude 8% of patients with	Strollo et al. 2014	22,610
complete concentric collapse		

Source: Table 1, p26 of Application Form

Intervention

PASC confirmed the proposed intervention, and noted the importance of involving a multidisciplinary team in patient management.

PASC advised that the role of multidisciplinary team members needs to be more clearly defined. More detailed instruction/guidance should expand on the concept that these other practitioners work collaboratively with sleep physicians.

PASC noted that Drug Induced Sleep Endoscopy (DISE) is not routinely used in Australia to select patients for OSA surgery. Confirmation (and justification) is needed if it will be routinely used to select patients for UAS (see 'Current and Proposed Clinical Management Algorithm' section).

The intervention for the proposed medical service is implantation of an upper airway stimulator system. Prior to surgery, a drug-induced sleep endoscopy (DISE) must be performed to observe the patient's upper airway anatomy in a sleep-like state. The otalaryngologist is looking for absence of a complete concentric collapse at the level of the soft palate. Patients with a complete collapse of the soft palate are not suitable for UAS.

Surgical procedure

The Inspire[®] System consists of three components, an implantable pulse generator (IPG), a respiratory sensing lead and a stimulation lead. The leads connect to the IPG via two connection ports (Figure 1).

Figure 1: Inspire IPG and Connector Ports



Source: Figure 1, p18 of the Application Form

The respiratory sensing lead detects respiratory effort. The lead has a pressure-sensitive membrane that converts the mechanical energy of respiration into an electronic signal. The stimulation lead

delivers stimulation to the hypoglossal nerve via a self-sizing cuff electrode that encircles the median division of the nerve (Figures 2 and 3).

Figure 2: Respiratory Sensing Lead



Source: Figure 2, p18 of the Application Form

Figure 3: Stimulation Lead





The Inspire system is implanted under general anaesthetic via three small incisions. The stimulation electrode is placed on the median division of the hypoglossal nerve to recruit the tongue protrusion function. The sensing lead is placed via an incision in the fifth intercostal space and placed between the internal and external intercostal muscles to detect ventilatory effort. The IPG is placed in the right ipsilateral mid-infra-clavicular region (Figure 4).

Figure 4: Inspire System in situ



Figure 4, p19 of the Application Form

To allow for healing, activating the device is delayed until approximately one month after surgery. The device is switched on and the patient begins therapy. The Inspire device continuously monitors the patient's breathing patterns and delivers mild hypoglossal nerve stimulation during inspiration to prevent airway collapse. The device is activated by the patient using a hand-held remote control. Therapy is adjusted by the specialist at a follow up monitoring visit(s). Patients are likely to have at least one sleep study following the procedure.

Setting

The service is delivered by ear, nose and throat surgeons (ENTs). The service must be performed in an appropriate operating theatre, under general anaesthetic. A proportion of patients may be appropriate for same day discharge, where others may have an overnight stay.

Surgeons will have fulfilled the requirements of the Australian Society of Otolaryngology Head and Neck Surgery (ASOHNS) or be otherwise qualified to practice this specialty in Australia.

Extensive training, provided by Inspire[®] Medical Systems, is required before ENTs may deliver this therapy. Training includes off-site classroom training and cadaver training. The first 3-5 cases conducted by an ENT are proctored, and Inspire[®] Medical Systems is likely to provide continued theatre support for ENTs.

In addition to specific surgical training for ENTs, training is provided to operating room staff, sleep physicians and sleep laboratory staff. Additional training is provided to sleep physicians and other sleep or ENT clinic staff, so that activation and programming of the device is appropriate.

There may be limitations in access to qualified specialists who have trained in the proper use and surgical procedure associated with Inspire[®] therapy. Should the new medical service be recommended, and the Inspire[®] System subsequently included on the Prostheses List, it is more likely the procedure would be carried out in private hospitals, on patients who have private health insurance. There may be budget constraints in the public hospital system.

A majority of ENTs practice in major cities, so patients who live in rural or remote areas may have difficulty accessing the service.

The device battery is conservatively estimated to last 10 years, so the initial procedure is likely to be carried out only once. Once the battery has depleted, the IPG may be removed and a new IPG would be attached to existing leads (which remain in situ).

Clarification is need in the assessment report as to whether new batteries can be placed into the existing IPG, or a new IPG is needed when batteries are depleted (no less than 10 years, based on information from the applicant).

Prosthesis

As the proposed medical service involves implantation of a device, an application to the Prostheses List Advisory Committee (PLAC) will be made following completion of the MSAC application process.

Comparator

PASC advised that 'conservative medical management' needs to be clearly defined in the assessment report. PASC recommended that (conservative intervention) oral devices should be considered, if appropriate (such as mandibular advancement splints).

The applicant has advised that oral devices are intended for use in patients with mild OSA, and are not in common use for moderate to severe OSA. The applicant therefore recommends that oral devices are not an appropriate comparator.

PASC is comfortable with this, as long as the applicant can justify it. PASC is still of the view that conservative medical management needs a clear definition.

PASC agrees that it might not be common in moderate and severe OSA, but the question is what happens to those who fail CPAP and do not receive surgery. PASC noted the American Academy of Dental Sleep Medicine 'Clinical Practice Guideline for the Treatment of Obstructive Sleep Apnea and Snoring with Oral Appliance Therapy' (2015 update) recommendations include:

"#3. We recommend that sleep physicians consider prescription of oral appliances, rather than no treatment, for adult patients with obstructive sleep apnea who are intolerant of CPAP therapy or prefer alternate therapy. (STANDARD) "Quality of Evidence: Moderate" (http://dx.doi.org/10.5664/jcsm.4858)

PASC noted that surgical measures may include one or more of a basket of surgeries, UPPP being one example. The supplementary comparator should therefore not be restricted to UPPP alone. The applicant has advised that UPPP is the most common surgery, adding that, as noted by PASC, UPPP is a reasonable and representative supplementary comparator.

The applicant recommends that, because of the diverse nature of surgeries other than UPPP, if PASC wishes another subset of surgeries be included as comparators, these should be specified. PASC recognises that the most common surgery is a basis for justification of the comparator. However, the justification and implications of this simplifying assumption should be explored and discussed in the assessment report.

PASC advised that bariatric surgery is not required as a comparator or adjunct, given the restriction of the population to patients with a BMI $\leq 32 \text{ kg/m}^2$.

PASC noted the applicant's estimated uptake of the intervention (153 services per year, after 3 years) was a small proportion of the eligible population (22,610 patients). The applicant stated this was primarily due to issues relating to patient access to ear, nose and throat surgeons, and appropriate facilities.

PASC considered that, if access is the main barrier, the comparator of conservative medical management is appropriate. However, PASC requested expert input to clarify whether access is the only issue, and whether this may affect the comparator for those patients who are not recommended for the intervention; that is, whether there are other differences between candidates for surgery and candidates for UAS (e.g. a different phenotype).

The applicant has advised that the UPPP population is not the same as the UAS population, but there is some crossover:

- patients with complete concentric collapse at the palate are not indicated for UAS, and may receive UPPP procedure;
- patients with anterior-posterior collapse at the palate may receive either UPPP or UAS;
- patients with multi-level collapse (retropalatal and retroglossal) may receive UAS or UPPP as a part of multi-level surgeries;
- patients with only retroglossal collapse are not suitable for UPPP.

The main comparator to closed loop UAS is conservative medical management. Patients who fail CPAP or who are intolerant of CPAP are usually managed by their GP or sleep physician with conservative measures. These may consist of lifestyle changes such as weight and alcohol reduction and sleep hygiene. No pharmaceutical therapy is available for OSA.

Surgical measures such as uvulopalatopharyngoplasty (UPPP) are implemented in a small proportion of patients who have been identified by DISE as being suitable for this type of intervention. These surgeries are designed to increase the volume of the airway. There was a total of 607 UPPPs and 1,276 UPPPs with tonsillectomy performed in Australia in 2017-2018.(11) Surgical management of OSA has limited success (12) and CPAP may still necessary to reduce OSA (13).

It is difficult to estimate the number of people in the community who are receiving conservative management following failed CPAP. Should closed loop UAS be included on the MBS, then it is anticipated that a proportion of patients who are currently being treated with UPPP will be treated with closed loop UAS instead. Only a proportion of patients receiving UPPP will be eligible for UAS. Patients with total concentric collapse, or who are aged less than 18 are not eligible. It is not anticipated that UPPP or conservative management will be displaced to a large extent, because of narrower indications for closed loop UAS.

It is anticipated that closed loop UAS will be used instead of conservative management and some upper airway surgeries. Should the service be included on the MBS, there may initially be patients who have previously failed UPPP or other surgeries who may be eligible. It is, however, intended that closed loop UAS be used as a second line therapy, following failed CPAP.

Adjuncts to OSA management

Medical and surgical weight loss options should be routinely recommended in the management of OSA, and lends itself to multidisciplinary collaboration with dieticians, exercise physiologists, physiotherapists and endocrinologists (14).

Bariatric surgery is an effective means to achieve weight loss in eligible individuals with a BMI of 40kg/m² or with a BMI of 35kg/m² and with one or more obesity related complications (as per Australian guidelines for bariatric surgery (1)). International clinical guidelines developed by the Adult OSA Task Force of the American Academy of Sleep medicine state bariatric surgery may be adjunctive in the treatment of OSA in obese patients (15). However, the remission rate for OSA two years after bariatric surgery, related to the amount of weight loss is 40%, emphasizing the need for ongoing clinical follow-up of these patients (16).

As highlighted above, PASC advised that bariatric surgery is not required as a comparator or adjunct, given restriction of Application 1595's population to patients with a BMI \leq 32 kg/m².

Outcomes

PASC recommended the exercise tolerance test be removed as an outcome, as it is not relevant to sleep apnoea measurement. This has been actioned in the PICO.

PASC noted that AHI and other sleep study parameters are surrogate outcomes.

PASC advised that the minimal clinically important difference (MCID) in AHI or ODI should be specified. PASC noted the pivotal trial's (Strollo et al. 2014) defined response (as measured by AHI) was a reduction of at least 50% from baseline AHI and an AHI score on the 12-month polysomnography of less than 20 events per hour; and a defined response (as measured by ODI) as a reduction of at least 25% from baseline ODI.

PASC advised that 'incremental cost per QALY' should be added as a healthcare system outcome. This has been actioned in the PICO.

The applicant claimed that Inspire[®] therapy is superior to medical management for patients with moderate to severe OSA and who have failed or unable to tolerate CPAP.

The applicant claimed that Inspire[®] therapy is superior to upper airway surgery (UPPP) for patients with moderate to severe OSA and who have failed or unable to tolerate CPAP.

The applicant nominated the following outcomes.

Patient-relevant outcomes

Efficacy/effectiveness

- Apnoea Hypopnoea Index (AHI)
- Oxygen Desaturation Index (ODI)
- Quality of Life
 - Epworth Sleepiness Scale (ESS)
 - Functional Outcomes of Sleep Questionnaire (FOSQ)

Safety

- Device related adverse events
- Other adverse events

Healthcare system outcomes

Healthcare resources

- Cost to deliver intervention
 - o Subcutaneous placement of electrical pulse generator
 - \circ $\;$ Surgical placement of lead and connection to hypoglossal nerve
 - o Surgical placement of respiratory sensing lead
 - \circ $\;$ Surgical repositioning or removal of electrical pulse generator $\;$
- Incremental cost per quality-adjusted life year (QALY)

Total Australian Government Healthcare costs

- Total cost to the Medicare Benefits Schedule (MBS)
- Total cost to other healthcare services

Current and Proposed Clinical Management Algorithms

PASC noted consultation feedback that DISE is not routinely used in Australia to select patients for OSA surgery. Confirmation (and justification) is needed if DISE will routinely be used to select patients for UAS, with associated reflection in the current and proposed algorithms.

Current clinical management algorithm for identified population

The clinical pathway for patients who fail CPAP may be complex (Figure 5). Patients who are considered unsuitable or unwilling to have surgery may be managed conservatively by a sleep physician. Management may consist of lifestyle modifications such as weight loss, decrease in alcohol use and sleep position modification.

Some patients may be considered for upper airway surgery. A variety of upper airway surgeries exist, although only UPPP and maxillomandibular advancement (MMA) are specifically included on the MBS. MMA is rarely used to treat OSA although patients who have particular anatomic characteristics such as a receding chin may be suitable.(17)

Patients considered for UPPP must be carefully selected so surgery is targeted appropriately. Therefore, a DISE must be conducted prior to surgery. Patients may still use CPAP following surgery, as surgery may assist in increasing the tolerance and success of CPAP. Patients who fail surgery have limited options. Tracheostomy is rarely used but is a definitive treatment for OSA as the upper airway is bypassed, otherwise patients will continue to be conservatively managed.



CPAP = continuous positive airway pressure treatment; DISE = drug induced sleep endoscopy; OSA = obstructive sleep apnoea

Note: (1) Bariatric surgery has been ruled out as adjunctive in the treatment of OSA in obese patients. (2) The use of DISE needs to be confirmed and justified if it will routinely be used to select patients for UAS, with associated reflection in the current and proposed algorithms.

Proposed clinical management algorithm for identified population

The pathway following implementation of Inspire[®] therapy is similar to that following (UPPP) surgery or conservative management (Figure 6). However, it is unlikely that patients would use CPAP, as is the case with some patients following (UPPP) surgery. It is possible that some patients might proceed to surgery, although this is likely to be a smaller number than in the absence of closed-loop UAS, and in extreme cases, tracheostomy may be considered. Non-responders would likely be treated with conservative medical management.



CPAP = continuous positive airway pressure treatment; DISE = drug induced sleep endoscopy; IPG = implantable pulse generator; OSA = obstructive sleep apnoea; UAS = upper airway stimulation
Note: (1) Bariatric surgery has been ruled out as adjunctive in the treatment of OSA in obese patients.
(2) The use of DISE needs to be confirmed and justified if it will routinely be used to select patients for UAS, with associated reflection in the current and proposed algorithms.

Proposed economic evaluation

PASC confirmed the economic evaluation should be a cost-utility analysis, unless evidence of superiority is not demonstrated.

PASC noted significant equity issues, including the requirement for access to a multidisciplinary team and specialist surgical services, and the shortage of practitioners. There is potential for out-of-pocket costs for patients, and possible substantial cost implications if there is a gap between MBS and PLAC listings.

The applicant has advised it does not intend to launch the device in the private sector prior to Prostheses Listing, meaning out-of-pocket costs for the device are unlikely to arise. However, PASC's concern about other out-of-pocket costs should be discussed/addressed in the assessment report, especially given demand for the service is likely to exceed supply. PASC advised that consumable costs should be considered, in addition to device costs.

The clinical claim is that Inspire[®] therapy is superior in clinical effectiveness to medical management and UPPP surgery for patients with moderate to severe OSA and who have failed or are unable to tolerate CPAP. According to the *Technical Guidelines for preparing assessment reports for the Medical Services Advisory Committee: Investigative* the required economic analysis is therefore a cost-utility or a cost-effectiveness analysis. However, if the evidence does not prove superiority, then a cost-consequence model may be more appropriate.

Proposed MBS item descriptor/s and MBS fees (if relevant)

(If the MBS is not relevant, please make that statement in this section, and provide alternative proposed funding source and price information)

The applicant initially proposed three new MBS items for: implantation of components of the upper airway stimulator system: subcutaneous placement of IPG (XXXXX); surgical placement of stimulation lead (YYYYY); and surgical placement of respiratory sensing lead (ZZZZZ). In addition, the applicant proposed a fourth item, for surgical repositioning or removal of IPG (AAAAA).

PASC noted that none of the proposed MBS items appear to describe an entire closed-loop system, and it could be possible to construct an open system using the proposed item descriptors. PASC queried if the various items proposed for placement of the device could be bundled together.

PASC advised that the item descriptors should not be specific to the 'Inspire system', but should be agnostic to brand (in line with standard MBS practice). Reference to a generic <u>closed</u> loop system is all that is needed.

PASC also advised that, unless it can be justified, the item descriptors should not be limited to unilateral placement, but should also allow bilateral placement. However, the applicant has advised that, currently, there is insufficient evidence on safety and efficacy of bilateral placement, and the applicant believes the procedure is not currently performed bilaterally. While the applicant has no objection to future contemplation of bilateral placement, the applicant is of the view that bilateral placement should not be included in the current assessment (nor included in the initial item descriptors).

PASC agreed with limiting the assessment to 'unilateral'.

PASC advised that the item descriptors needed updating with the revised population, which has been actioned. Item bundling should be considered during the assessment phase. For this current assessment, 'unilateral' has been added to the proposed descriptors.

The proposed descriptors have also been restricted to single use per patient (in line with applicant advice). This includes "surgical repositioning or removal of electrical pulse generator" item AAAAA, given the applicant's advice that batteries last (conservatively) 10 years (so item AAAAA is not likely to be needed until 10 years after initial implantation of the device). If this is not the case, use of item AAAAA should be more fully explained and justified in the assessment report.

A reference to 'anaesthetic' (Anaes.) has also been added to the proposed descriptors, in addition to 'Multiple Operation rule'.

Clarification during the assessment phase is needed on whether 'assistance at operation' needs to be added, represented by (Assist.) in the item descriptors.

PASC advised that the items should include an MBS Explanatory Note that identifies the requirement for expertise and management within a multidisciplinary environment.

PASC noted the proposed MBS fees, acknowledging that item bundling would affect these.

The proposed fees are based on current MBS items for vagus nerve stimulation (because the applicant claims these items represent similar procedures, in terms of time and complexity):

- 1. 40701 (similar to proposed closed-loop 'subcutaneous placement of electrical pulse generator' item XXXXX) = \$346.05 (MBS fee)
- 40704 (similar to proposed closed-loop 'surgical placement of lead/respiratory sensing lead' items YYYYY and ZZZZZ) = \$684.95 (single MBS fee for existing vagus nerve stimulation 'lead placement' item, but two separate fees of \$684.95 for each proposed closed-loop 'lead placement' item)
- 3. 40702 (similar to proposed closed-loop 'surgical repositioning or removal of electrical pulse generator' item AAAAA) = \$161.95 (MBS fee).

Clarification is needed during the assessment phase on the purpose of (and difference between) the two separate 'lead placement' items. This should include justification for such separation of tasks during a single procedure (and potential additional MBS fees [taking into account the Multiple Operation Rule] for a procedure that the applicant stated is similar to existing item 40704).

Evidence for UAS, obtained from the pivotal trial data (6), included patients with moderate to severe OSA (AHI >15 and <65). However, the trial included patients that were non-compliant with CPAP (i.e. not necessarily failed CPAP; definition of CPAP treatment failure: AHI>20). The applicant was asked to advise how these two cut-offs affected the definition for MBS item purposes.

Category 3 – Therapeutic Procedures				
XXXXX				
Proposed item descriptor: Unilateral closed-loop hypoglossal nerve stimulation therapy with Inspire® Upper Airway Stimulation System through stimulation of the hypoglossal nerve, subcutaneous placement of electrical pulse generator for management of moderate to severe obstructive sleep apnoea in a patient who:				
a) has an Apnoea Hypopnoea Index of greater than 15 and less than 65; and				
b) is aged 18 and over; and				
c) has failed or is intolerant to continuous positive airway pressure therapy; and				
d) has a BMI \leq 32 kg/m ² ; and				
e) does not have complete concentric collapse of the upper airway.				
Once only per patient				
Multiple Operation Rule				
(Anaes.)				
MBS Fee: \$346.05 Benefi	t: 75% = \$259.55 (in-hospital/admitted patient only)			

Category 3 – Therapeutic Procedures

YYYYY

Proposed item descriptor: Unilateral closed-loop hypoglossal nerve stimulation therapy with Inspire® Upper Airway Stimulation System through stimulation of the hypoglossal nerve, surgical placement of lead, including connection of lead to the hypoglossal nerve and intra-operative test stimulation for management of moderate to severe obstructive sleep apnoea in a patient who:

a) has an Apnoea Hypopnoea Index of greater than 15 and less than 65; and

b) is aged 18 and over; and

c) has failed or is intolerant to continuous positive airway pressure therapy; and

d) has a BMI \leq 32 kg/m²; and

e) does not have complete concentric collapse of the upper airway.

Once only per patient

Multiple Operation Rule

(Anaes.)

MBS Fee: \$684.95

Benefit: 75% = \$513.75 (in-hospital/admitted patient only)

Category 3 – Therapeutic Procedures

ZZZZZ

Proposed item descriptor: Unilateral closed-loop hypoglossal nerve stimulation therapy with Inspire® Upper Airway Stimulation System through stimulation of the hypoglossal nerve, surgical placement of respiratory sensing lead and intra-operative test stimulation for management of moderate to severe obstructive sleep apnoea in a patient who:

a) has an Apnoea Hypopnoea Index of greater than 15 and less than 65; and

b) is aged 18 and over; and

c) has failed or is intolerant to continuous positive airway pressure therapy; and

d) has a BMI \leq 32 kg/m²; and

e) does not have complete concentric collapse of the upper airway.

Once only per patient

Multiple Operation Rule

(Anaes.)

MBS Fee: \$684.95 Benefit: 75% = \$513.75 (in-hospital/admitted patient only)

Category 3 – Therapeutic Procedures

AAAAA

Proposed item descriptor: Unilateral closed loop hypoglossal nerve stimulation therapy with Inspire Upper Airway Stimulation System through stimulation of the hypoglossal nerve, surgical repositioning or removal of electrical pulse generator, inserted for management of moderate to severe obstructive sleep apnoea in a patient who:

a) has an Apnoea Hypopnoea Index of greater than 15 and less than 65; and

b) is aged 18 and over; and

c) has failed or is intolerant to continuous positive airway pressure therapy; and

d) has a BMI \leq 32 kg/m², and

e) does not have complete concentric collapse of the upper airway.

Category 3 – Therapeutic Procedures		
Once only per patient		
Multiple Operation Rule		
(Anaes.)		
MBS Fee: \$161.95	Benefit: 75% = \$121.50 (in-hospital/admitted patient only)	

In line with PASC's advice, an MBS Explanatory Note should be considered, outlining the requirement for clinical expertise and patient management within a multidisciplinary environment.

Consultation feedback

PASC noted the consultation feedback, highlighting the importance of:

- BMI restriction in trials;
- importance of multi-disciplinary care; and
- importance of appropriate selection for type of surgery or UAS.

PASC also noted the feedback that early research was underway to investigate use of UAS in children, and those with complete collapse.

Next steps

Upon ratification of PICO 1595, the application can PROCEED to the pre-Evaluation Sub-Committee (ESC) stage.

The applicant has elected to prepare its own ADAR (applicant-developed assessment report).

<u>References</u>

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