



Australian Government
Medical Services Advisory Committee

Public Summary Document

Application No. 1697 – Review of Different Minimally Invasive Therapeutic Approaches for the Management of Patients with Benign Prostatic Hyperplasia (BPH)

Applicant: Australian Government Department of Health and Aged Care

Date of MSAC consideration: 28-29 July 2022

Context for decision: MSAC makes its advice in accordance with its Terms of Reference, [visit the MSAC website](#)

1. Purpose of application

MSAC requested that the Department of Health and Aged Care, in consultation with applicants and professional and consumer stakeholders, undertake a review on the effectiveness, safety, cost and cost-effectiveness of visual laser ablation of the prostate (VLAP), prostatic urethral lift (PUL), transurethral water vapour ablation (TUWA), transurethral resection of the prostate (TURP), transurethral needle ablation (TUNA), transurethral microwave thermotherapy (TUMT), holmium-YAG laser enucleation of the prostate (HoLEP) and (potentially) any other minimally invasive procedures used to manage benign prostatic hyperplasia (BPH) in Australia.

MSAC considered that this review would allow the Committee to provide more comprehensive advice to the Minister on which BPH procedures should be listed on the Medicare Benefits Schedule (MBS), and the appropriate fee for each listed procedure.

2. MSAC's advice to the Minister

MSAC reviewed the evidence in relation to comparative safety, clinical effectiveness, cost-effectiveness and total cost for minimally invasive therapeutic approaches used to manage patients with benign prostatic hyperplasia (BPH) to provide advice on procedures funded or proposed to be funded via the Medicare Benefits Schedule (MBS; MSAC applications 1586 and 1612). MSAC noted that in comparison to transurethral resection of the prostate (TURP), none of the minimally invasive procedures provide superior effectiveness but some may provide superior safety. MSAC noted there is a wide range of factors considered by clinicians and patients when choosing a procedure and that patients have different preferences when considering the balance between side effects and effectiveness. MSAC considered the existing MBS items for endoscopic enucleation (EEP) and visual laser ablation of the prostate (VLAP) were appropriate but did not

support repurposing the VLAP MBS item to create a general ablation item for treating BPH. MSAC considered the MBS item for transurethral microwave thermotherapy (TUMT) should be delisted on the basis of inferior effectiveness, non-inferior safety and low and declining service volume. MSAC supported creation of new MBS items for transurethral water vapour ablation (see MSAC application 1586) and prostatic urethral lift (see MSAC application 1612).

Consumer summary

This application was a request from MSAC to review the effectiveness, safety and cost-effectiveness of different minimally invasive therapeutic procedures for the management of patients with benign prostatic hyperplasia (BPH) in Australia.

BPH, also called prostate enlargement, is a non-cancerous enlargement of the prostate gland that occurs as a natural part of ageing. The urethra is a thin tube that allows urine to flow from the bladder and out of the body. As the urethra runs through the prostate, BPH can cause symptoms such as needing to urinate frequently, difficulty starting or stopping urination, a weak urinary stream, the inability to urinate, and/or loss of bladder control, which can impact on a patient's quality of life.

Transurethral resection of the prostate (TURP) is type of surgery where the prostate tissue is cut out piece by piece and flushed out of the body via the urethra. TURP is considered the gold standard treatment for BPH, and it is the treatment used most often because it is very effective and safe. However, patients may prefer alternative procedures that are not as invasive as TURP.

This review compared these minimally invasive procedures to TURP to see if they were as effective, safe and cost-effective.

The minimally invasive procedures reviewed were:

- endoscopic enucleation (EEP), which uses a laser to remove part of the enlarged prostate
- prostatic urethral lift (PUL), which uses implants to pull and lift the enlarged prostate into a better position
- transurethral microwave thermotherapy (TUMT), which uses heat to remove part of the enlarged prostate
- transurethral water vapour ablation (TUWA), which uses water vapour to remove part of the enlarged prostate
- visual laser ablation of the prostate (VLAP), which uses a laser to remove part of the enlarged prostate.

MSAC noted that none of the minimally invasive procedures were more effective than TURP, but some may be safer. Each BPH treatment has different side effects and long-term effectiveness compared to TURP. MSAC noted there was a trade-off between how well each procedure works (effectiveness) and the risks of the procedure (safety) compared to TURP. MSAC noted that there were a wide range of factors considered by clinicians and patients when choosing a procedure. The key factors for patients included level of bother, level of invasiveness, recovery time, duration of treatment, sexual function preservation, risk of adverse events and financial impact (out-of-pocket costs). MSAC noted that patients have different preferences when considering the balance between effectiveness and safety.

Consumer summary

MSAC's advice to the Commonwealth Minister for Health and Aged Care

MSAC supported creating two new Medicare Benefits Schedule (MBS) items, for TUWA and PUL. MSAC considered these to be just as safe or safer than TURP. MSAC considered the MBS items for EEP and VLAP were appropriate and should remain. MSAC advised that the MBS item for TUMT be removed, as it is not as effective or safe as TURP and is not commonly used.

3. Summary of consideration and rationale for MSAC's advice

MSAC recalled that at its July 2020 meeting, MSAC had deferred consideration of two MSAC applications for minimally invasive procedures to treat BPH and requested the Department commission a review of the effectiveness, safety and cost-effectiveness of all minimally invasive procedures used to manage BPH in Australia (BPH review). MSAC recalled that it had considered the BPH review would allow MSAC to provide more comprehensive advice on which BPH procedures should be listed on the MBS, as well as the appropriate fee for each procedure. In particular, to facilitate MSAC's reconsideration of the following two deferred MSAC applications:

- MSAC application 1586, which seeks creation of a new MBS item for TUWA.
- MSAC application 1612, which seeks to increase the MBS fee for PUL to be equivalent to the MBS fee for VLAP and TURP by amending MBS item 36811 for cystoscopy (a generic item).

MSAC noted this application presents the requested BPH review which included endoscopic enucleation (EEP, such as HoLEP), PUL, TUMT, TUWA and VLAP. The review compared the minimally invasive procedures against TURP, the gold standard for surgical treatment of BPH.

MSAC noted all of the minimally invasive BPH procedures included in the review can be performed under different MBS item numbers. MSAC noted that EEP, TUMT and VLAP are funded under specific MBS items, and PUL is funded under a generic MBS item (36811). A fee increase is being sought for PUL although MSAC noted that prior to the commissioning of the current review, MSAC had not previously considered the safety and effectiveness of PUL. MSAC also noted that TUWA is funded on an interim basis under the MBS item for TUNA (37201) which is restricted to patients who are medically unfit for TURP and creating a new item for TUWA will remove this restriction from TUWA allowing its use as an alternative to TURP. MSAC noted that TURP (MBS item 37203) had the most services claimed (66.2% of the total claims), followed by VLAP (MBS items 37207; 15.3%), EEP (MBS item 37245; 7.4%), PUL (MBS item 36811; 7.0%), TUWA/TUNA (MBS item 37201; 3.9%) and TUMT (MBS item 37230; 0.1%) for the 2020/2021 financial year. MSAC noted that MBS items 37202 and 37206 are retreatment operation item numbers (within 10 days) for items 37201 and 37203, respectively which are infrequently used: from July 2020 to June 2021 there were four claims (0.0% of the total claims) for MBS item 37202 and 20 claims (0.1%) for MBS item 37206. MSAC noted the utilisation rates of PUL, TUWA and TURP have not increased since 2016.

MSAC noted from the clinical management algorithm (excluding prostates larger than 80ml) that TUNA is not recommended for patients with severe BPH and high-impact urinary symptoms who are suitable for TURP. Consistent with this, the MBS item for TUNA is also restricted to patients who are not medically fit for TURP. Therefore, TUNA was not within scope of the review. MSAC noted a National Institute for Health and Care Excellence (NICE)-developed management pathway for lower urinary tract symptoms in men included consideration of whether patients are high or low risk for surgery, if they can have surgery under anaesthesia, their prostate volume,

and whether they can stop anticoagulant/antiplatelet therapy. MSAC noted that clinicians may also consider the presence of a middle lobe, cardiovascular risk and other health issues to guide procedure choice. Key choice determinants for patients included level of bother, level of invasiveness, recovery time, duration of treatment, sexual function preservation, risk of adverse events and financial impact (out-of-pocket costs). Further, patients may prioritise different risks based on their age.

MSAC noted that the quantity of evidence varied across the interventions but at least one randomised controlled trial (RCT) was available comparing each intervention with TURP, with the exception of TUWA. Therefore, the BPH review drew on other evidence to inform the comparison of TUWA versus TURP. This included the indirect comparison previously presented to MSAC (as part of MSAC application 1586), a comparison of treatment crossover arms from a single RCT vs sham, and a published network meta-analysis (not previously considered by MSAC). MSAC noted that key clinical endpoints for effectiveness included the International Prostate Symptom Score (IPSS) and maximal flow rate (Qmax). MSAC noted that the minimal clinically important difference (MCID) for IPSS is 3 points (lower is better), while the MCID for Qmax is 5 ml/s (higher is better).

Regarding the comparative safety and effectiveness of EEP versus TURP, MSAC noted that the BPH review concluded EEP was superior for some effectiveness outcomes, transfusion requirements and urinary tract infections. MSAC noted there was evidence that EEP was non-inferior for retrograde ejaculation, urethral stricture and recatheterisation but inferior for urinary incontinence. MSAC noted the BPH review concluded that EEP had non-inferior effectiveness compared to TURP with some EEP techniques found to be statistically superior for some outcomes, but these differences are of unknown clinical significance. MSAC considered EEP had non-inferior safety and effectiveness compared to TURP.

Regarding the comparative safety and effectiveness of PUL versus TURP, MSAC agreed with the BPH review that PUL had superior safety compared to TURP for two safety outcomes, retrograde ejaculation and urinary incontinence. PUL showed no difference to TURP for major adverse events, urinary tract infections or urethral strictures. MSAC also noted that PUL may have been superior for erectile dysfunction but the trial evidence for PUL was not powered to show this. MSAC noted that PUL had statistically and clinically poorer outcomes for IPSS at 12 months and Qmax at 6 and 12 months compared to TURP. MSAC disagreed with the pre-MSAC response from Teleflex Medical (applicant for PUL – MSAC application 1612) which claimed PUL had non-inferior clinical effectiveness compared with TURP. MSAC acknowledged that six months post-intervention, PUL was non-inferior to TURP for IPSS, but MSAC considered after one and two years PUL was inferior to TURP for IPSS. MSAC noted that the reintervention rates for PUL and TURP were similar after one year (about 6%), but were much higher for PUL (13.6%) after five years (LIFT trial). MSAC acknowledged that although TURP is superior for IPSS change, PUL still does achieve a significant change: PUL 11.4 vs TURP 15.4 at 12 months. However, based on the comparative evidence, MSAC considered PUL has superior safety and inferior effectiveness compared to TURP.

Regarding the comparative safety and effectiveness of TUMT versus TURP, MSAC noted that the BPH review suggested TUMT had superior safety versus TURP for some outcomes. However, MSAC was not convinced that TUMT has superior safety. MSAC noted safety data for TUMT were only available for three of the seven safety outcomes summarised in the BPH review, and TUMT was only superior in safety for major adverse events. TUMT was non-inferior for urinary tract infection and urethral stricture safety outcomes. For IPSS and Qmax effectiveness outcomes, TUMT was inferior for both outcomes at 6 and 12 months. Overall, MSAC considered TUMT had unclear or non-inferior safety and inferior effectiveness compared to TURP.

Regarding the comparative safety and effectiveness of TUWA versus TURP, MSAC noted the BPH review concluded that TUWA had non-inferior safety compared to TURP. However, MSAC noted that this conclusion was based on a meta-analysis with a confidence interval that includes both substantial reductions and increases in harms indicating low certainty in the reported safety of TUWA compared to TURP. MSAC noted that the pre-MSAC response from Boston Scientific (applicant for MSAC application 1586) highlighted that the BPH review had not included the MSHQ-EjD¹ ejaculatory function outcome data previously presented in MSAC application 1586 and requested the inclusion of outcomes for retrograde ejaculation, urinary tract infection, urethral stricture and urinary continence using indirect data. MSAC noted that the indirect data indicated TUWA may be superior for erectile dysfunction, urinary tract and urinary incontinence safety outcomes. MSAC noted that TUWA has inferior effectiveness compared to TURP, in particular TUWA had statistically and clinically worse outcomes for IPSS and Qmax at 12 months. However, MSAC agreed with ESC, that as these comparisons relied on naïve or indirect treatment comparisons, the evidence should be interpreted with caution. MSAC considered that it was reasonable to conclude that TUWA had non-inferior (potentially superior) safety and inferior effectiveness compared to TURP.

MSAC recalled that when it previously considered MSAC application 1586, MSAC had requested a comparison of TUWA versus VLAP. As there was no direct comparative evidence comparing TUWA versus VLAP, Boston Scientific provided an addendum to MSAC application 1586 comparing the clinical effectiveness of TUWA with VLAP by presenting an indirect treatment comparison (ITC): TUWA vs sham vs PUL vs TURP vs VLAP, limited to outcomes at 3 months. Comparisons beyond 3 months are naïve comparisons. MSAC noted from the Commentary that the three-step ITC analysis has a significant risk of bias, especially for the naïve comparison of longer-term outcomes beyond 3 months. MSAC noted from the ITC that VLAP is likely superior to TUWA for IPSS and Qmax, while TUWA may be superior to VLAP with respect to sexual dysfunction and incontinence. TUWA and VLAP are likely equivalent for urinary tract infection and transient retention. For retreatment, MSAC noted that real world data² suggests that TUWA has a retreatment rate of 9.5% compared to 7% for VLAP.

Regarding the comparative safety and effectiveness of VLAP versus TURP, MSAC noted VLAP had superior safety for transfusion requirement, non-inferior safety for erectile dysfunction and inferior safety for urinary tract infection and urinary stricture. The evidence indicated VLAP had non-inferior effectiveness compared to TURP for IPSS, Qmax and reintervention outcomes. Overall, MSAC agreed with the BPH review that VLAP had non-inferior safety and effectiveness compared to TURP.

Regarding cost-effectiveness, MSAC recalled that, during the July 2020 consideration of TUWA and PUL, MSAC had expressed concern that it was difficult to compare costs and determine appropriate fees, as each application used different costing approaches. Thus, verification of appropriate costs for each procedure and a consistent application of these costs was an important objective of the BPH review. MSAC agreed with ESC that the BPH review was comprehensive and thorough in its approach to costing the procedures. MSAC also agreed with ESC that the presentation of a cost-consequence analysis for all outcomes and a cost-effectiveness analysis for some outcomes (IPSS and Qmax) was appropriate, given the number of important health outcomes, the level of evidence available to support the clinical claims, and the trade-offs in effectiveness and safety outcomes. MSAC noted that while the cost-consequence

¹ Male Sexual Health Questionnaire for Ejaculatory Dysfunction

² Kaplan SA & Rukstalis D (2021). Urolift PUL compared to Rezum, TURP and GreenLight PVP: US Medicare and commercial claims analysis reveals lowest complications for PUL and highest retreatment for Rezum. *Journal of Urology* **206**(Suppl 3):e1170.

analysis did not allow procedures to be compared to each other using a single outcome, it did allow the procedures to be benchmarked against TURP.

MSAC noted the BPH review assumed all procedures were performed in hospital under general anaesthesia, which is consistent with clinical practice in Australia. MSAC noted that the costs associated with anaesthesia were based on the estimated mean procedure durations for each procedure. MSAC noted that the mean operative times for each BPH procedure were as follows: EEP 73 minutes, VLAP 72 minutes, TURP 64 minutes, PUL 55 minutes, TUMT 30 minutes, and TUWA 20 minutes. MSAC also noted that it was assumed that TURP will be the method for all reinterventions. MSAC noted that TURP is not always the reintervention method, for example PUL can be used instead, however MSAC considered it reasonable to assume that TURP is the typical reintervention procedure.

MSAC noted that the total cost of TURP was estimated to be \$6,876 per procedure. All of the minimally invasive interventions were estimated to cost less than TURP, with the exception of PUL when the MBS service costs are increased to \$1,058.80 (as originally requested in MSAC application 1612). MSAC noted that the cost of PUL is sensitive to the number of prostheses used. MSAC recalled MSAC application 1612 had assumed four implants per procedure, but at that time MSAC had noted that the cost of PUL may be underestimated due to the number of implants required. MSAC noted that the BPH review used results of a recent systematic review and applied 4.54 implants per procedure which MSAC considered appropriate.

MSAC noted the pre-MSAC response from Teleflex Medical (applicant for MSAC 1612) advised that the majority of equipment required for PUL is the same as for TURP, meaning the incremental capital costs for PUL are very low (\$63 per PUL vs \$56 per TURP) as hospitals would already be set up to perform both procedures. When this was taken into consideration, along with the new proposed fee of \$842.10 for PUL, Teleflex Medical claimed the total costs per procedure for PUL were less than for TURP.

MSAC noted that TUWA consumables, at a cost of \$█, are not included on the Protheses List, and raised the possibility that these costs may be passed on to patients if the costs are not covered by private health insurance. MSAC noted that any such out-of-pocket cost for patients would require informed financial consent from patients. MSAC noted the pre-MSAC responses from Teleflex Medical and Boston Scientific queried the reintervention rates (and therefore costs) applied in the BPH review, however MSAC considered the alternatives were not well supported by data and considered the reintervention rates (and sensitivity analyses testing these rates) were appropriate.

MSAC noted the cost-effectiveness analyses which presented the incremental cost-effectiveness ratios (ICER) for IPSS and Qmax effectiveness outcomes. MSAC noted that EEP dominated TURP, but that the superiority claim may be overstated. However, when the MBS fee was set to \$1,084 for PUL (equivalent to the MBS fee for TURP) PUL was dominated by TURP. MSAC noted that the ICER for TUWA is in the southwest quadrant of the cost-effectiveness plane, with \$█ of cost savings per gain in IPSS.

MSAC noted that the average fee charged for each procedure appears to relate linearly to the scheduled fee. MSAC considered that the availability of a range of reimbursed options was important to allow for patient preference.

Based on the available evidence for comparative safety, effectiveness and cost-effectiveness, MSAC formulated the following advice regarding which minimally invasive BPH procedures should be listed on the Medicare Benefits Schedule (MBS). In addition, MSAC also considered procedure duration and complexity when considering the appropriate fees for each procedure.

MSAC deliberated on the merits of a generic ablative MBS item as proposed by the MBS Taskforce Review³. MSAC noted that this recommendation had not yet been implemented due to differences in MBS fees across the BPH items. MSAC did not support repurposing the MBS item for VLAP (37202) as a new generic item for all ablative procedures on the basis that there are differences in the procedure time and complexity across the procedures.

MSAC advised that the current MBS listings and fees for EEP and VLAP are appropriate and should remain unchanged.

MSAC supported the creation of a new MBS item specific for PUL (rather than amending the generic cytology MBS item 36811) on the basis that PUL has superior safety and inferior effectiveness compared to TURP. MSAC noted there is a wide range of factors considered by clinicians and patients when choosing a procedure and that patients have different preferences when considering the balance between side effects and long-term effectiveness. MSAC considered the proposed increased fee of \$842.10 for PUL appeared to be commensurate with the procedure time and complexity. MSAC considered that PUL was likely to have total costs that would be comparable to TURP. The item descriptor accepted by MSAC for PUL is shown below. MSAC did not consider it necessary to include clinical criteria in the item descriptor noting there are clinical guidelines available that address these. MSAC noted that PUL can be repeated and therefore questioned if the item descriptor should specify a once per lifetime limit. MSAC suggested the Department could seek input from urologists on whether such a restriction would disadvantage any population groups.

Category [3] – [Therapeutic Procedures]
<p>CYSTOSCOPY with insertion of prostatic prostheses for the treatment of Benign Prostatic Hyperplasia in men: Multiple Operation Rule (Anaes.) Fee: \$842.10 Benefit: 75% = 631.60 85% = \$715.79</p>

MSAC supported the creation of a new MBS item specific for TUWA on the basis of inferior effectiveness and non-inferior overall safety compared with TURP although for some safety outcomes TUWA may be superior. As described previously, MSAC noted there is a wide range of factors considered by clinicians and patients when choosing a procedure and MSAC did not consider it necessary to include clinical criteria in the item descriptor. However, MSAC noted that the time taken for a TUWA procedure is a short (20min) and of lower complexity. As such, MSAC did not support the proposed fee (\$842.10) for TUWA. MSAC considered the procedure time and complexity for TUWA was comparable with existing cystoscopy procedures and on this basis, MSAC advised that the fee for TUWA should be \$341.90. MSAC considered that TUWA would be cost-saving compared with TURP and that the overall cost to the MBS would be small. The item descriptor for TUWA accepted by MSAC is shown below.

Category 3 – THERAPEUTIC PROCEDURES
<p>#### - Transurethral Water Ablation of the Prostate PROSTATE, ablation by water vapour with or without cystoscopy and with or without urethroscopy Fee: \$341.90 Benefit: 75% = \$256.43 85% = \$290.62</p>

³ [MBS Review Taskforce: Final report on the review of urology MBS items 2018: Recommendation 61](#)

MSAC advised that TUMT should be delisted on the basis of inferior effectiveness and non-inferior safety compared to TURP, as well as having a low and declining service volume (according to MBS utilisation data).

MSAC also advised that retreatment MBS items 37202 and 37206 should be delisted on the basis that current MBS claiming suggests there is minimal need for these items. That is, from July 2020 to June 2021, there have been four claims (0.0% of the total claims) for retreatment MBS item 37202 and 20 claims (0.1%) for retreatment MBS item 37206. MSAC noted that patients who require a second procedure could instead access the first procedure item again. MSAC considered that because of the low utilisation of retreatment items, this would not have a significant budget impact.

4. Background

A number of minimally invasive BPH procedures have previously been considered by MSAC:

- HoLEP – [MSAC application 1149](#)
- PUL – [MSAC application 1612](#)
- TUMT – [MSAC application 1076](#)
- TUNA – [MSAC application 1014](#)
- TUWA – [MSAC application 1586](#)
- VLAP – [MSAC application 1518](#).

All of these procedures are currently listed on the MBS, except TUWA which is currently being claimed on an interim basis under the MBS item for TUNA. However, advice regarding an increase to the MBS fee for PUL ([MSAC application 1612](#)) and the creation of a new MBS item for TUWA ([MSAC application 1586](#)) were deferred by the MSAC at the 79th MSAC meeting in July 2020 due to differences in the method of costing the procedures, which did not allow an accurate comparison to be made. This report compares the safety, effectiveness and cost-consequences of minimally invasive BPH procedures currently used in Australia with a main comparator (TURP).

Table 1 Summary of key matters of concern

Component	Matter of concern	How the current assessment report addresses it
Costing of PUL	MSAC noted there are significant uncertainties in the costs associated with each procedure, and requested a further holistic assessment of the different therapeutic approaches to BPH management that takes into account the different outcomes and costs associated with each (1612 PSD, p1).	Addressed: Single report with common costing of components.
Costing of PUL	MSAC noted that the cost of PUL may be underestimated due to the cost and numbers of implants required and the re-intervention rate not being adequately accounted for, and that the cost of TURP and VLAP may be overestimated, including major complications, length of stay and capital costs (1612 PSD, p3)	Addressed: Cost-comparison redone to take these factors into account.
Costing of TUWA	MSAC considered it difficult to compare costs and determine appropriate fees, as each application (referring to PUL, VLAP, TURP and TUWA (under TUNA)) used different assessment approaches. (1586 PSD p3)	Addressed: Single report with common approach to costing.

Component	Matter of concern	How the current assessment report addresses it
Patient preferences	MSAC recognised that individual patients may have different preferences when considering the balance between side effects and long-term effectiveness (1612 PSD, p1). MSAC considered this review could usefully garner information on why urologists recommend certain procedures and what informs patient preferences for certain procedures (1612 PSD, p1; 1586 PSD, p2)	Addressed: Section 5 discusses what factors influence patient preferences and clinician recommendations.
Long-term outcomes	MSAC considered this review could usefully garner information on long-term outcomes (1612 PSD, p1; 1586 PSD, p2)	Addressed: where RCT data were not available for long-term outcomes such as relapse rate, large observational data were sought and included.

Source: Table 1, pg 9 of MSAC 1697 Department Contracted Assessment Report (DCAR)
Abbreviations: MSAC = Medical Services Advisory Committee; PSD = Public Summary Document

5. Prerequisites to implementation of any funding advice

Some of the interventions included in this report require equipment or prostheses, and these components have TGA approval. The procedures themselves are performed by urological surgeons. This specialty has established training, accreditation and standards in place.

6. Proposal for public funding

This review is intended to assist MSAC to provide advice to the Minister on which BPH procedures should be listed on the Medicare Benefits Schedule (MBS), and what the appropriate fees for each procedure are. In particular, the review is intended to assist MSAC's consideration of two MSAC applications:

- MSAC application 1586 which seeks to create a new MBS item for TUWA
- MSAC application 1612 which seeks to increase the MBS fee for PUL (equivalent to the MBS fee for VLAP and TURP) by amending MBS 36811 for cystoscopy.

7. Population

The population of interest for this assessment is patients with BPH and severe or high impact lower urinary tract symptoms (LUTS) suitable for TURP.

BPH is also known as benign prostate enlargement (BPE). It is a non-cancerous enlargement of the prostate gland, involving progressive proliferation of the smooth muscle and epithelial cells. The disease is progressive and the global lifetime prevalence is 26.2% (95%CI 22.8-29.6%). BPH can cause LUTS including urinary frequency, urgency to void, nocturia, dribbling or incomplete bladder emptying, which can impact quality of life (QoL) and physical health.

When lifestyle, pharmacologic or non-procedural approaches fail to improve LUTS symptoms or prevent progression, surgical procedures are considered.

8. Interventions

The following minimally invasive surgical procedures (interventions) available to manage BPH in Australia are included in this assessment (Table 2).

Table 2 Interventions included in MSAC application 1697

Intervention	Description	Currently on MBS?
EEP	During the procedure, a laser dissects the median and lateral lobes of the prostatic capsule. Once the tissue is enucleated, a tissue morcellator may be applied in order to aspirate the enucleated tissue from the bladder	Yes, item number 37245.
PUL	PUL is done by installing small permanent implants which lift apart the obstructing lateral prostatic lobes to reduce urethral obstruction. This is conducted transurethraly and under endoscopic guidance.	Yes, using a generic item number (MBS 36811).
TUMT	The TUMT system uses a specialised urethral catheter that emits electromagnetic waves through an antenna at a frequency of 915 – 1296 MHz to induce heat. The system allows prostate tissue to be locally thermo-ablated.	Yes, item numbers 37230 and 37233.
TUWA	TUWA is conducted using Rezūm water vapour technology. Water vapour is delivered to the prostate through the insertion of a cystoscopic probe into the urethra. The prostate tissue is ablated by the water vapour.	No specific TUWA item, however two currently listed MBS items encompass the use of radio-frequency for the ablation of prostatic tissues in patients who are not medically fit for TURP (MBS 37201 and MBS 27202), and these are used for TUWA procedures.
VLAP	This procedure can be performed using a free-beam laser which is capable of producing deep coagulation or vaporisation of the prostate tissue to relieve bladder outlet obstruction due to BPH. The treated prostate tissue undergoes coagulation necrosis and then sloughs in the urinary stream.	Yes, item number 37207 and 37208.
Other	MBS item 36811 is device-agnostic, and may be used for insertion of other urethral or prostatic stents. A summary of devices identified which would be eligible, and are currently on the Prostheses List are shown in Table 18 in the DCAR. Not all of these stents would have TURP as a comparator (some are indicated for patients unfit for surgery or on a waiting list for TURP).	Generic item number 36811.

Source: Table 2, pg 11 of MSAC 1697 DCAR

Abbreviations: BPH = benign prostatic hyperplasia; DCAR = Department Contracted Assessment Report; EEP = endoscopic enucleation of the prostate; MBS = Medicare Benefits Schedule; PUL = prostatic urethral lift; TUMT = transurethral microwave therapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate

Transurethral needle ablation (TUNA) was excluded from the review, as this intervention was never recommended for patients who are able to have TURP, and therefore it is not a suitable therapy for the target population. TUNA is currently not used in Australian clinical practice, however it could be claimed under MBS item numbers 37201 and 37202.

9. Comparator

TURP is considered the gold standard for surgical treatment of BPH. With TURP, prostate tissue is resected piece by piece via the urethra from the transition zone of the gland, and then extracted

using irrigation (under general or spinal anaesthesia). There are two subcategories of TURP, according to the energy used to resect tissue: electrosurgical and laser resection.

Electrosurgical TURP is currently listed on the MBS (MBS items 37203 and 37206) and can be monopolar (M-TURP) or bipolar (B-TURP).

M-TURP is a well-established surgical method and is currently considered to be the “gold standard”. It is currently recommended in the European Association of Urology (EAU) guidelines as the standard surgical procedure for men with bothersome to severe LUTS due to benign prostatic obstruction, if the prostate size is between 20 to 80 mL. Higher voltages are needed for M-TURP due to the distance between electrodes (and the need to pass through body tissue), This means that M-TURP is done at higher temperatures, which can lead to increased complications (e.g. damage to surrounding tissue, bleeding, erectile dysfunction, urinary incontinence).

B-TURP has a local bipolar circuit completed locally with energy contained between an active electrode and a return electrode. Energy is transmitted from the active electrode to the surrounding conductive solution. This causes water to evaporate, which creates an interface gas layer surrounding the loop which provides resistance to the energy flow. B-TURP requires lower voltages and has less tissue resistance compared with M-TURP, resulting in reduced thermal damage to surrounding tissue and a reduced risk of adverse events. The most common bipolar resection systems are the plasmakinetic resection system (PKRP), the TURiS system (transurethral resection in saline) and the controlled tissue resection system.

The MBS items do not distinguish between B-TURP and M-TURP, and therefore both M-TURP and B-TURP are considered to be valid comparators and are considered together as the comparator ‘TURP’.

10. Summary of public consultation input

Consultation input was received from seven (7) individual specialists and four (4) organisations:

- Boston Scientific Pty Ltd (Applicant for MSAC 1518 and 1586)
- St Vincent’s Health Australia
- Teleflex Medical Australia Pty Ltd (Applicant for MSAC 1612)
- The Royal Australian and New Zealand College of Radiologists (RANZCR).

Cost-comparison

Boston Scientific Pty Ltd provided cost comparisons for TUWA, VLAP, TURP and PUL and Teleflex Medical Australia provided cost comparisons for PUL, TUWA and VLAP. However, the resource use and associated costs varied across the two consultations.

Factors which influence the choice of BPH procedure

Input regarding factors influencing a clinician to recommend a certain BPH procedure and patient’s preferences was provided by individuals specialists, Boston Scientific, St Vincent’s Health Australia, and Teleflex Medical Australia, and is discussed in Section 15 below.

Support for availability of variety of treatment options

The feedback from St Vincent’s Health Australia highlighted that the availability of various surgical options allows clinicians to offer multiple options to patients who decide on treatment depending on not only the expected urinary outcome but also minimising the risk of sexual dysfunction. This feedback was consistent with other consultation responses and anecdotal evidence from individual specialists highlighting that the availability of minimally invasive

treatment options facilitates individualised care that takes into consideration patient factors and preferences.

Comparator considerations

One individual presented an important consideration regarding the comparator. The feedback claimed that historic TURP data involved M-TURP, whereas current clinical practice (“modern TURP”) uses B-TURP techniques (e.g. TURiS). The response suggested that for an accurate representation of current clinical practice modern forms of TURP would need to be evaluated, rather than relying on historic TURP data. It was stated that the historic M-TURP was associated with increased blood loss, transfusion rates, hyponatraemia and TUR syndrome. The response suggested that due to the different safety profiles between B-TURP and M-TURP, that the two forms of TURP should be differentiated.

11. Characteristics of the evidence base

The number of randomised controlled trials (RCTs) included in each comparison is shown in Table 3. With the exception of TUWA, RCTs were identified for every comparison (intervention vs TURP). No RCTs were identified which directly compared TUWA to TURP, however one RCT was identified comparing TUWA to sham. Both the evidence presented for TUWA in MSAC application 1586 and a Cochrane meta-analysis presented comparative effectiveness of TUWA based on an indirect comparison of TUWA and TURP.

Eleven trials (all comparing endoscopic enucleation of the prostate (EEP) with TURP) reportedly used B-TURP as the comparator in the EUnetHTA report. No information was available in the EUnetHTA report regarding the type of TURP technique used in trials against other interventions.

Table 3 Key features of the included evidence

Intervention	Number of studies vs TURP	N	Key Outcome(s)
EEP	25 RCTs	2,765	IPSS, Qmax, safety outcomes
PUL	1 RCT Network meta-analysis (k=27)	79 PUL, 35 TURP	IPSS, Qmax, reintervention rates, safety outcomes
TUMT	4 RCTs	419	IPSS, Qmax, reintervention rates
TUWA	0 RCTs (other types of evidence: MSAC Commentary with indirect comparison (k=3) Network meta-analysis (k=27) Treatment crossover arms from RCT vs sham (n=135))	-	IPSS, Qmax, reintervention rates, major adverse events
VLAP	3 RCTs	451	IPSS, Qmax, safety

Source: Table 3, pg 13 of MSAC 1697 DCAR

Abbreviations: EEP = endoscopic enucleation of the prostate; IPSS = International prostate symptom score; PUL = prostatic urethral lift; Qmax = maximum flow rate (of urine flow); RCT = randomised controlled trial; TUMT = transurethral microwave therapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate¹⁰.

Comparative safety

A summary of the safety outcomes is shown in Table 4. Evidence was synthesised from other MSAC reports (MSAC 1014, 1076, 1149, 1518, 1586, and 1612), the European Network for Health Technology Assessment (EUnetHTA⁴) report and RCTs or meta-analyses identified through a gap analysis. Due to time limitations, data were extracted from meta-analyses (e.g. the EUnetHTA report) or MSAC reports were possible (and not directly from the individual studies). Furthermore, no separate risk of bias assessment was conducted.

No interventions reported a statistically significant difference in erectile dysfunction scores compared with TURP, and it has not been presented in the table below. However, PUL may have been superior for this outcome, had it been powered to detect a difference (0 and 9 events of erectile dysfunction reported following PUL and TURP, respectively, with a P-value of 0.08).

Both PUL and TUMT were considered to be of superior safety when compared with TURP (Table 4). PUL had fewer cases of retrograde ejaculation and urinary incontinence compared with TURP, and TUMT had fewer major adverse events overall (compared with TURP).

There were fewer transfusion requirements after VLAP compared with TURP, however the rates of urinary tract infection (UTI) and urinary incontinence were higher with VLAP. Overall, a clinical conclusion of non-inferiority may be the most appropriate when considering the comparative safety of VLAP vs TURP.

EEP had a higher rate of urinary incontinence compared with TURP, however the rate of urinary tract infection was lower in the groups undergoing EEP. A key difference in safety between EEP techniques and TURP was reported to be the incidence of transfusions, with significantly lower transfusion rates reported in patients undergoing HoLEP or ThuLEP (compared with TURP).

Mean catheterisation times were also presented for VLAP and the EEP techniques, however this is not presented in Table 4 as it was not technically considered a safety outcome during the analysis. VLAP did not show a statistical significant difference in catheterisation time compared with TURP (mean difference -0.84 days, 95%CI -2.08, 0.41), whereas all four EEP methods (HoLEP, ThuLEP, DioLEP, B-TUEP) showed a difference in catheterisation time. Overall, EEP had a shorter mean catheterisation time by 23.21 hours (95%CI -28.37, -18.06). It is unclear whether this reduction is clinically relevant, or whether duration of catheterisation is partly explained by differences in duration of hospitalisation (where catheters are generally removed prior to discharge).

The safety of TUWA was only assessed in a single RCT (versus sham). No direct comparison with TURP was made. One network meta-analysis reported a risk ratio of TUWA vs TURP, which suggested that TUWA may result in a large reduction of adverse events compared to TURP, although the confidence interval includes both substantial reductions and increases in harms.

⁴ EUnetHTA OTCA27 Authoring Team (2021). Comparative effectiveness of surgical techniques and devices for the treatment of benign prostatic hyperplasia. Collaborative Assessment. Diemen, the Netherlands, EUnetHTA. Available from: <https://www.eunetha.eu/otca27/>

Table 4 Summary of safety outcomes, compared with TURP

Intervention	Major adverse events	Retrograde ejaculation	Transfusion requirement	Urinary tract infection	Urethral stricture	Urinary incontinence	Re-catheterisation	Erectile dysfunction
EEP	B-TUEP		RR 0.40 (95%CI 0.05, 3.03)	RR 0.88 (95%CI 0.45, 1.75)	RR 0.80 (95%CI 0.30, 2.15)	RR 1.70 (95%CI 0.89, 3.27)	RR 0.72 (95%CI 0.23, 2.23)	IIEF-5 MD -0.21 (95% CI -1.29, 0.87)
	DioLEP					RR 1.22 (95%CI 0.37, 4.04)		
	HoLEP		RR 0.22 (95%CI 0.09, 0.50)	RR 0.20 (95%CI 0.07, 0.52)	RR 0.50 (95%CI 0.23, 1.05)	RR 1.60 (95%CI 1.09, 2.34)	RR 0.69 (95%CI 0.30, 1.57)	IIEF-5 MD -0.05 (95% CI -0.51, 0.41)
	ThuLEP	RR 1.13 (95%CI 0.91, 1.41)	RR 0.25 (95%CI 0.06, 0.99)	RR 0.75 (95%CI 0.26, 2.14)	RR 0.76 (95%CI 0.21, 2.84)	RR 0.82 (95%CI 0.42, 1.59)		
	Overall		RR 0.24 (95%CI 0.12, 0.47)	RR 0.58 (95%CI 0.35, 0.95)	RR 0.62 (95%CI 0.36, 1.06)	RR 1.45 (95%CI 1.10, 1.91)	RR 0.70 (95%CI 0.36, 1.36)	
PUL	RR 0.30 (95%CI 0.04, 2.22)	PUL: 0 TURP: 20 P-value: 0.002		PUL: 7 TURP: 6 P-value: 0.9	PUL: 0 TURP: 3 P-value: 0.4	PUL: 2 TURP: 17 P-value: 0.04		PUL: 0% TURP: 9% P-value 0.08
TUMT	RR 0.20 (95%CI 0.09, 0.43)			RR 1.04 (95%CI 0.59, 1.84)	RR 0.17 (95%CI 0.02, 1.44)			
TUWA	RR 0.37 (95%CI 0.01, 18.68)							IIEF-5 MD 6.49 (95% CI 8.13, 21.12) MSHQ-EjD MD 3.54 (95% CI 1.057, 6.023)
VLAP (PVP)			RR 0.11 (95%CI 0.02, 0.59)	RR 1.75 (95%CI 1.01, 3.04)		RR 2.60 (95%CI 1.18, 5.72)		IIEF-5 MD -1.24 (95% CI -3.11, 0.64)

Source: Table 4, pg 15 of MSAC 1697 DCAR updated to include erectile dysfunction outcome data and indirect data for TUWA presented in pre-MSAC response from Boston Scientific

Abbreviations: B-TUEP = bipolar transurethral enucleation; CI = confidence interval; DioLEP = diode laser enucleation; EEP = endoscopic enucleation of the prostate; HoLEP = holmium laser enucleation of the prostate; IIEF-5= International Index of Erectile Dysfunction, MD=mean difference; MSHQ-MjD=Male Sexual Health Questionnaire for Ejaculatory Dysfunction; PUL = prostatic urethral lift; RR = risk ratio; ThuLEP = thulium laser enucleation; TUMT = transurethral microwave therapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate. Note: Comparison of each technology (intervention, left column) by row with TURP. The colours denote the quantitative difference for each comparison, as shown in the key. When no evidence was available for a certain outcome, this cell was left blank. **Key: Green = Intervention statistically significantly better than control, Grey = No statistically significant difference detected, Orange = Intervention statistically significantly worse than control, White = no data.**

12. Comparative effectiveness

Compared with TURP, the use of PUL, TUMT and TUWA were less effective, whereas VLAP and EEP were non-inferior, and possibly superior (Table 5).

PUL was considered to be of inferior effectiveness due to worse outcomes for IPSS at 12 months and Qmax at 6 and 12 months (compared with TURP). The differences in IPSS and Qmax are likely to be clinically meaningful.

TUMT also showed significantly worse outcomes for IPSS and Qmax compared with TURP. The differences are likely to be clinically meaningful.

The use of TUWA likely results in inferior effectiveness, based on the IPSS and Qmax changes reported (not included in the table below as it reported IPSS and Qmax changes from baseline instead of IPSS and Qmax scores).

There were no statistically significant differences in effectiveness (IPSS or Qmax) between VLAP and TURP, and therefore the effectiveness of VLAP was considered to be non-inferior to TURP.

The extent of use of the various enucleation techniques in Australia is unknown. This DCAR has sought to present results by individual enucleation technique, and pooled across all techniques. However, there are some differences in the results across the enucleation techniques, and the pooled analysis should be interpreted with caution. While effectiveness outcomes (IPSS and Qmax) were statistically superior after pooling, the size of the difference was unlikely to be clinically meaningful. The evidence best supports a conclusion of non-inferior effectiveness to TURP.

Table 5 Summary of effectiveness outcomes, compared with TURP

Intervention		IPSS 6mth	IPSS 12mth	Qmax 6mth	Qmax 12mth	Reintervention
EEP	B-TUEP	Mean diff: -0.36 (95%CI -0.71, 0.00)	Mean diff: -0.43 (95%CI -1.06, 0.19)	Mean diff: 1.71 (95%CI -0.02, 3.44)	Mean diff: 0.54 (95%CI -0.11, 1.19)	RR 0.40 (95%CI 0.19, 0.87)
	DioLEP	Mean diff: -0.26 (95%CI -0.69, 0.17)	Mean diff: -0.20 (95%CI -0.76, 0.36)	Mean diff: -0.43 (95%CI -1.37, 0.51)	Mean diff: -0.90 (95%CI -2.09, 0.29)	
	HoLEP	Mean diff: -0.00 (95%CI -0.80, 0.80)	Mean diff: -0.69 (95%CI -1.42, 0.04)	Mean diff: 0.20 (95%CI -0.78, 1.18)	Mean diff: 0.64 (95%CI 0.07, 1.20)	RR 0.58 (95%CI 0.12, 2.90)
	ThuLEP	Mean diff: -0.72 (95%CI -1.14, -0.29)	Mean diff: 0.13 (95%CI -0.64, 0.90)	Mean diff: 0.51 (95%CI -0.46, 1.48)	Mean diff: 0.73 (95%CI -0.56, 2.02)	
	Overall	Mean diff: -0.24 (95%CI -0.59, 0.11)	Mean diff: -0.51 (95%CI -0.98, -0.04)	Mean diff: 0.48 (95%CI -0.14, 1.09)	Mean diff: 0.49 (95%CI 0.12, 0.86)	RR 0.46 (95%CI 0.23, 0.91)
PUL		PUL: 9.2 TURP: 8.0 P-value: 0.42 Change from baseline PUL: -13.0 TURP: -14.6	PUL: 10.9 TURP: 7.3 P-value: 0.01 Change from baseline PUL: -11.4 TURP: -15.4	PUL: 13.5 TURP: 19.0 P-value: 0.003 Change from baseline PUL: 3.8 TURP: 9.6	PUL: 13.6 TURP: 19.0 P-value <0.001 Change from baseline PUL: 4.0 TURP: 13.7	RR 2.39 (95%CI 0.51, 11.10)
TUMT		Std. mean diff: 0.44 (95%CI 0.18, 0.70)	Std. mean diff: 0.63 (95%CI 0.40, 0.85)	Mean diff: -2.94 (95%CI 4.43, -1.44)	Mean diff: -5.52 (95%CI -7.18, -3.87)	RR 1.46 (95%CI 0.79, 2.70)
TUWA (WAVE)		Change from baseline (95%CI) TUWA: -12.2 (-13.5, -10.9) TURP: -14.6 (-17.5, -11.7)	Change from baseline (95%CI) TUWA: -11.6 (-12.9, -10.3) TURP: -15.4 (-17.8, -13.0)	Change from baseline (95%CI) TUWA: 5.7 (4.6, 6.8) TURP: 9.6 (6.1, 13.1)	Change from baseline (95%CI) TUWA: 5.5 (4.3, 6.7) TURP: 12.7 (8.9, 16.5)	HR 1.015 P-value: 0.8
VLAP (PVP)			Mean diff: 1.20 (95%CI 0.00, 2.40)		Mean diff: -1.18 (95%CI -3.59, 1.23)	RR 0.86 (95%CI 0.57, 1.31)

Source: Table 5, pg 16 of MSAC 1697 with correction of the cell colour for TUWA IPSS 12mth as specified in the rejoinder and change from baseline data provided in pre-ESC response from Teleflex Medical (MSAC 1612 applicant)..

Abbreviations: B-TUEP = bipolar transurethral enucleation; CI = confidence interval; DioLEP = diode laser enucleation; EEP = endoscopic enucleation of the prostate; HoLEP = holmium laser enucleation of the prostate; HR = hazard ratio; IPSS = International prostate symptom score; MSAC = Medical Services Advisory Committee; PUL = prostatic urethral lift; Qmax = maximum flow rate (of urine flow); RR = risk ratio; ThuLEP = thulium laser enucleation; TUMT = transurethral microwave therapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate.

Key to quantitative differences

	Intervention clinically and statistically significantly better than control
	statistically significantly better than control
	No difference
	Intervention statistically significantly worse than control
	Intervention clinically and statistically significantly worse than control

Note: Comparison of each technology (intervention, left column) by row with TURP. The colours denote the quantitative difference for each comparison, as shown in the key. The minimal clinically important difference (MCID) for IPSS is 3 points (lower is better), the MCID for Qmax is 5 ml/s (higher is better). When no evidence was available for a certain outcome, this cell was left blank.

Clinical conclusion

In summary, the conclusions regarding superiority, non-inferiority and inferiority of the safety and effectiveness of the different interventions (compared with TURP) are shown in the table below. The applicants of the different MSAC applications for PUL, TUMT, TUWA, VLAP and HoLEP presented a clinical claim. None of the interventions are superior for both efficacy and safety compared to TURP. These claims are presented in Table 5 above.

When choosing an intervention there is a trade-off between safety and effectiveness. Individual patients will have different preferences when considering the balance between effectiveness and possible side effects. Selecting an intervention would depend on factors like the individual patient's prostate size, cardiovascular risk, level of invasiveness of the intervention, recovery time, likely treatment effect, contraindications, and risk of erectile dysfunction. As different patients may value outcomes differently, the net health impacts of interventions compared with TURP may differ according to patient preferences.

Table 6 Clinical conclusion for each intervention, compared with TURP

Intervention	Effectiveness	Safety	MSAC's previous assessment
EEP	Non-inferior (statistically superior for some outcomes, however clinical significance unknown)	Superior for some outcomes	MSAC assessment 1149 Effectiveness: non-inferior Safety: non-inferior or superior
PUL	Inferior	Superior	MSAC assessment 1612 Effectiveness: inferior Safety: Unclear
TUMT	Inferior	Superior	MSAC assessment 1076 Effectiveness: inferior Safety: non-inferior
TUWA	Inferior	Non-inferior	MSAC assessment 1586 ¹ Effectiveness: inferior Safety: may be superior
VLAP	Non-inferior	Non-inferior (some safety outcomes are superior, some non-inferior, some inferior)	MSAC assessment 1518 Effectiveness: non-inferior Safety: non-inferior

Source: Table 6, pg 17 of MSAC 1697 DCAR

Abbreviations: EEP = endoscopic enucleation of the prostate; PUL = prostatic urethral lift; TUMT = transurethral microwave therapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate.

¹ MSAC's previous assessment of TUWA (MSAC 1586) was based on 2-step indirect comparison presented in the ADAR for MSAC 1586 and did not include the meta-analysis that included TUWA and TURP in Franco et al 2021.

13. Economic evaluation

The clinical evaluation identified different clinical conclusions for efficacy and safety outcomes for the included minimally invasive procedures compared with TURP. Although conclusions of superiority and inferiority are most thoroughly explored using a cost-effectiveness analysis, uncertainty relating to the estimates of the incremental effects would undermine a robust analysis. In addition, valuing some of the outcomes may be difficult if different patients express considerably different preferences.

A cost-consequences analysis has been presented to provide a comparison of the costs of the included procedures in the context of the different outcomes achieved.

Table 7 Summary of the economic evaluation

Perspective	Australian healthcare
Comparator	TURP
Interventions	VLAP, TUMT, EEP, PUL and TUWA
Type of economic evaluation	Cost-consequences and cost-comparisons
Sources of evidence	Evidence identified in the clinical evaluation, previous MSAC evaluations and data provided by the Department of Health and Aged Care.
Time horizon	No explicit time horizon. Costs are limited to immediate procedure related costs and reintervention costs. Outcomes are reported across varying time frames.
Costs	Australian Dollars

Source: Table 7, pg 18 of MSAC 1697 DCAR

Abbreviations: EEP = endoscopic enucleation of the prostate; MSAC = Medical Services Advisory Committee; PUL = prostatic urethral lift; TUMT = transurethral microwave thermotherapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate

Medical services costs were sourced using MBS item numbers associated with the BPH procedure.

Available evidence indicated that, although other jurisdictions may use local anaesthesia for some procedures, Australian clinical practice uses general anaesthesia for all of the included BPH procedures (including PUL and TUWA). Anaesthesia costs were varied according to duration and complexity of procedure.

Average length of hospital stay was estimated from AR-DRGs, weighted according to data provided for ACHI codes. Daily hospital costs were estimated from AR-DRGs after removing prostheses costs, and total hospital costs were derived as the product of average length of stay and daily hospital costs. Theatre costs are included in total hospital costs.

Total procedure costs include the cost of consumables, the cost of prostheses (for PUL), and amortised capital costs to provide an estimate of cost per procedure.

It is assumed that TURP will be selected as the method for all reinterventions. The cost of reinterventions for each BPH procedure are estimated as the product of the reintervention rate and the total cost of a TURP procedure. Table 8 provides a summary of the costs included in the cost analyses.

Table 8 Summary of the costs included in the cost-comparisons

Item	TURP	EEP	PUL	Proposed PUL ¹	TUMT	TUWA	VLAP
Medical service costs							
Primary service costs	\$1,084	\$1,313	\$337	\$1,084	\$1,084	\$842	\$1,084
Anaesthesia costs	\$292	\$250	\$209	\$209	\$168	\$168	\$250
Consumables cost	\$463	\$821	\$0	\$0	NA	\$	\$
Prostheses costs	\$0	\$0	\$3,234	\$3,234	\$0	\$0	\$0
Capital costs	\$20	\$164	\$172	\$172	NA	\$	\$
Hospital stay	\$4,602	\$2,641	\$1,719	\$1,719	\$3,624	\$1,719	\$3,624
Costs associated with reinterventions	\$467	\$215	\$1,115	\$1,115	\$681	\$474	\$401
Total	\$6,876	\$5,404	\$6,785	\$7,533	\$5,557	\$	\$

Source: Table 8, pg 18 of MSAC 1697 DCAR

Abbreviations: EEP = endoscopic enucleation of the prostate; NA = indicates data were not available; PUL = prostatic urethral lift; TUMT = transurethral microwave thermotherapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate

¹ MSAC application 1612 seeks to increase the MBS fee for PUL (equivalent to the MBS fee for VLAP and TURP) by amending MBS 36811 for cystoscopy. Proposed PUL uses primary service cost of PUL equivalent to TURP.

Note: – Costs not presented or included in the table above indicates gaps in costings, which may highlight underestimations in various cost modelling for prostatic procedures. The stepped analysis of costs is presented in Table 9. Compared with TURP, the base-case analysis indicates that all other minimally invasive techniques for the treatment of BPH are less costly. However, the cost differences for some of the comparisons are minor. The highest cost components tend to be hospitalisations, except for PUL (the highest cost component is the prosthesis cost) and TUWA (the highest cost component is consumables).

Table 9 Incremental costs of BPH interventions compared with TURP

Item	TURP	EEP	PUL	Proposed PUL ¹	TUMT	TUWA	VLAP
Step 1: Medical service costs only	\$1,376	\$1,564	\$546	\$1,294	\$1,252	\$1,010	\$1,335
<i>Incremental cost</i>		\$188	-\$830	-\$82	-\$124	-\$366	-\$41
Step 2: Step 1 + consumables cost + prostheses costs	\$1,788	\$2,385	\$3,779	\$4,527	\$1,252	\$	\$
<i>Incremental cost</i>		\$597	\$1,992	\$2,739	-\$535 ²	\$	\$
Step 3: Step 2 + Hospital stay	\$6,389	\$5,026	\$5,498	\$6,246	\$4,876	\$	\$
<i>Incremental cost</i>		-\$1,364	-\$891	-\$143	-\$1,565	-\$	-\$
Step 4: Step 3 + Capital costs	\$6,410	\$5,190	\$5,670	\$6,418	\$4,876	\$	\$
<i>Incremental cost</i>		-\$1,220	-\$740	\$8	-\$1,585 ²	-\$	-\$
Step 5: Step 4 + Reintervention costs	\$6,876	\$5,404	\$6,785	\$7,533	\$5,557	\$	\$
<i>Incremental costs</i>		-\$1,472	-\$91	\$657	-\$1,319	-\$	-\$

Source: Table 9, pg 19 of MSAC 1697 DCAR

Abbreviations: EEP = endoscopic enucleation of the prostate; NA = indicates data were not available PUL = prostatic urethral lift; TUMT = transurethral microwave thermotherapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate

¹ MSAC application 1612 seeks to increase the MBS fee for PUL (equivalent to the MBS fee for VLAP and TURP) by amending MBS 36811 for cystoscopy. Proposed PUL uses primary service cost of PUL equivalent to TURP.

Note: – Costs not presented or included in the table above indicates gaps in costings, which may highlight underestimations in various cost modelling for prostatic procedures.

Clinical effectiveness outcomes included in the cost-consequence analyses are summarised in Table 10. Costs associated with reinterventions are captured in the estimated total costs per procedure. Therefore, these are not explicitly discussed as a cost-consequence outcome. While effectiveness outcomes (IPSS and Qmax) may have been statistically superior after pooling for some comparisons, the size of the difference was unlikely to be clinically meaningful.

Table 10 Effectiveness outcomes for BPH procedures compared with TURP

	EEP	PUL	TUMT	TUWA	VLAP
<i>IPSS after 12 months</i>					
Mean difference	-0.51	1.47	0.63	3.6	1.2
95% CI	(-0.98, -0.04)	(-4, 6.93)	(0.4, -0.85)	(-4.25, 11.26)	(0, 2.4)
<i>Qmax after 12 months</i>					
Mean difference	0.49	NA	-5.52	NA	-1.18
95% CI	(0.12, 0.86)	NA	(-7.18, -3.87)	NA	(-3.59, 1.23)
<i>Reintervention</i>					
Risk ratio	0.46	2.39	1.46	1.015	0.86
95% CI	(0.23, 0.91)	(0.51, 11.1)	(0.52, 10.08)	NA	(0.57, 1.31)

Source: Table 10, pg 20 of MSAC 1697 DCAR

Abbreviations: CI = confidence interval; EEP = endoscopic enucleation of the prostate; IPSS = International prostate symptom score; NA = indicates data were not available; PUL = prostatic urethral lift; Qmax = maximum flow rate (of urine flow); TUMT = transurethral microwave thermotherapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate

Note: standardised mean differences are presented. Information not presented or included in the table above indicates gaps in the evidence, which may highlight uncertainties in the estimations in various cost modelling for prostatic procedures.

The clinical evaluation did not identify statistical differences in erectile dysfunction measured with International Index of Erectile Function (IIEF) across the included studies. However, it is plausible that sexual function may be more likely to be preserved following a PUL procedure compared with a TURP.

Therefore, while the cost of PUL is similar to TURP, and it is inferior in terms of LUTS and urinary flow, it is an option that may result in lower levels of erectile dysfunction. The availability of a range of reimbursed options may result in a higher overall population utility.

Table 11 presents the incremental cost-effectiveness of BPH interventions compared with TURP.

Table 11 Incremental cost-effectiveness of BPH interventions compared with TURP

	EEP	PUL	Proposed PUL ¹	TUMT	TUWA	VLAP
Incremental cost	-\$1,472	-\$91	\$657	-\$1,319	-\$█	-\$█
Incremental IPSS	-0.51	1.47	1.47	0.63	3.6	1.2
ICER per loss in IPSS ¹	<i>Dominant</i>	<i>SW-quadrant</i> (\$62 cost savings per gain in IPSS)	<i>Dominated</i>	<i>SW-quadrant</i> (\$2,094 cost savings per gain in IPSS)	<i>SW-quadrant</i> (\$█ cost savings per gain in IPSS)	<i>SW-quadrant</i> (\$█ cost savings per gain in IPSS)
Incremental Qmax	0.49	NA	NA	-5.52	NA	-1.18
ICER per gain in Qmax ²	<i>Dominant</i>	NA	NA	<i>SW-quadrant</i> (\$239 cost savings per loss in Qmax)	NA	<i>SW-quadrant</i> (\$█ cost savings per loss in Qmax)

Source: Table 11, pg 20 of MSAC 1697 DCAR

Abbreviations: EEP = endoscopic enucleation of the prostate; IPSS = International prostate symptom score; NA = indicates data were not available; PUL = prostatic urethral lift; Qmax = maximum flow rate (of urine flow); SW = south-west; TUMT = transurethral microwave thermotherapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate

¹ MSAC application 1612 seeks to increase the MBS fee for PUL (equivalent to the MBS fee for VLAP and TURP) by amending MBS 36811 for cystoscopy. Proposed PUL uses primary service cost of PUL equivalent to TURP.

² A negative mean difference for IPSS means the intervention is better than TURP, whilst a positive mean difference for Qmax indicates intervention is better than TURP.

Notes: Costs/information not presented or included in the table above indicates gaps in costings and evidence, which may highlight underestimations in various cost modelling for prostatic procedures.

SW-quadrant of the cost-effectiveness acceptability curves indicates an intervention is less costly and less effective than comparator. The interpretation of ICERs in this quadrant is opposite of that in the North East quadrant. The higher ICERs in the SW quadrant are more acceptable.

Dominant indicates that an intervention is less costly and more effective than comparator.

Dominated indicates that an intervention is more costly and less effective than comparator.

Cost-consequence analyses for VLAP, TUWA, TUMT and PUL suggests that all these interventions are less costly and also less effective compared with TURP for the outcomes IPSS and Qmax after 12 months (where data available). EEP techniques dominate TURP as these are less costly and more effective compared to TURP.

Sensitivity analysis (cost comparisons) were performed to assess the impact of several variables including type of anaesthesia used, costs associated with consumables, prostheses costs, capital costs and average length of hospital stay. Table 12 presents results for key sensitivity analyses (cost comparisons only).

Table 12 Key sensitivity analyses

	EEP	PUL	TUMT	TUWA	VLAP
Base case incremental costs	-\$1,472	-\$91	-\$1,319	-\$	-\$
<i>Fees for all procedures same as TURP</i>					
Incremental cost	-\$1,701	\$657		-\$	
<i>Cost per TURP loop \$439, base case \$365</i>					
Incremental cost	-\$1,556	-\$175	-\$1,402	-\$	-\$
<i>Number of implants used in PUL: 4, basecase 4.54</i>					
Incremental cost		-\$477			
<i>Number of implants used in PUL: 6, basecase 4.54</i>					
Incremental cost		\$947			
<i>Lower CI for risk ratio for reintervention</i>					
Incremental cost	-\$1,589	-\$968	-\$1,757		-\$
<i>Upper CI for risk ratio for reintervention</i>					
Incremental cost	-\$1,211	\$3,972	\$2,703		\$
<i>ALoS of TURP 2 days, base case 2.34 days</i>					
Incremental cost	-\$1,441	\$398	-\$776	-\$	\$
<i>ALoS of TURP 4 days, base case 2.34 days</i>					
Incremental cost	-\$1,624	-\$2,481	-\$3,971	-\$	-\$
<i>Capital cost per procedure for VLAP: \$839; base case \$372</i>					
Incremental cost					\$

Source: Table 12, pg 21 of MSAC 1697 DCAR

Abbreviations: ALoS = average length of stay; BPH = benign prostatic hyperplasia; EEP = endoscopic enucleation of the prostate; LUTS = Lower Urinary Tract Symptoms; MBS = Medicare Benefits Schedule; MSAC = Medical Services Advisory Committee; NICE = The National Institute for Health and Care Excellence; PUL = prostatic urethral lift; TUMT = transurethral microwave thermotherapy; TURP = transurethral resection of the prostate; TUWA = transurethral water vapour ablation; VLAP = visual laser ablation of the prostate.

Note: Shaded cells represent sensitivity analyses not applicable to the procedure.

Sensitivity analyses were performed to estimate the impact of varying incremental health outcomes, using the 95% confidence limits presented in Table 10, on the incremental cost-effectiveness of BPH interventions compared with TURP. Base case incremental costs were used for these analyses. For interventions where outcomes were statistically significant (EEP), the conclusion of cost effectiveness does not change when the upper and lower 95% CI are used.

The largest cost components across the interventions and TURP related to length of hospital stay. Estimates of hospital stay are largely derived from observational data where patient selection into different procedures may confound length of stay, and therefore, overall hospital costs. However, varying length of stay for TURP patients in sensitivity analyses did not result in either TUWA or EEP becoming more costly.

PUL is cost saving in the base case. However, it is dominated by TURP (more costly and less effective) when the fee of PUL is set equivalent to TURP (proposed fee in MSAC Application 1612) or when the number of implants used in the PUL treatment is higher than 4.7.

In terms of achieved health outcomes, most procedures appeared to be similar, although PUL and TUWA may have had marginally poorer urinary symptom outcomes, and EEP may have had marginally better urinary symptom outcomes. Of note is that PUL may be associated with reduced incidence of erectile dysfunction.

The base case analysis indicated that TURP was the most costly option for treating BPH. However, the difference in costs between TURP, VLAP and PUL were small, and likely within the boundaries of uncertainty in the analysis. Cost differences were more favourable for TUWA, TUMT

and EEP. However, the costing for TUMT is incomplete (does not include consumables or capital costs), and the cost-consequences is therefore difficult to interpret.

14. Financial/budgetary impacts

Not requested as part of the terms of reference for the assessment.

15. Other relevant information

Which BPH procedure is recommended by the provider is influenced by multiple patient related factors, including: prostate size/shape, presence of a middle lobe, cardiovascular risk, bleeding risk, incontinence risk, other health issues, whether the patient is on complex anticoagulants, and a patient's ability to have anaesthesia.

Common factors taken into account by patients on which BPH procedure to choose are:

- The severity of BPH symptoms and the effectiveness of the treatments at resolving these symptoms.
- Sexual activity – a sexually active man may prefer a BPH procedure that is more likely to preserve sexual function.
- Level of invasiveness – patients may prefer a procedure that is less invasive and that takes place as a day procedure rather than being hospitalised for ≥ 1 day.
- Risk of side effects.
- Financial impact – the affordability of different procedures may impact the procedure patients choose.

The authors of a large discrete-choice survey⁵ of men in the United States and Puerto Rico suggested that differences between respondents emphasised the importance of individualised care. This is to ensure patients select the most suitable treatment based on their preferences and patient characteristics.

Particular procedures require capital equipment to be invested in, and the availability and funding of this equipment would also influence which procedures patients are able to choose from. Furthermore, the added pressure put on the healthcare system due to COVID-19 means that any opportunities to relieve the burden on hospitals, staff and operating theatres would be welcomed, inferring that the minimally invasive procedures would be preferred over the more resource-intensive TURP. However, this must be balanced with the risk of re-treatment.

⁵ Huffman, P. J., et al. (2022). "Evaluating Patient Preferences in Benign Prostatic Hyperplasia Treatment Using Conjoint Analysis." [Urology](#).

16. Key issues from ESC to MSAC

Main issues for MSAC consideration

Clinical issues:

- In general, minimally invasive procedures appear to have non-inferior or inferior effectiveness and superior safety compared to TURP.
- The comparative safety and effectiveness of TUWA should be interpreted with caution as it is based on low level evidence (2-3 step indirect treatment comparison at 3 months or naïve comparison for outcomes >3 months)
- TURP as a sole comparator is appropriate. It is not possible to compare minimally invasive procedures with each other, since direct RCT evidence is lacking.
- There is a clear trade-off in efficacy to achieve particular safety outcomes.
- The choice of minimally invasive procedures is multifactorial. Efficacy is not the only driver for clinician/patient decision making.

Economic issues:

- ESC considers that the level of detail included in the cost analysis, the approaches to estimate cost inputs for the economic evaluation, and the sources used were comprehensive and generally appropriate (improving both accuracy and consistency).
- TUWA appears cost saving and there are small cost differences for PUL (and VLAP) compared to TURP, possibly within the boundaries of uncertainty.
- If there is a small increase in the number of implants for PUL, it is no longer cost saving.
- If the MBS fee for PUL is increased, PUL is more costly than TURP and the cost-effectiveness analysis (CEA) indicates it is a dominated intervention for the International Prostate Symptom Score (IPSS) outcome.
- The capital cost component is the most uncertain component in estimating the total costs for the procedures.

Other issues:

- ESC suggests that, if the fee for PUL is increased, a new separate MBS item should be created for PUL. MSAC may wish to consider the implications for new urethral stents that may be used for treating BPH (e.g., iTIND).

ESC discussion

ESC noted that MSAC requested a review of the effectiveness, safety and cost-effectiveness of all minimally invasive procedures used to manage benign prostatic hyperplasia (BPH) in Australia. MSAC requested this assessment to provide better advice on which BPH procedures should be listed on the Medicare Benefits Schedule (MBS), as well as appropriate fees for each procedure. In particular the review will be relevant to MSAC's reconsideration of two deferred MSAC applications:

- MSAC application 1586 which seeks creation of a new MBS item transurethral water vapour ablation (TUWA).
- MSAC application 1612 which seeks to increase the MBS fee for prostate urethral lift (PUL; MBS item 36811).

ESC noted that the population within scope of the review, as supported by the MSAC Executive, was patients with BPH and severe or high-impact urinary symptoms. The comparator specified for the review was transurethral resection of the prostate (TURP), which is the most common procedure for BPH in Australia and is considered the gold standard for BPH surgical procedures.

ESC noted that MSAC has previously considered and supported MBS listing of four other minimally invasive procedures for BPH: transurethral needle ablation (TUNA; MBS item 37201 and 37202), transurethral microwave therapy (TUMT; MBS item 37230), endoscopic enucleation (EEP) such as holmium-YAG laser enucleation of the prostate (HoLEP; MBS item 37245), and visual laser ablation (VLAP; MBS item 37207). TUWA is currently claimed under TUNA MBS items but TUNA was not included in the review as it is not recommended for patients who are suitable for TURP (the comparator for the review) therefore not within scope of the review.

ESC noted the public consultation feedback highlighted the importance of patients being able to choose treatment, as treatment for BPH aims to improve quality of life. ESC noted personal and professional anecdotal experiences from clinicians that TUWA is safe, preserves sexual function, is a day procedure and has relatively few side effects compared with alternative treatments. For example, a side effect of alpha blockers (a possible treatment option for BPH), is memory loss. ESC noted that allowing patients a choice of not undergoing a treatment with known side effects would improve their quality of life. However, the feedback also noted that the data are incomplete, showing a lack of research and poor quality of evidence. ESC noted that feedback reported there are several factors that influence the decision of which procedure to perform, including prostate size, comorbidities, invasiveness of the procedure, access to equipment, adverse events (including sexual dysfunction) that are important to the patient/clinician, and patient preference.

ESC noted that the quantity of evidence varied across the interventions but at least one randomised controlled trial (RCT) was available comparing the interventions with TURP, except for TUWA. Therefore, the review drew upon other evidence to inform the comparison of TUWA versus TURP which included the indirect comparison previously presented to MSAC (as part of MSAC application 1586) and a published network meta-analysis (not previously considered by MSAC).

Regarding comparative safety, ESC noted that there were many different safety endpoints used in the evidence, and there was no one consistent safety endpoint that was used in all trials. Additionally, detailed safety data on TUWA versus TURP were not available. However, ESC noted the evidence suggested that PUL and TUMT have superior safety versus TURP (when comparing retrograde ejaculation, urinary incontinence and major adverse events). Both VLAP and EEP had lower transfusion requirements than TURP, and while EEP also had lower rates of urinary tract infections, it had higher urinary incontinence rates. ESC noted that none of the interventions reported a statistically significant difference in erectile dysfunction scores compared with TURP. While it appeared that PUL may be superior, the trial was not sufficiently powered.

Regarding comparative effectiveness, ESC noted that key clinical endpoints for effectiveness included the International Prostate Symptom Score (IPSS) and maximal flow rate (Q_{max}). In particular, the IPSS is an important patient reported outcome measure consisting of 7 questions to assess disease/symptom severity. ESC noted that PUL, TUMT and TUWA were no different or had inferior effectiveness compared to TURP. PUL and TUWA had statistically and clinically worse outcomes for IPSS and Q_{max} at 12 months. TUMT also had worse outcomes for IPSS and Q_{max}. Conversely, EEP techniques were found to have superior effectiveness compared to TURP for some endpoints. Overall, compared with TURP, EEP and VLAP were found to have non-inferior effectiveness, and for EEP possibly superior effectiveness, for IPSS and Q_{max}.

ESC noted that evidence provided to MSAC in July 2020 suggested that PUL had inferior effectiveness versus TURP. PUL was also shown to have a different safety profile, so comparative safety was unclear. ESC noted the pre-ESC response from Teleflex Medical (applicant for PUL – MSAC 1612) highlighted that although TURP is superior for IPSS change, PUL still achieves a significant change (change from baseline: -11.4 for PUL versus -15.4 for TURP, at 12 months), and the quality of life (QOL) improvement is no different between TURP and PUL. The pre-ESC response from Teleflex Medical also suggested alternative reintervention rates for PUL. ESC considered the 5 year re-intervention rate (13.6%) from the L.I.F.T study to be high and noted the review applied the re-intervention rate from a network meta-analysis⁶.

ESC noted that the evidence provided to MSAC in July 2020 suggested that TUWA had inferior effectiveness and potentially superior safety compared to TURP. In the review, TUWA was found to have inferior effectiveness and non-inferior safety. ESC noted the pre-ESC response from Boston Scientific (applicant for TUWA – MSAC 1586) highlighted that the review did not consider the Male Sexual Health Questionnaire for Ejaculatory Dysfunction (MSHQ-Edj) outcome for TUWA vs TURP and suggested that a conclusion of non-inferior effectiveness and superior safety is more appropriate. ESC noted the rejoinder agreed that it is likely that TUWA is superior to TURP for sexual function, and that evidence suggests TUWA sexual function remains stable over 5 years of follow-up. However, the review more cautiously reported TUWA as being non-inferior as the safety outcomes for TUWA were not statistically significantly different from TURP, and all safety comparisons were naïve and indirect treatment comparisons. ESC considered a conclusion of inferior effectiveness and non-inferior safety for TUWA versus TURP was appropriate, but acknowledged TUWA may potentially have superior safety although these conclusions were based on low-level evidence (naïve or indirect treatment comparison) which should be interpreted with caution.

ESC also noted that when MSAC previously considered MSAC application 1586, MSAC had also requested a comparison of TUWA versus VLAP. As there is no direct comparative evidence comparing TUWA versus VLAP, Boston Scientific provided an addendum to MSAC application 1586, comparing the clinical effectiveness of TUWA with VLAP by presenting an indirect treatment comparisons (ITC): TUWA vs Sham vs PUL vs TURP vs VLAP limited to a 3 month time period. Comparisons beyond 3 months are naïve comparisons. ESC agreed with the Commentary on MSAC 1586 addendum that the 3-step ITC analysis has a significant risk of bias, especially for the naïve comparison of longer-term outcomes beyond 3 months ESC noted that it was claimed that TUWA had superior safety compared to VLAP with respect to sexual function and adverse events. ESC noted the reported lower rates for any adverse event at 24 months (60.3% TUWA versus 67.2% VLAP), urinary tract infection (1.5% TUWA versus 20% VLAP) and urinary retention (5.1% TUWA vs 12% VLAP). However, ESC noted higher rates for TUWA have been reported in clinical practice, 14-17% UTI and 14% urinary retention. ESC noted it was claimed that TUWA has non-inferior effectiveness compared to VLAP with respect to IPSS, IPSS QoL and retreatment rate. ESC noted that it appeared IPSS favoured VLAP over TUWA and that VLAP was superior to TUWA for Qmax. ESC noted the reported low retreatment rates for TUWA but noted this was based on the REZUM trial with 34% patient data missing at 5 years (n=77/136). Further, other data suggested the retreatment rate for TUWA was higher. Overall, ESC considered that the effectiveness and safety of TUWA versus VLAP, should be interpreted with caution due to the low-level evidence (ITC for 3 months, naïve comparisons for > 3mths), the risk of within-study bias, inconsistency between studies (and naïve comparisons), and uncertainty regarding applicability. ESC considered that a robust clinical claim is not supported due to uncertainty in the evidence.

⁶ Franco, JV, et al. (2021), 'Minimally invasive treatments for lower urinary tract symptoms in men with benign prostatic hyperplasia: a network meta-analysis', *Cochrane Database Syst Rev*, vol. 7.

In general, ESC noted that minimally invasive procedures have non-inferior or inferior effectiveness and superior safety compared to TURP. None of the interventions are superior for both efficacy and safety compared to TURP. ESC agreed with the review that there is a trade-off in efficacy to achieve particular safety outcomes.

ESC noted that during its previous consideration of MSAC application 1586 and 1612, MSAC had expressed concern that it was difficult to compare costs and determine appropriate fees, as each application used different costing approaches. Thus, verification of appropriate costs for each procedure and consistent application was an important aspect of the review to support and inform MSAC's deliberation and advice.

ESC noted that the review presented a cost-consequence analysis and for some outcomes (IPSS and Qmax) presented a cost-effectiveness analysis. ESC considered this to be appropriate given there are a number of important health outcomes, the level of evidence available to support the clinical claims, and the trade-offs in effectiveness and safety outcomes. ESC considered that the review was comprehensive and thorough in its approach to costing the procedures.

ESC noted that the primary services costs were based on MBS fees. In the case of PUL, the review presented the costing for PUL at the current MBS fee (\$337, MBS item 36811) and the costing for PUL at the proposed increased MBS fee as per MSAC application 1612 (\$1,084 same as TURP and VLAP MBS fee). ESC also noted that the applicant for MSAC 1612 appeared to suggest a different fee for PUL in their pre-ESC response (\$842, same as the fee proposed for TUWA).

ESC considered it appropriate that anaesthesia costs were included, as it is assumed that all BPH procedures are performed under general anaesthesia. ESC noted that the costs associated with anaesthesia are based on the estimated mean procedure durations for each treatment.

ESC considered the steps used to calculate hospital costs to be appropriate. ESC noted that in MSAC Applications 1612 and 1586, different approaches and figures were used that affected the hospital costs. These included not adding theatre costs, using different average lengths of stay, and basing costs on private hospital fees for worker compensation (which is a flat rate). ESC noted the effect this had on the estimated hospital costs, which were \$3,662 (MSAC Application 1586 - TUWA), \$4,500 (MSAC Application 1612 - PUL) and \$4,602 (this review). ESC considered the steps taken to derive the hospitals costs for the review were more appropriate.

ESC noted that the costs associated with reintervention were another important component of the economic evaluation. ESC noted the review assumed that TURP will be selected as the method for all reinterventions, and used four RCTs to derive a weighted mean for the TURP reintervention rate. Risk ratios were used to estimate the reintervention for each procedure. ESC considered this approach to be appropriate. ESC noted that, in MSAC Application 1612, the cost of reintervention for PUL was calculated as \$83 more than TURP (using a very low rate of reintervention); however, the incremental cost in this review was \$648. ESC also discussed the different re-intervention rates suggested in the pre-ESC responses from the applicants for MSAC applications 1586 and 1612. ESC considered that the base case re-intervention rates and the ranges used in the sensitivity analysis for the review were appropriate.

ESC noted that the cost of PUL is sensitive to the number of prostheses. Application 1612 used four implants, but at that time MSAC had noted that the cost of PUL may be underestimated due to the number of implants required. ESC noted that the review used results of a recent systematic review and applied 4.54 implants in the base case. ESC considered this appropriate. The sensitivity analysis provided in the review found that more than 4.67 implants resulted in no cost savings for PUL.

ESC considered the capital and maintenance costs to be the most uncertain item. For example, ESC noted that assumptions were based on 100 procedures per year per device for VLAP, and 50 procedures per year per device for TUWA and PUL. Although these were informed by information previously supplied to support MSAC's consideration of VLAP (MSAC 1516), TUWA (MSAC 1586) and PUL (MSAC 1612), no justification was provided for these figures. The sensitivity analysis provided in the review found that 50 procedures per year per device resulted in no cost savings for VLAP.

ESC noted that the total cost of TURP was estimated to be \$6,876. All of the minimally invasive interventions were estimated to cost less than TURP, with the exception of PUL if the MBS service costs are increased. ESC noted that prostheses costs (\$3,234) are the key driver of costs for PUL, which is affected by the number of implants required. The intervention with the largest cost savings is TUWA. One of the key drivers of cost for TUWA is the consumables (\$█), which is offset by low hospital stay costs (\$1,719).

ESC noted that the difference in costs between VLAP, PUL (current MBS fee) and TURP is small, possibly within the boundaries of uncertainty in the analysis. However, ESC considered there is uncertainty around the inputs used to estimate costs associated with implants and reinterventions for VLAP.

ESC noted that the cost effectiveness analysis found that when incremental IPSS is presented as the most important clinical outcome, the incremental cost-effectiveness ratio (ICER) for PUL (with equivalent service costs to TURP) is dominated by TURP. ESC noted that the ICER for TUWA is in the southwest quadrant of the cost-effectiveness plane, meaning \$█ cost savings per gain in IPSS. ESC noted that most of the cost savings are relevant to private providers and health insurers (for example, capital costs and hospital costs).

ESC noted that the MBS Reviews Taskforce has previously recommended creating a 'general' ablative MBS item by repurposing the MBS item for VLAP (MBS item 37207) to cover all ablative procedures but that this had not been implemented due to the differing fees for ablative items for treating BPH. ESC noted that MSAC may wish to discuss a general ablative item for BPH but that the MBS fee disparity issue still remained. ESC noted that the MBS fee sought for TUWA was less than the MBS fee for VLAP, so inclusion of TUWA in a 'general' ablative item would increase the proposed fee for TUWA. Although whether this is appropriate based on the level of evidence available would be an important consideration.

ESC considered that if the fee for PUL is increased, a new MBS item should be created for PUL instead of increasing the fee for MBS item 36811 which is a general cystoscopy item for insertion of urethral or prostatic stents. ESC considered that a separate MBS item for PUL would allow for usage tracking and auditing. ESC also noted that PUL is non-ablative and easily repeated, so questioned if there should be a limit or lifetime restriction (noting there are no data available on retreatment with PUL following PUL – TURP is usually used for reintervention). ESC also noted there had been some suggestions to include clinical criteria in the item descriptors for PUL. However, ESC considered that clinical criteria should not be included in the item descriptor and that it would be more appropriate for clinicians to make these decisions. There are guidelines available from the American Urological Association about prostate volume selection. ESC also noted that there are new urethral stents (e.g. iTIND) available for the treatment of BPH that would currently be inserted under the general cystoscopy item like PUL. ESC noted MSAC may wish to consider whether the new MBS item for PUL should or should not encompass other prostheses for BPH treatment.

Other discussion

ESC also noted that the pre-ESC response from Boston Scientific (applicant for MSAC 1586) requested MSAC make a recommendation to the Protheses List Advisory Committee (PLAC) that Rezūm water vapour therapy should be placed on the Protheses List (PL). ESC noted that an application has been submitted to PLAC for the consumable components associated with use of the Rezūm system. ESC noted the applicant had previously requested this of MSAC and MSAC had advised that the role of MSAC is not to advise about the PL; this is the role of PLAC (pg 4 of [MSAC application 1586 Public Summary Document](#)).

17. Applicant comments on MSAC's Public Summary Document

Applicant comment – Boston Scientific Pty Ltd

The Applicant welcomes MSAC's decision to create a new MBS item for TUWA for the treatment of BPH. In the context of the emphasis on individual care, treatment choice and relieving hospital and health system burden, this listing of TUWA on the MBS will provide patients and clinicians with an alternate treatment option that meets the clinical need for a minimally invasive, resource efficient procedure that is safe and effective without having a detrimental impact on sexual function, and that leaves no permanent medical device behind in the body. TUWA provides cost savings to the Australian health care system compared to TURP and PUL, making it a valuable addition to the already available BPH interventions listed on the MBS.

Applicant comment – Teleflex Medical Australia Pty Ltd

Teleflex supports an increased fee for PUL via a new MBS item instead of amending the existing generic MBS item that PUL is currently claimed under. Teleflex agrees that there are a wide range of factors considered by clinicians and patients when choosing a procedure and that patients have different preferences when considering the balance between side effects and long-term effectiveness. The new PUL MBS item will enable clinicians (and patients) to choose the right treatment for them without negatively impacting on overall healthcare costs.

18. Further information on MSAC

MSAC Terms of Reference and other information are available on the MSAC Website: [visit the MSAC website](#)