



Australian Government

Department of Health

Application 1518:

Endoscopic visual laser ablation of the prostate (VLAP) for benign prostatic hyperplasia

PICO Confirmation

(To guide a new application to MSAC)

(Version 1.0)

Summary of PICO criteria to define the question(s) to be addressed in an Assessment Report to the Medical Services Advisory Committee (MSAC)

This PICO confirmation is for a treatment already listed on the MBS. The Applicants are seeking an increased fee, to be consistent with the main comparator, with the claim of non-inferiority between the intervention and comparator.

Table 1 PICO components to assess VLAP for men with BPH

Component	Description
Patients	Men with severe or high impact symptoms (LUTS) of benign prostatic hyperplasia (BPH)
Intervention	Visual laser ablation of the prostate (VLAP) using a non-contact (side firing) endoscopic approach
Comparator	Transurethral resection of the prostate (TURP)
Outcomes	<p>Safety^a:</p> <ul style="list-style-type: none"> • Immediate surgical complications – bleeding, acute urinary retention, infection, TURP syndrome (dilutional hyponatraemia), mortality • Longer term complications – urethral stricture, erectile dysfunction, urinary incontinence <p>Clinical effectiveness^a:</p> <ul style="list-style-type: none"> • Symptoms of BPH and LUTS, including International Prostate Symptom Score (IPSS) • Peak flow (Q_{max}) • Post-void residual volume • Prostate volume • Quality of life • Treatment failure rate, re-intervention rate • Detection rate of prostate cancer by histology following TURP and clinical impact of this <p>Healthcare resources: length of hospital stay in Australia^b, cost of consumables, co-claiming data for VLAP and TURP, out-of-pocket costs to consumers</p> <p>Total Australian Government healthcare costs: financial impact of proposed fee increase</p>

BPH = benign prostatic hyperplasia; HoLEP = holmium laser enucleation of the prostate; IPSS = international prostate symptom score; LUTS = lower urinary tract symptoms; TURP = transurethral resection of the prostate; VLAP = visual laser ablation of the prostate

^a Evidence for safety and effectiveness may be based on the GOLIATH randomised controlled trial. Other studies comparing laser and TURP should also be included to support GOLIATH data.

^b Consider datasets such as private health insurance.

PICO rationale for therapeutic medical services

Population

Benign prostatic hyperplasia (BPH) is a non-cancerous enlargement of the prostate gland, in which smooth muscle and epithelial cells proliferate. It is a complex progressive disease occurring in a large proportion of older men. Although it is not cancerous, BPH can progress to cause lower urinary tract symptoms (LUTS) that can impact on a man's quality of life, and physical health (Pascoe et al. 2017). LUTS include an increased frequency or urgency of urination, increased urination at night, difficulty stopping or starting urination, pain or bleeding with urination. As they progress, the symptoms can impact on daily life, to the extent that they reduce the quality of life, and interfere with sexual function. Strictly speaking, BPH is diagnosed through histopathological investigation, however in the literature it is often described in terms of LUTS, and sometimes the terms are used interchangeably.

Measurement of LUTS/BPH symptoms

BPH can cause LUTS either by directly obstructing the bladder outlet, or by the increased smooth muscle tone and resistance within the gland. The severity of LUTS is assessed through clinical investigation and documentation of medical history. Measurement of the degree of severity of LUTS can be performed using the International Prostate Symptom Score (IPSS). The IPSS Q8 is a written tool consisting of 8 questions: 7 physical symptom questions (score range 0 to 35) and 1 Quality of Life (QoL) question (6 levels of response ranging from "delighted" to "terrible") used to screen, diagnose and manage the symptoms of BPH.¹ Threshold scores for mild, moderate and severe disease are used in clinical practice (Table 2), but there is some disagreement of the usefulness of the scores (D'Silva, Dahm & Wong 2014). Scores used to determine the level of severity do not incorporate the Quality of Life score. It is important to use the IPSS score in conjunction with other clinical assessment measures. Another commonly used score is the American Urology Association Symptom Index (AUA-SI), which uses a similar scoring scale to IPSS.

Table 2 IPSS score thresholds for LUTS BPH severity level

Level of severity	Score level
Mild	≤ 7
Moderate	8 - 19
Severe	20 - 35

BPH = benign prostate hyperplasia; IPSS = International Prostate Symptom score; LUTS = lower urinary tract symptoms

Prevalence of BPH and LUTS

A combined lifetime prevalence estimate of BPH of 26.2% (95% CI: 22.8 – 29.6%) was published by Lee et al (Lee, Chan & Lai 2017), pooled from 25 studies using objective measures. According to Lee et al prevalence increased with age, but there was no difference found between rural, urban or mixed sites; countries; respondent representativeness; sample size; or study quality.

The prevalence of diagnosed BPH estimated from the Bettering the Evaluation and Care of Health (BEACH) program in Australia was 21.2% (95%CI 17.3, 25.1) overall, with estimates varying by age (Figure 1) (BEACH 2012). The BEACH data were based on 707 male patients aged 40 years or older, of whom 150 had been diagnosed with BPH. Of the 243 symptomatic respondents in the BEACH data cohort, 44.9% (109

¹ The IPSS tool can be found online: [International Prostate Symptom Score calculator](#)

patients) were being treated for LUTS, and 41% of those being treated (45 patients) were taking medications (BEACH 2012).

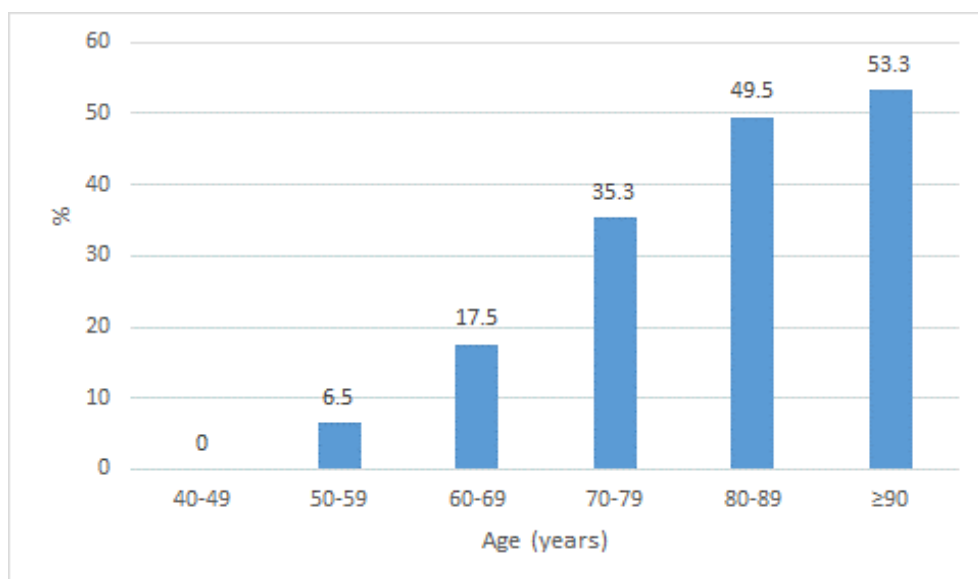


Figure 1 Prevalence of BPH by age

Source: BEACH 2012. Benign prostatic hyperplasia (BPH) among male general practice patients aged 40 years or older. SAND abstract 190 from the BEACH program: FRMC University of Sydney, 2012

BEACH = Bettering the Evaluation and Care of Health; BPH = benign prostate hyperplasia; FRMC = Family Medicine Research Centre, University of Sydney; IPSS = International Prostate Symptom score; LUTS = lower urinary tract symptoms; SAND = Supplementary Analysis of Nominated Data

Epidemiological data reported that LUTS resulting from BPH affects an estimated 70% of men aged between 61 and 70 years, and 90% of those aged 81 to 90 years (Nickel 2006). LUTS prevalence was also found to increase with age in estimates pooled across 25 studies by Lee et al. LUTS was defined as moderate or severe symptoms (IPSS or AUA-SI >7) in Lee et al's study, but authors commented on the presence of heterogeneity amongst the studies in methodology and definitions. Data can be seen in Table 3.

Table 3 Prevalence of men with moderate to severe symptoms of LUTS/BPH by age group (Lee, Chan & Lai 2017)

Age range	Prevalence of LUTS (IPSS or AUA-SI >7)
40-49 years	14.8%
50-59 years	20.2%
60-69 years	29.1%
70-79 years	36.8%
≥ 80 years	38.4%

AUA-SI = American Urological Association Symptom Index; BPH = benign prostate hyperplasia; IPSS = International Prostate Symptom score; LUTS = lower urinary tract symptoms

Intervention

Visual laser ablation of the prostate (VLAP; also called photoselective vaporisation of the prostate, PVP) can be performed using a number of laser systems which have the capability of being focused and selectively coagulating or vaporising prostate tissue. The laser systems use a side-firing technique and can be used with an endoscope through the urethra. Ablation of the prostate by VLAP is practised in Australia on enlarged prostates of any size.

VLAP is not a treatment for prostate cancer, and if a malignancy is suspected, a biopsy of the prostate is conducted as a separate procedure to VLAP.

VLAP using Greenlight® laser systems

One photoselective vaporisation system used for VLAP is the Greenlight® laser. The 180-W XPS GL (XPS-180) has been developed following earlier trials with green light laser systems with lower power output, and it claims to have a number of advantages over the previous systems (Brunken, Seitz & Woo 2015). The XPS-180 system is the most commonly used for VLAP in Australia. As with other laser systems, the XPS-180 utilises laser energy to vaporise tissue on which it is focused, and thereby remove the tissue. This method does not leave tissue to be removed via the bladder and urethra. VLAP is a transurethral procedure in which access to the prostate is achieved enabling passing of a cystoscope and the laser fibre through the urethra.

Green light system wavelengths (532nm) are selectively absorbed by oxyhaemoglobin, making them particularly well absorbed by the vascularised tissue of the prostate. Where vascularisation is low, the laser becomes less efficient, and may lead to longer vaporisation time (Brunken, Seitz & Woo 2015; Ding et al. 2012). The XPS-180 system has a relatively shallow depth of action (1 to 2 mm), and because of its coagulative action, it results in minimal bleeding. Patients with comorbidities, or taking anticoagulants may be treated by VLAP using the XPS, and patients can experience relatively short catheterisation time and hospital stays.

The XPS-180 system uses a lithium triborate laser to achieve the 532nm wavelength. Other greenlight options for VLAP exist, and are possibly used in Australian clinics. 120W potassium titanyl phosphate (KTP) laser (Greenlight® HPS-120 Laser Therapy) is an earlier version producing 532nm, as is the first generation Greenlight® 80W system. The higher wattage systems provide a reduced laser footprint and better vaporisation efficiency.

Reimbursement of VLAP services

The medical service VLAP is currently funded by Medicare Item 37207, with a fee of \$866.45 for a single service (Table 10). The Applicant proposes that because the reimbursement for VLAP is lower than for transurethral resection of the prostate (TURP), it creates a financial incentive for practitioners to choose TURP, despite evidence that VLAP is non-inferior. The purpose of this application is to request an increased fee for VLAP, thereby removing the financial incentive to choose TURP. A second MBS item exists (Item 37208, fee \$416.05) for reimbursement of VLAP procedures that are not completed. It would be expected that reimbursement for this item would also increase should this application be successful.

Rationale

The laser system is not specified in the Medicare Item descriptor for VLAP, other than that it is to be a side-firing device. Side-firing laser systems designed for the treatment of BPH, that have been trialled successfully on prostate tissue and met TGA requirements should be suitable for claiming the Medicare rebate.

VLAP using other laser systems

A number of other systems could be used for VLAP, however they rarely in use in Australia and are not included in this assessment.² The diode laser and thulium laser systems can be used for VLAP. For the former technique, a high powered laser beam capable of surgical application (980nm), is emitted by a glass or crystal rod which has been excited using AC power. Diode laser systems are used infrequently in

Australia but may be reimbursed under MBS item 37207 for VLAP. The Thulium laser system is not side-firing and is not included in this application.²

Comparator(s)

TURP is the most frequently used procedure for reduction of prostate tissue, is used in the same patient population as VLAP and is considered the gold standard for prostate tissue removal (2015 2017; AUA 2010). TURP will therefore be the main comparator for VLAP in the assessment. Patients who are eligible for TURP would be considered eligible for VLAP, however the procedure of choice is likely to be limited by the availability of equipment and practitioner training. It is expected that VLAP would further replace TURP in clinical practice if this application were to be successful.

TURP

TURP is considered the gold standard procedure by many authors for BPH patients when a reduction of prostate tissue is necessary (Teo, Lee & Ho 2017). In Australia, the practise of TURP is not restricted to prostates of any particular size. There are two forms – monopolar (M-TURP) and bipolar (B-TURP). In the monopolar procedure, a high frequency current from a generator is passed through an active electrode, enabling electro-resection via a resectoscope. Lighting and irrigation enable vision for the surgeon while resecting the vascular organ. Pieces of tissue separated from the prostate are flushed into the bladder and then from the body. Bleeding is a common event occurring with incidence of bleeding requiring transfusion of 0.4%-7.1% (Teo, Lee & Ho 2017).

Bipolar TURP, although less frequently practised in Australia, was introduced as an alternative to help reduce side effect of M-TURP. It induces tissue disintegration through molecular dissociation with a high frequency energy. One advantage of the technique is that it can be used with saline irrigation. Placement of active and return electrodes mean high current densities are local and thermal damage to surrounding tissue is reduced. Although trial outcomes have been mixed, it is possible that blood loss is likely to be smaller with B-TURP compared to M-TURP (EAU 2016; Teo, Lee & Ho 2017).

TURP syndrome is a serious complication which can occur with TURP. It is thought to be caused by the use of irrigation fluids of lower osmolality than serum during the procedure. Perforation of capsular veins and sinuses may occur as a result. TURP syndrome is characterised by mental confusion, nausea, vomiting, hypertension and bradycardia, and can lead to cerebral oedema and sometimes death. Preventative measures should be taken to avoid this side effect.

TURP can provide a sample of prostatic tissue for histology analysis, which occasionally identifies tumour cells.

The Medicare item descriptor identified for reimbursement of TURP is shown in Table 4.

² Both diode and thulium lasers have been compared against TURP in the literature for treatment of LUTS BPH (Barbalat et al. 2016; Cetinkaya et al. 2015; Li et al. 2016). See the review by Li et al (2016) for a discussion of laser systems used to treat LUTS BPH.

Table 4 MBS item descriptor for TURP

Category 3 – THERAPEUTIC PROCEDURES
37203
PROSTATECTOMY (endoscopic, using diathermy or cold punch), with or without cystoscopy and with or without urethroscopy, and including services to which item 36854, 37201, 37202, 37207, 37208, 37245, 37303, 37321 or 37324 applies
Multiple Services Rule
(Anaes.)
Fee: \$1,042.15 Benefit: 75% = \$781.65

TURP = transurethral resection of the prostate

Rationale

There are a number of other procedures used for prostate surgery, although the eligible patients for each procedure may vary. The procedures discussed here are either funded by Medicare or in common use in Australia in some populations of patients with BPH.

Alternative comparators

For very large prostates, alternative methods using laparoscopic, robotic or open surgical techniques are more likely to be used. Some patients with very large prostates (> 80-100ml), or other comorbidities may be recommended for open surgery rather than TURP or VLAP. Open prostatectomy is not a comparator for VLAP in this assessment.

There are several other procedures used for the treatment of LUTS/BPH. They are generally known as TUNA (transurethral radio-frequency needle ablation, Item 37201), TUMT (transurethral microwave thermotherapy, Item 37230), TUIP (transurethral incision of the prostate) and HoLEP (Holmium: YAG laser enucleation of the prostate, Item 37245). TUIP, TUMT and TUNA are not considered best practice in Australia and are rarely used procedures. They are not suitable comparators for VLAP. HoLEP may be considered a minor comparator.

HoLEP

HoLEP employs laser technology for tissue resection. A specific wavelength created by using holmium: YAG (crystals of yttrium, aluminium and garnet, doped with holmium) can be focussed for accurate cutting of prostate tissue. As with TURP, resected portions of tissue are flushed into the bladder and then finally from the body. HoLEP was approved for funding in November 2012 for treatment of moderate to severe BPH. HoLEP was not considered an alternative to OP at that time. Usage of HoLEP is low and not expected to change if this application is successful. It is therefore not considered a comparator for VLAP in this assessment. The number of requests for HoLEP from July 2011 to June 2017 can be seen in Table 5.

Current use of VLAP and comparators

Usage of relevant Medicare items from July 2011 to June 2017 is reported in Table 5.

Table 5 Requested Medicare items processed from July 2011 to June 2017

Item	Jul 2011 - Jun 2012	Jul 2012 - Jun 2013	Jul 2013 - Jun 2014	Jul 2014 - Jun 2015	Jul 2015 - Jun 2016	Jul 2016 - Jun 2017	Total
37203 TURP	12,183	11,252	10,788	10,899	11,142	11,285 (76.6%)	67,539 (79.4%)
37207 VLAP	1,437	2,139	2,742	2,937	2,811	2,612 (17.7%)	14,678 (17.3%)
37245 HoLEP	NA	81	548	641	733	837 (5.7%)	2,840 (3.3%)
Total	13,620	13,472	14,078	14,477	14,686	14,734	85,057

Source: Statistical report from [Medicare statistics online](#)

HoLEP = holmium: YAG laser enucleation of the prostate; OP = open prostatectomy; TUMT = transurethral microwave thermotherapy of the prostate; TUNA = transurethral needle ablation; VLAP = visual laser ablation of the prostate

By far the most commonly used procedure is TURP (79.4% of claims), followed by VLAP (17.3% of claims). Together these two procedures, shown by the highlighted rows in Table 4, make up 97% of all procedures claimed. Of note is the gradual increase in the total number of procedures over time, a trend which is expected to continue into the future. An estimate of the projected number of all procedures to the year 2022 has been provided by the applicant (Figure 2). Using the projected estimate of 16,000 services in total for 2022, the expected number of TURP services would be 12,160 and PVP services would be 2,816 in that year, based on the proportion of each service claimed in 2016-2017.

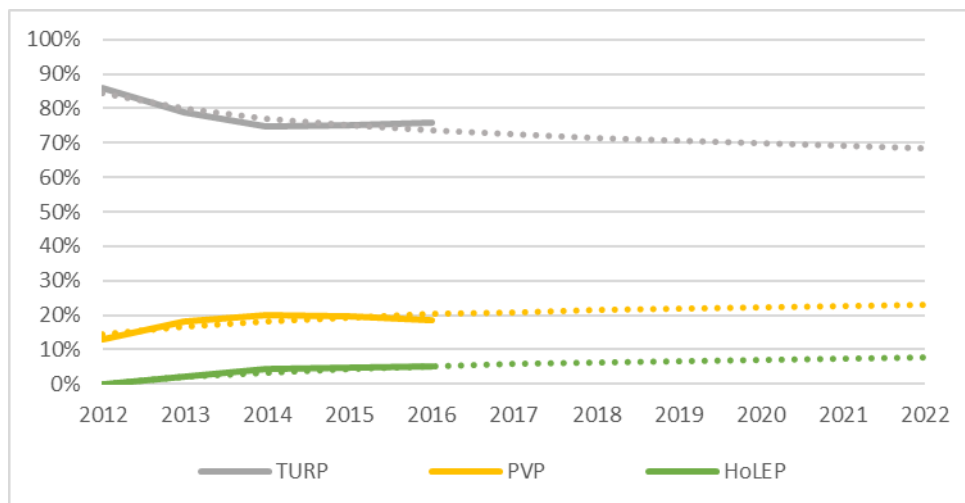


Figure 2 Projected market size for MBS items 37203 (TURP), 37207 (PVP), and 37245 (HoLEP)

Source: MSAC Application 1518, Application form, Boston Scientific

Outcomes

Patient-relevant outcomes

Safety outcomes related to the procedure, associated anaesthetic and hospital stay should be considered. Clinical effectiveness should be measured by the change in LUTS, preferably using standardised scoring systems such as IPSS. Other similar scores, such as the American Urology Association Symptom Index (AUA-SI), may also be found in the literature. Other standard measures for achieving reduction of prostate volume and function should also be included. Treatment failure rate varies between procedures and is another important outcome to be considered, along with re-treatment rate. Quality of life is strongly linked to LUTS in BPH patients and should also be assessed. Length of hospital stay may be an important outcome to assess safety. PASC also requested that the impact of tumour detection (through histology of the specimen retrieved by TURP) be considered (i.e. in those where a malignancy is not suspected, and where a separate biopsy would not be requested, concurrent with VLAP).

Safety outcomes relevant to this assessment are:

- Immediate complications
 - Bleeding
 - Acute urinary retention
 - Infection
 - TURP syndrome (dilutional hyponatraemia)
 - Mortality
- Longer term complications
 - Urethral stricture
 - Erectile dysfunction
 - Urinary incontinence
- Length of hospital stay

Clinical effectiveness outcomes relevant to this assessment are:

- Symptom severity related to LUTS – IPSS, AUA-SI
- Peak flow (Q_{max})
- Post-void residual volume
- Prostate volume
- Quality of life
- Treatment failure rate
- Re-treatment rate
- Prostate cancer detection rate and clinical implications

The GOLIATH study

The GOLIATH study compared XPS-180 and TURP in prospective randomised controlled trial conducted in 29 centres across Europe. The IPSS was used to evaluate the non-inferiority of the XPS-180, along with secondary outcomes of Q_{max} , prostate volume and other standardised measures. A total of 269 patients who were complication free and with inclusion criteria of IPSS ≥ 12 , and prostate size $\leq 100g$ underwent either treatment. Over a 2 year follow-up period, XPS-180 was found to have similar efficacy and safety to TURP for treatment of prostate enlargement (Bachmann et al. 2014, 2015; Thomas et al. 2016).

Healthcare system

Should the reimbursement for VLAP increase, it is expected that there would be an increase in its use and an equivalent decrease in the use of TURP. There would be an additional cost to Medicare as all VLAP and TURP procedures would be charged at the current reimbursement rate for TURP, provided the two methods have similar safety and effectiveness. In addition there may be an increased gap fee that will need to be covered by the patient.

Should VLAP be found to be safer or more effective than TURP, requiring fewer re-treatments, or reduced symptom treatment there may be some cost recovery. Should VLAP be found to be less safe and effective than TURP, then there may be costs to the Department on top of the additional cost of reimbursement fees.

It is expected that VLAP would require shorter hospital stays than TURP (Ow et al. 2018), and this may lead to cost savings and improved recovery for patients. However there may be significant cost to private clinicians who want to transfer their services from TURP to VLAP and need to purchase capital equipment to do so (for example if VLAP is performed in day surgery clinics). These additional costs may be borne by private patients.

Rationale

The applicant provided an estimate of costs arising if VLAP was approved for a fee increase. The applicant acknowledged that for patients who use VLAP at the current MBS fee, the proposed increase in the fee will be an additional cost to the MBS without any change in health outcomes. However, it is proposed that the overall costs (including hospitalisation costs of the respective procedures) would be greater for TURP than for VLAP, primarily due to reduced hospital time for VLAP. Therefore, the more VLAP procedures substituted for TURP, the greater the savings for the healthcare system as a whole. For example, the 3,378 PVP procedures in year 4 at a fee which might be \$200 higher than what is currently reimbursed would cost the MBS an additional \$675,600. However, cost data in Table 6 show that each VLAP procedure is associated with hospital cost savings of \$3,321 per patient compared to TURP. So the additional 238 VLAP procedures performed because of this better incentivised MBS fee will yield savings of \$790,398 to hospitals and net savings of \$114,798 to the health care system as a whole. Please note, the applicant provided these figures and calculations for illustrative purpose only and they are likely to change in a submission based assessment (SBA).

Table 6 Estimation of PVP services from 2 to 4 years after proposed fee increase

Parameter	Year 1	Year 2	Year 3	Year 4
Estimated market size (number of services)	15,207	15,425	15,642	15,860
Projected PVP market share – current MBS fee	19.9%	20.4%	20.9%	21.3%
Estimated services at current MBS fee	3,026	3,147	3,269	3,378
Projected increase in PVP market share due to proposed fee increase	0.0%	0.5%	1.0%	1.5%
Estimated additional services due to fee increase	0	77	156	238
Total projected market share – proposed fee	19.9%	20.9%	21.9%	22.8%
Total estimated PVP services	3,026	3,224	3,426	3,616

Source: MSAC Application 1518, Application form, Boston Scientific

Fees charged for prostate resection items 37203 (TURP) and 37207 (VLAP) were sought from MBS statistics. On average, the fees charged do reflect the difference in MBS reimbursement. For 2016-17, the median fee charged for TURP was \$1636.20 (IQR \$1581.8, \$2081.8), and the median charge for VLAP was

\$1481.4 (IQR \$1315.4, \$2850.0)³. The gap between the median fees charged and the amount reimbursed (75% of the MBS item fee) was \$831.55 for VLAP and \$854.55 for TURP.

Current and proposed clinical management algorithm for identified population

The current management pathway is illustrated in Figure 3.

In its early stages, LUTS/BPH can be managed with medical treatment, however when the disease develops, surgical options are used for management. Decision making for surgical options is based on clinical assessment of the impact of LUTS symptoms, the IPSS score, patient age and comorbidities.

The general practitioner (GP) is responsible for diagnosis and initial management of patients with BPH. Early BPH (IPSS < 4) may be managed with watchful waiting and lifestyle changes, and a number of medical interventions are used for mild to moderate symptoms with IPSS scores of ≥ 4 (Spatafora et al. 2012). Medical therapies vary according to symptoms and patient co-morbidities. The IPSS questionnaire (including the QoL score) is recommended for symptom assessment.

When severe or high impact symptoms are diagnosed, referral to a specialist is recommended. This may occur at initial assessment of a patient, or as symptom severity increases despite medical treatment. Progression of BPH from mild to moderate and eventually to severe impact is common as the prostate enlarges over time (illustrated by the dotted lines in Figure 3). The EAU guidelines make recommendations for surgical treatment for men with bothersome LUTS refractory to conservative or medical therapy or in cases of absolute indications for surgery. Surgical management takes into consideration the patient's prostate size, cardiovascular risk and ability to have anaesthesia (EAU 2016).

Table 7 EAU recommendations for surgically indicated patients with LUTS (EAU 2016)

Recommendations	LE ^a	GR ^a
Holmium laser enucleation and 532-nm laser vaporisation of the prostate are alternatives to transurethral resection of the prostate (TURP) in men with moderate-to-severe LUTS leading to immediate, objective, and subjective improvements comparable with TURP.	1a	A
The short-term and mid-term functional results of 532-nm laser vaporisation of the prostate are comparable with TURP.	1b	A
The long-term functional results of holmium laser enucleation are comparable with TURP or open prostatectomy.	1b	A
Thulium enucleation may be an alternative to TURP and holmium laser enucleation in men with moderate-to-severe LUTS leading to immediate and mid-term objective and subjective improvements.	1b	A
Diode laser operations lead to short-term objective and subjective improvement	1b	B
Tm:YAG vaporesction is an alternative to TURP for small- and medium-size prostates.	1b	A
With regard to intra-operative safety and haemostatic properties, diode and thulium lasers appear to be safe.	3	C
With regard to intra-operative safety, 532-nm laser vaporisation is superior to TURP.	1b	A
532-nm laser vaporisation should be considered in patients receiving anticoagulant medication or with a high cardiovascular risk.	3	B

EAC = European Association of Urology; LUTS = lower urinary tract symptoms; Tm:YAG = thulium doped yttrium, aluminium and garnet laser; TURP = transurethral resection of the prostate

^a References used were assessed according to their level of evidence (LE) and Guidelines are given a grade of recommendation (GR), according to a classification system modified from the Oxford Centre for Evidence-Based Medicine Levels of Evidence⁴.

³ For further details, see Appendix A

⁴ Phillips B, et al. Oxford Centre for Evidence-based Medicine Levels of Evidence. Updated by Jeremy Howick March 2009. 1998. <http://www.cebm.net/oxford-centre-evidence-based-medicine-levels-evidence-march-2009/>

Surgical therapy (including VLAP), is indicated for patients meeting one or more of the listed criteria. After the patient has undergone surgical treatment, he will be followed up either by the urologist/surgeon or referred back to his GP for follow-up. The Andrology Australia Clinical Summary Guide (2014) recommends follow up at 6 weeks, 12 weeks and 6 months in the first year after surgery, and annually thereafter. Symptom assessment using a standardised test (IPSS) should be performed at follow-up to determine the successfulness of the procedure, and whether there is a requirement for retreatment.

Choice of VLAP or TURP

In Australia, VLAP may be chosen to treat BPH, depending on access to equipment and training of the practitioner. TURP, on the other hand, is more accessible to most practitioners. VLAP can be performed on patients who are taking anti-coagulants, whereas patients undergoing TURP would be required to stop anti-coagulants prior to treatment. Multiple TURP procedures may be required over time to reduce the prostate, in contrast to VLAP, for which only one application of VLAP is usually needed to achieve the desired outcome.

Currently, no Australian guidelines exist. The Urological Society of Australia and New Zealand (USANZ) does not have any published guidelines for LUTS, but endorses the EAU guidelines.⁵ The European Association of Urology (EAU, 2016) published guidelines *Treatment of Non-neurogenic Male LUTS*⁶ are used by practitioners in Australia. Andrology Australia guidance is not considered current (Australia 2014).

Repeat and incomplete procedures

The need for re-intervention is a significant consideration with regard to BPH surgical treatments. Re-intervention rates published in a recent randomised controlled trial by Bachmann et al (Bachmann et al 2014) were 9.6% for XPS VLAP and 13.5% for TURP. These rates could be broken down into re-interventions following early adverse events (within 30 days) or late adverse events (30 to 80 days) post surgery. Projecting these rates onto the number of services performed in the 2016-2017 period provides an estimate of re-intervention procedures for that period (Table 8).

Table 8 Procedures and estimated re-interventions for the period July 2016 to June 2017

Procedure	Number of procedures	Re-interventions total	Re-interventions from early adverse events (≤30 days)	Re-interventions from late adverse events (30-80 days)
TURP	11,285	1,523 (13.5%)	1106 (9.8%)	429 (3.8%)
VLAP	2,612	251 (9.6%)	76 (2.9%)	172 (6.6%)

PVP = Photoselective vapourisation of the prostate; TURP = Transurethral resection of the prostate

The surgical procedures TURP and VLAP have other (separate) MBS items for practitioners to bill/claim when the procedures are not completed. In Table 9, the total claims for incomplete procedures are listed for the period July 2011 to June 2017, alongside the total claims for completed procedures. The proportion of all procedures that are incomplete is also given. There is no item for an incomplete HoLEP procedure.

⁵ Urology Society of Australia and New Zealand: <https://www.usanz.org.au/>

⁶ European Association of Urology guidelines for Non-neurogenic Male LUTS: <https://uroweb.org/guideline/treatment-of-non-neurogenic-male-luts/>

Table 9 Comparison of complete and incomplete procedures for BPH for the period July 2011 to June 2017

Procedure	MBS item	Completed procedures (N)	MBS item	Incomplete procedures (N)	% Incomplete/total
TURP	37203	67,539	37206	169	0.25
VLAP	37207	14,678	37208	14	0.095

TUMT = Transurethral microwave thermotherapy of the prostate; TUNA = Transurethral needle ablation; TURP = Transurethral resection of the prostate; VLAP = Visual laser ablation of the prostate

Note: NHMRC guidelines for management of LUTS/BPH published in 1994 and 2000 are now rescinded. International guidelines for treatment of LUTS BPH which may be useful are listed.

Treatment of non-neurogenic male LUTS, European Association of Urology Guideline, 2016

Singapore Urological Association Clinical Guidelines for Male Lower Urinary Tract Symptoms/Benign Prostatic Hyperplasia, Singapore Urological Association Guidelines Committee, 2015

Lower urinary tract symptoms in men: management (CG97), NICE Guideline, NHS, 2010

American Urological Guideline: Management of Benign Prostatic Hyperplasia (BPH), AUA guidelines, 2010

Spatafora et al, Evidence-based guidelines for the treatment of lower urinary tract symptoms related to uncomplicated benign prostatic hyperplasia in Italy: updated summary from AURO.it, Therapeutic Advances in Urology, 2012

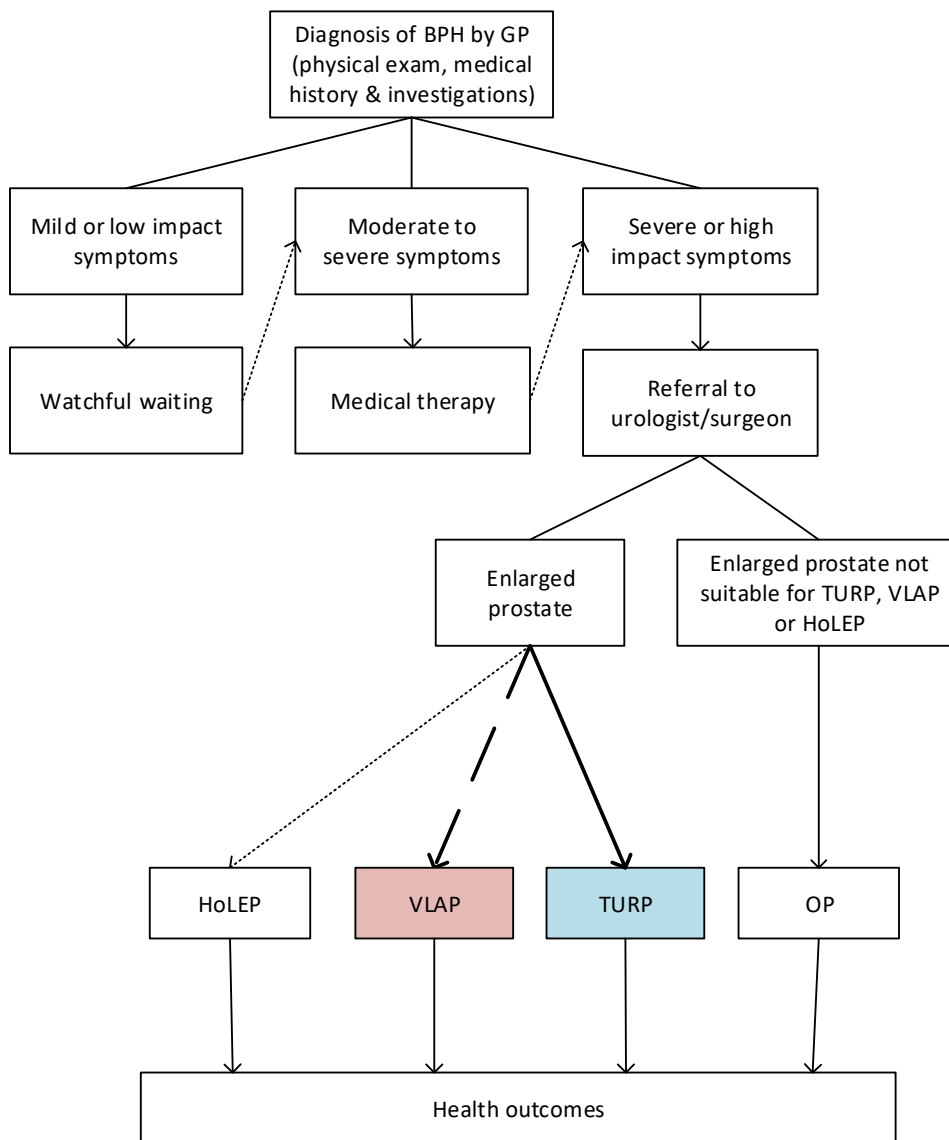


Figure 3 Current and proposed clinical management pathway for patients with BPH

HoLEP = holmium: YAG laser enucleation of the prostate; OP = open prostatectomy; TURP = transurethral resection of the prostate; VLAP = visual laser ablation of the prostate

Expected changes to clinical management algorithm for identified population

Clinical management of patients is not expected to change if this application for increased funding is approved for VLAP, because VLAP is already subsidised and utilised across Australia. However, an increased MBS fee for VLAP would expect to result in a shift of patients undergoing TURP to VLAP (usage of TURP and VLAP are indicated by the solid and dashed lines in Figure 3). Currently TURP is the most commonly used service for treatment of severe symptomatic LUTS BPH for prostates between 30 and 80ml in size. It is expected this proportion would reduce, and the proportion of VLAP services would increase.

HoLEP is another surgical alternative for treating the population of patients with severe symptoms. However, despite being approved for subsidy in 2012, its usage has remained lower than TURP and VLAP. HoLEP has a higher MBS fee than either TURP or VLAP (\$1,262.15). According to the Public Summary Document for HoLEP (MSAC Application 1149 (MSAC 2012)), an MBS fee between \$1,000 and \$1,262 was considered reasonable and cost-effective by MSAC when compared to TURP (prostate < 80-100gm) or OP

(prostate > 80-100gm). It is unlikely the number of claims for HoLEP would change significantly should this application be successful. PASC therefore did not recommend a comparison of VLAP and HoLEP was necessary.

Proposed economic evaluation

The applicant's clinical claim is that VLAP is *non-inferior* for effectiveness and safety, compared to the main comparator TURP. *The economic evaluation recommended is therefore a cost-minimisation analysis (CMA).*

PASC Comments and requirements

PASC noted the MBS listing of VLAP preceded MSAC, and although a full revisiting/review of safety, efficacy and cost-effectiveness of the procedure is not required, a review of evidence comparing TURP and side-firing laser technology is required. PASC recommended sourcing other studies to reassure MSAC that laser is not inferior to TURP.

PASC agreed that, given the claim of non-inferiority and identification of cost offsets, a utilisation and financial comparison is reasonable, but requested the following issues be addressed:

- Histology following TURP – consider savings if VLAP is performed, but also the cost of missing potential tumours that are normally identified from histology following TURP (The incidence was recently reviewed by {Perera, 2016, 11-4})
- Consumables- clarify differences between the procedures
- Out-of-pocket costs for patients – review available data to advise MSAC whether an increase in MBS fee is likely to result in increased co-payments for patients. This issue needs to be addressed, despite claims from the applicant and clinical expert that private health insurance rebates keep this in check.

PASC recommendations for the assessment

PASC determined this application does not need a full submission-based assessment (SBA). Rather, a fit-for-purpose SBA should be lodged by the applicant, for initial consideration by MSAC Executive (and possible subsequent referral to ESC for examination of utilisation and financial impacts of the fee increase).

The fit-for-purpose SBA should consider the following:

- The main high-quality, comparative evidence on efficacy and safety is to stem from the GOLIATH study (GreenLight™ Laser Therapy vs. TURP), which appears to be the only RCT on this technology. For this application, it is doubtful that a further literature review on efficacy would be helpful, but sourcing other studies that provide evidence comparing laser and TURP may help to reassure MSAC.
- The main outcome of reduced length of stay (compared to TURP), assuming equivalent safety and effectiveness, should be examined by obtaining and analysing information of a non-randomised nature. This can be achieved through examining use of VLAP and TURP in Australia. It should be noted that the GOLIATH study was undertaken in Europe, with no Australian sites.

- Sufficient Australian data should be available on co-claiming (through the MBS) and length of stay (through AIHW hospital separations). This can initially be presented to MSAC Executive in the fit-for-purpose SBA, together with utilisation and financial impact information associated with the proposed fee increase. MSAC Executive will then advise on possible subsequent referral to ESC and/or MSAC.
- The fit-for-purpose SBA should include analysis of the utilisation and financial impacts of the fee increase

Proposed item descriptor

Public funding is sought for an increase to the reimbursement for MBS item 37207.

The item descriptor (wording) of the MBS item used for the VLAP service would remain unchanged. It is only the MBS fee that would change (the \$ amount from which the patient rebate is calculated) (Table 10). The applicant claims that non-inferiority and the cost saving nature of VLAP (compared to TURP) support a fee for VLAP at least equivalent to TURP (\$1,042.15). If the SBA proposes a higher fee than TURP, a cost-effectiveness (rather than cost-minimisation) approach would be required. The applicant states that a higher fee should minimise financial disincentive, reflect superior resource utilisation outcomes and additional procedure duration of VLAP over TURP. The exact fee to be proposed will be justified in the SBA.

The proposed fee in Table 10 is based on the fee for TURP (MBS item 37203).

Table 10 Proposed MBS item descriptor

Category 3 – THERAPEUTIC PROCEDURES
<p>37207</p> <p>PROSTATE, endoscopic non-contact (side-firing) visual laser ablation, with or without cystoscopy and with or without urethroscopy, and including services to which items 36854, 37201, 37202, 37203, 37206, 37245, 37321 or 37324 applies</p> <p>Multiple services rule</p> <p>(Anaes.)</p> <p>Proposed MBS Fee: \$1,042.15 Benefit: 75% (in-hospital only) = \$781.65* Current MBS Fee: \$866.45 Benefit: 75% (in-hospital only) = \$649.85</p>
<p>37208</p> <p>PROSTATE, endoscopic non-contact (side firing) visual laser ablation, with or without cystoscopy and with or without urethroscopy, and including services to which item 36854, 37303, 37321 or 37324 applies, continuation of, within 10 days of the procedure described by items 37201, 37203, 37207 or 37245 which had to be discontinued for medical reasons</p> <p>Multiple Services Rule</p> <p>(Anaes.)</p> <p>Proposed MBS Fee: To be determined. Current MBS Fee: \$416.05 Benefit: 75% (in-hospital only) = \$312.05</p>

*Note the proposed fee for item 37207 is equivalent to the fee for TURP

References

2015, SUAGC 2017, 'Singapore Urological Association Clinical Guidelines for Male Lower Urinary Tract Symptoms/Benign Prostatic Hyperplasia', *Singapore Medical Journal*, vol. 58, no. 8, pp. 473-480.

AUA 2010, *American Urological Guideline: Management of Benign Prostatic Hyperplasia (BPH)*, AUA guidelines.

Australia, A 2014, *BPH and Prostatitis - Diagnosis and Management*, Clinical summary guide, AA, Australia.

Bachmann, A, Tubaro, A, Barber, N, et al 2014, '180-W XPS GreenLight laser vaporisation versus transurethral resection of the prostate for the treatment of benign prostatic obstruction: 6-month safety and efficacy results of a European Multicentre Randomised Trial--the GOLIATH study', *Eur Urol*, vol. 65, no. 5, May, pp. 931-942.

Bachmann, A, Tubaro, A, Barber, N, et al 2015, 'A European multicenter randomized noninferiority trial comparing 180 W GreenLight XPS laser vaporization and transurethral resection of the prostate for the treatment of benign prostatic obstruction: 12-month results of the GOLIATH study', *J Urol*, vol. 193, no. 2, Feb, pp. 570-578.

Barbalat, Y, Velez, MC, Sayegh, CI & Chung, DE 2016, 'Evidence of the efficacy and safety of the thulium laser in the treatment of men with benign prostatic obstruction', *Therapeutic Advances in Urology*, vol. 8, no. 3, 02/24, pp. 181-191.

BEACH 2012, *SAND abstract number 190: Benign prostatic hyperplasia (BPH) and symptoms among male general practice patients aged 40 years or older*.

Brunken, C, Seitz, C & Woo, HH 2015, 'A systematic review of experience of 180-W XPS GreenLight laser vaporisation of the prostate in 1640 men', *BJU Int*, vol. 116, no. 4, Oct, pp. 531-537.

Cetinkaya, M, Onem, K, Rifaioglu, MM & Yalcin, V 2015, '980-Nm Diode Laser Vaporization versus Transurethral Resection of the Prostate for Benign Prostatic Hyperplasia: Randomized Controlled Study', *Urol J*, vol. 12, no. 5, Nov 14, pp. 2355-2361.

D'Silva, KA, Dahm, P & Wong, CL 2014, 'Does this man with lower urinary tract symptoms have bladder outlet obstruction?: The Rational Clinical Examination: a systematic review', *JAMA*, vol. 312, no. 5, Aug 6, pp. 535-542.

Ding, H, Du, W, Lu, ZP, Zhai, ZX, Wang, HZ & Wang, ZP 2012, 'Photoselective green-light laser vaporisation vs. TURP for BPH: meta-analysis', *Asian J Androl*, vol. 14, no. 5, Sep, pp. 720-725.

EAU 2016, *Treatment of non-neurogenic male LUTS*, European Association of Urology Guidelines.

Lee, SWH, Chan, EMC & Lai, YK 2017, 'The global burden of lower urinary tract symptoms suggestive of benign prostatic hyperplasia: A systematic review and meta-analysis', *Sci Rep*, vol. 7, no. 1, Aug 11, p. 7984.

Li, Z, Chen, P, Wang, J, et al 2016, 'The impact of surgical treatments for lower urinary tract symptoms/benign prostatic hyperplasia on male erectile function: A systematic review and network meta-analysis', *Medicine*, vol. 95, no. 24, 06/17

MSAC 2012, *1149-PSD-HolmiumYAG laser enucleation of the Prostate*, MSAC Public Summary Documents, Department of Health, Australia, Canberra.

Nickel, JC 2006, 'The overlapping lower urinary tract symptoms of benign prostatic hyperplasia and prostatitis', *Curr Opin Urol*, vol. 16, no. 1, Jan, pp. 5-10.

Ow, D, Papa, N, Perera, M, et al 2018, 'Trends in the surgical treatment of benign prostatic hyperplasia in a tertiary hospital', *ANZ J Surg*, vol. 88, no. 1-2, Jan, pp. 95-99.

Pascoe, C, Ow, D, Perera, M, Woo, HH, Jack, G & Lawrentschuk, N 2017, 'Optimising patient outcomes with photoselective vaporization of the prostate (PVP): a review', *Transl Androl Urol*, vol. 6, no. Suppl 2, Jul, pp. S133-141.

Perera, M, Lawrentschuk, N, Perera, N, Bolton, D & Clouston, D 2016, 'Incidental prostate cancer in transurethral resection of prostate specimens in men aged up to 65 years', *Prostate Int*, vol. 4, no. 1, Mar, pp. 11-14.

Spatafora, S, Casarico, A, Fandella, A, et al 2012, 'Evidence-based guidelines for the treatment of lower urinary tract symptoms related to uncomplicated benign prostatic hyperplasia in Italy: updated summary from AURO.it', *Therapeutic Advances in Urology*, vol. 4, no. 6, pp. 279-301.

Teo, JS, Lee, YM & Ho, HSS 2017, 'An update on transurethral surgery for benign prostatic obstruction', *Asian Journal of Urology*, vol. 4, no. 3, 06/15

Thomas, JA, Tubaro, A, Barber, N, et al 2016, 'A Multicenter Randomized Noninferiority Trial Comparing GreenLight-XPS Laser Vaporization of the Prostate and Transurethral Resection of the Prostate for the Treatment of Benign Prostatic Obstruction: Two-yr Outcomes of the GOLIATH Study', *Eur Urol*, vol. 69, no. 1, Jan, pp. 94-102.

Appendix A MBS statistics on fees charged

Given the hypothesis that the MBS fee listed for a procedure would influence which procedure a physician would recommend, it was thought important to determine what fees were actually charged to patients for TURP (item 37203) and VLAP (item 37207). MBS statistics in Table 11 show the range of fees charged for each procedure, across different percentiles.

Table 11 Fees charged for items 37207 (VLAP) and 37203 (TURP)

Financial Year	MBS Item	No. of Services	Mean charge \$	P10	P25	P50 (Median)	P75	P90	P95
2012-13	37203 TURP	11,263	\$1,860.4	1,403.1	1,557.6	1,600.0	2,081.8	2,530.0	3,022.5
2013-14	37203 TURP	10,798	\$1,901.1	1,406.8	1,578.7	1,634.4	2,150.5	2,693.0	3,192.0
2014-15	37203 TURP	10,904	\$1,903.7	1,425.0	1,581.8	1,644.5	2,081.8	2,750.0	3,192.0
2015-16	37203 TURP	11,144	\$1,897.9	1,434.6	1,581.8	1,636.2	2,025.4	2,725.0	3,214.3
2016-17	37203 TURP	11,281	\$1,924.8	1,434.6	1,581.8	1,636.2	2,081.8	2,824.9	3,337.5
2012-13	37207 VLAP	2,141	\$1,848.2	1,244.5	1,301.0	1,446.3	2,445.0	3,000.0	3,500.0
2013-14	37207 VLAP	2,741	\$1,717.1	1,221.2	1,315.4	1,376.2	1,885.0	2,639.6	3,250.0
2014-15	37207 VLAP	2,940	\$1,733.5	1,238.9	1,315.4	1,444.2	1,945.0	2,705.0	3,200.0
2015-16	37207 VLAP	2,813	\$1,780.9	1,248.3	1,315.4	1,481.4	1,990.0	2,830.0	3,400.0
2016-17	37207 VLAP	2,613	\$1,750.0	1,248.3	1,315.4	1,481.4	1,900.0	2,850.0	3,400.0

Source: Medicare data accessed February 2018