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# Malde, S. A Systematic Review of Patients' Values, Preferences, and Expectations for the Diagnosis and Treatment of Male Lower Urinary Tract Symptoms

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Platinum Priority – Review – Benign Prostatic Obstruction

Editorial by XXX on pp. x–y of this issue

## A Systematic Review of Patients' Values, Preferences, and Expectations for the Diagnosis and Treatment of Male Lower Urinary Tract Symptoms

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### Abstract

**Context:** Understanding men's values and preferences in the context of personal, physical, emotional, relational, and social factors is important in optimising patient counselling, facilitating treatment decision-making, and improving guideline recommendations.

**Objective:** To systematically review the available evidence regarding the values, preferences, and expectations of men towards the investigation and treatment (conservative, pharmacological, and surgical) of male lower urinary tract symptoms (LUTS).

**Evidence acquisition:** We searched electronic databases until August 31, 2020 for quantitative and qualitative studies that reported values and preferences regarding the investigation and treatment of LUTS in men. We assessed the quality of evidence and risk of bias using the Grading of Recommendation, Assessment, Development and Evaluation (GRADE) and GRADE Confidence in the Evidence from Reviews of Qualitative Research (CERQual) approaches.

**Evidence synthesis:** We included 25 quantitative studies, three qualitative studies, and one mixed-methods study recruiting 9235 patients. Most men reported urodynamic testing to be acceptable, despite discomfort or embarrassment, as it significantly informs

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Lower urinary tract symptoms;  
Management;  
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Values and preferences

treatment decisions (low certainty evidence). Men preferred conservative and less risky treatment options, but the preference varied depending on baseline symptom severity and the risk/benefit characteristics of the treatment (moderate certainty). Men preferred pharmacological treatments with a low risk of erectile dysfunction and those especially improving urgency incontinence (moderate certainty). Other important preference considerations included reducing the risk of acute urinary retention or surgery (moderate certainty).

**Conclusions:** Men prefer lower-risk management options that have fewer sexual side effects and are primarily effective at improving urgency incontinence and nocturia. Overall, the evidence was rated to be of low to moderate certainty. This review can facilitate the treatment decision-making process and improve the trustworthiness of guideline recommendations.

**Patient summary:** We thoroughly reviewed the evidence addressing men's values and preferences regarding the management of urinary symptoms and found that minimising adverse effects is particularly important. Further research to understand other factors that matter to men is required.

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## 1. Introduction

Men, especially older men, frequently experience lower urinary tract symptoms (LUTS). Among the several causes of LUTS in men, benign prostate obstruction (BPO) has proved to be the most common. The impact of LUTS on quality of life varies between individuals [1]. Preferences for treatment also vary, and depend on an interplay between personal and psychosocial factors [2].

Choosing between the conservative, pharmacological, and surgical treatment options for LUTS due to BPO requires trading off their benefits, harms, and burdens. The recent development of novel minimally invasive treatment options for LUTS due to BPO has increased patients' options, and thus increased the importance of assessing and incorporating patients' values and preferences. This need for considering values and preferences exists both for optimal management of individual patients and for the development of trustworthy clinical practice guidelines. However, no systematic summaries assessing men's values and preferences regarding the investigation or treatment of LUTS are available, severely limiting the capacity of current international guidelines to ensure that their recommendations align with men's preferences.

The Grading of Recommendation, Assessment, Development and Evaluation (GRADE) approach, widely adopted by international guideline groups, provides a framework to facilitate integration of values and preference information into guideline recommendations [3]. GRADE recognises that trustworthy guidelines will rely on systematic reviews of both quantitative and qualitative studies to provide evidence addressing the relative importance people place on the outcomes of interest [4,5].

To inform both clinicians and guideline developers, we therefore performed a systematic review to determine the values and preferences related to the investigation and treatment of LUTS in men.

## 2. Evidence acquisition

We conducted a systematic review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-

Analyses (PRISMA) guidelines [6] and registered the protocol on PROSPERO (registration number: CRD42018114615).

### 2.1. Search strategy and study selection

Our search, developed in collaboration with a research librarian (C.Y.), included MEDLINE, EMBASE, PsycINFO, CINAHL, Cochrane Central Register of Controlled Trials, and Cochrane Central Database of Systematic Reviews databases up to August 31, 2020 (detailed search strategy is provided in the Supplementary material). Searches included reference lists of included studies. Two reviewers (S.M. and R.U.) independently evaluated titles and abstracts, and subsequently full-text articles of all potentially eligible studies, and for articles that proved to be eligible, abstracted data including outcomes, study characteristics, and risk of bias (RoB). Adjudicators resolved disagreements on judgements at each stage and assisted in data abstraction (J.W. and K.A.O.T.).

### 2.2. Types of studies included and excluded

We included qualitative and quantitative studies that reported values, preferences, views, perceptions, attitudes, or experiences regarding investigation and treatment of male LUTS. Studies included health state value studies, direct choice studies, surveys, qualitative studies, and tool development and validation studies.

We excluded the following types of studies: (1) studies reporting overall health-related quality of life, (2) case reports and case series, (3) cost-effectiveness studies, (4) studies providing quantitative information limited to treatment satisfaction, and (5) studies focussed on men's values and preferences prior to clinical involvement.

The detailed criteria are presented in the Supplementary material.

### 2.3. Types of participants and interventions included

We included studies that recruited adult men ( $\geq 18$  yr) with LUTS (excluding those focussing on urinary incontinence). We excluded studies of men with neurological conditions, prostate cancer, or urethral stricture.

We included bladder diary, uroflowmetry, urodynamic studies, ultrasound-based measures, and noninvasive urodynamic tests for the diagnosis of LUTS. For the management of LUTS, we included behavioural techniques, oral pharmacotherapies, invasive treatments for BPO (such as transurethral resection of prostate), and invasive treatments for overactive bladder (such as intravesical botulinum toxin A).

#### 2.4. Outcome measures

The primary outcomes were quantitative measurements of values and preferences (standard gamble, time trade-off, visual analogue scale, willingness to pay, conjoint analysis, discrete choice, contingent choice method, pairwise comparison, ranking, probability trade-off, and direct choice), and qualitative descriptions of values and preferences (including personal experiences, reflections, emotions, hopes, fears, expectations, attitudes, perceptions, and beliefs) related to the investigation and treatment of LUTS in men.

#### 2.5. Assessment of RoB

The RoB in quantitative studies was assessed using a RoB tool with the following key items: (1) sample selection, (2) response rate (or attrition rate if follow-ups involved), (3) choice and administration of the methodology, (4) outcome (or health state) presentation, and (5) respondent understanding and data analysis (if applicable; Supplementary Table 1) [7]. We rated the overall RoB as high for studies in which the measurement instrument was not validated. For studies in which the measurement instrument was validated, we rated the overall RoB as low if there were no items at high RoB and not more than two items at moderate RoB.

RoB in the qualitative studies was assessed using the Critical Appraisal Skills Programme (CASP) qualitative research checklist, consisting of the following items: (1) aim of the research, (2) qualitative methodology appropriateness, (3) research design, (4) appropriate recruitment strategy, (5) data collection, (6) relationship between researchers and participants, (7) ethical issues, (8) data analysis, (9) findings, and (10) value of the research (Supplementary Table 2) [8]. We rated studies having “serious methodological limitations” if more than two items were judged “high” methodological limitations (RoB).

#### 2.6. Certainty of evidence

To assess the overall quality of the body of evidence for outcomes informed by quantitative studies, we used the GRADE approach based on RoB, inconsistency, imprecision, indirectness, and publication bias [9,10]. For qualitative studies, we used the Confidence in the Evidence from Reviews of Qualitative Research (CERQual) tool based on methodological limitations, relevance, coherence, and adequacy [11].

#### 2.7. Data analysis

We provide a narrative synthesis of the results, with a thematic analysis to identify key themes. Based on the identified themes, we constructed a conceptual framework to guide the organisation and presentation of results based on the content analysis.

### 3. Evidence synthesis

#### 3.1. Quantity of evidence identified

Of 4130 potentially relevant titles and abstracts, we judged 97 as warranting full-text review; of these, 29 reports proved eligible: 25 quantitative studies [12–36], three qualitative studies [37–39], and one mixed-methods study [40] (Supplementary Fig. 1).

#### 3.2. Characteristics of included studies

Table 1 presents the characteristics of all 29 eligible studies (17 cross-sectional surveys, four cohort studies, three semistructured interviews, three randomised trials that included a preference component to their outcome measures, and two surveys) recruiting 9235 patients. Fourteen studies assessed preferences regarding pharmacological treatment, seven surgical treatment, and four conservative, pharmacological, or surgical treatment of LUTS; four studies evaluated preferences and attitudes towards investigations. Out of 29 studies, 27 (93%) assessed values and preferences in men with LUTS secondary to BPO, and the other two studies assessed values and preferences in men with LUTS without specifying whether symptoms were related to BPO.

#### 3.3. RoB assessment

Of the 26 quantitative studies (25 pure quantitative studies and the quantitative data from one mixed-methods study), nine (35%) used validated preference measurement instruments, 18 (69%) clearly documented the sampling strategy, 16 (62%) reported a high response rate, five (19%) reported that they piloted their measurement tools or formally tested participant understanding, and 24 (92%) analysed data correctly. Overall, eight (31%) of 26 quantitative studies were judged to have a low RoB (Supplementary Table 3). Of the four qualitative studies (three pure qualitative studies and the qualitative data from one mixed-methods study), three were judged as having no serious methodological limitations and one as having serious methodological limitations (Supplementary Table 4).

#### 3.4. Results

Individual and overall results based on key themes related to the primary focus of the preference, together with certainty of evidence ratings, are presented in Tables 2–5 and Supplementary Table 5.

**Table 1 – Characteristics of included studies**

Study	Primary focus	Study design	Analysis type	Sample size for analysis	Age (yr), mean (SD)	Setting	Funding
Abdul-Muhsin (2016) [12]	Survey of regret associated with various surgical treatments for LUTS/BPO	Cohort study	Quantitative	479	NR	Secondary care	Private individual funding source
Abraham (2006) [13]	Preferences between electronic and paper bladder diaries	Randomised crossover study	Quantitative	48	63.7 (9.7) USA 66.9 (7.5) Slovakia	Secondary care	Pfizer
Barry (1995) [14]	Assessing the effect of an educational programme on treatment choices of men	Cohort study	Quantitative	373	NR	Secondary care	Charitable grants
Bouhadana (2020) [35]	Survey to assess the views and expectations of future and past BPO surgery patients regarding their postoperative complications	Cross-sectional survey	Quantitative	300	NR	NR	PROCEPT BioRobotics
Brandenburg (2020) [36]	Survey to identify the expectations of men with LUTS referred to a urologist	Cohort study	Quantitative	182	64.6 (12.3)	Secondary care	Academic department
Eberth (2009) [15]	Assessing heterogeneity in preferences for pharmacological treatment	Cross-sectional survey	Quantitative	100	52 (8.9) range 34–69	Secondary care	Academic department and GSK
Edelman (2019) [16]	Survey to assess willingness to stop pharmacological treatment	Cross-sectional survey	Quantitative	179	69.4 (9.2)	Primary care	None
Emberton (2008) [17]	Assessing healthcare-seeking behaviour and attitudes to LUTS/BPO treatment	Cross-sectional survey	Quantitative	497	NR	Secondary care and community	GSK
Ertel (2016) [18]	Assessing healthcare-seeking behaviour and attitudes to LUTS/BPO treatment	Cross-sectional survey	Quantitative	1094	NR	Secondary care and community	GSK
Fan (2017) [19]	Assessing healthcare-seeking behaviour and attitudes to LUTS/BPO treatment	Cross-sectional survey	Quantitative	101	72.1 (SD 10.3)	Secondary care	NR
Hareendran (2005) [20]	Preference for pharmacological treatment dosing regime	Randomised controlled trial	Quantitative	536	64.5 (SD 8.1)	Secondary care	Pfizer
Hunter (1997) [21]	Assessing preferences for prostatectomy	Cross-sectional survey	Quantitative	2002	NR	Community	Spanish Health Research Fund
Kaplan (2006) [22]	Survey assessing attitudes towards an enlarged prostate and its treatment	Cross-sectional survey	Quantitative	419	NR	Community	GSK
Krhut (2015) [24]	Preferences between electronic and paper bladder diaries	Cohort study	Quantitative	24	67.8 (range 49–80)	Secondary care	Academic department
Krumins (1988) [25]	Assessing patients' subjective values for outcomes of surgical and nonsurgical management of LUTS/BPO	Cross-sectional survey	Quantitative	20	64 (range 53–73)	Secondary care	Academic department
Llewellyn-Thomas (1996) [26]	Assessing attitudes towards conservative, pharmacological, and surgical treatment	Cross-sectional survey	Quantitative	87	68 (8.7)	Secondary care	Ontario Ministry of Health
Mankowski (2016) [27]	Quantifying men's preferences for attributes of medications	Cross-sectional survey	Quantitative	247	62.3 (9.1)	Community	Astellas
Watanabe (2011) [30]	Exploring preferences between 2 different medication regimes for LUTS/BPO	Randomised crossover study	Quantitative	84	70.3 (8.4; range 45–88)	Secondary care	NR
Watson (2004) [31]	Assessing trade-offs between different pharmacological therapies for LUTS/BPO	Cross-sectional survey	Quantitative	208	NR	Community	GSK
Weibl (2015) [32]	Evaluating knowledge and attitudes of LUTS/BPO and its treatment	Repeated surveys	Quantitative	426	68.4	Secondary care	GSK
Weibl (2015) [33]	Evaluating knowledge and attitudes of LUTS/BPO and its treatment	Cross-sectional survey	Quantitative	454	63.3 (SD 7.4)	Secondary care	GSK
Wills (2006) [34]	Assessing the impact of a decision aid on preferences of pharmacological treatment for LUTS/BPO	Repeated surveys	Quantitative	160	61.7	Community	Agency for Healthcare Research and Quality
Piercy (1999) [28]	Assessing the effect of a shared decision-making programme on treatment preferences of men	Cross-sectional survey	Quantitative	678	median 63.1	Secondary care	Ontario Ministry of Health, Canadian Prostate Health Council, and NHRDP

**Table 1 (Continued)**

Study	Primary focus	Study design	Analysis type	Sample size for analysis	Age (yr), mean (SD)	Setting	Funding
Scarpero (2005) [29]	Assessing patient perceptions of video urodynamics	Cross-sectional survey	Quantitative	78	64.8 (range 28–89)	Secondary care	NR
Kawakami (1999) [23]	Survey to assess attitudes towards acute urinary retention or need for surgery	Cross-sectional survey	Quantitative	62	69.5 (range 52–84)	Secondary care	NR
Ikenwilo (2018) [40]	Understanding men's preferences for pharmacological treatment	Cross-sectional survey	Mixed methods	269	62.3 Quantitative 59.8 Qualitative	Community	Astellas
Kelly-Blake (2006) [41]	Interviews to examine how the possibility of sexual dysfunction is incorporated into treatment decision-making	Semistructured interviews	Qualitative	74	61 (SD 8)	Community	Agency for Healthcare Research and Quality
Pateman (2000) [38]	Interviews assessing the experience of men following surgery for LUTS/BPO	Semistructured interviews	Qualitative	13	NR	Community	NR
Selman (2019) [39]	Assessing attitudes to urodynamic testing	Semistructured interviews	Qualitative	41	Range 52–89	Secondary care	National Institute for Health Research

BPO = benign prostate obstruction; LUTS = lower urinary tract symptoms; NR = not reported; SD = standard deviation.

**3.4.1. Diagnostic tests**

Two quantitative survey-based studies (72 participants) compared preferences between paper and electronic bladder diaries in men with LUTS/BPO [13] and with overactive bladder [24] (Tables 2 and 5). Preferences were similar between the groups (30–50% preferring the paper diary and 42–62% the electronic diary) [13,24]. The key themes included ease of use, convenience, and accuracy [13]. Reported ease of use varied by country. Participants found the electronic diary slightly easier to read, more convenient to carry, and more discrete, although changing answers was easier with the paper version. Levels of data accuracy were similar across countries and formats, but the electronic diary was more likely to be completed after every urinary event. Of US men, 89% felt that they could complete the electronic diary for ≥2 wk and still provide accurate data, as did 74% of Slovaks [13].

Two studies (119 participants), one quantitative and one qualitative, investigated values and preferences regarding urodynamic investigation [29,39]. Of men with LUTS scheduled for urodynamics (men were booked for video urodynamics but had not yet undergone it), approximately 40% expected no or minimal pain and 50% moderate anxiety and pain, approximately 70% expected no or minimal pain and 20% moderate embarrassment, and 27% expressed concern regarding radiation exposure during the test [29].

Younger patients were more likely to report a negative experience, although 95% still reported that they would undergo video urodynamics again if recommended. A semistructured interview study conducted within a large randomised trial of urodynamic investigation prior to bladder outlet surgery in men with bothersome LUTS [39] reported that, because they perceived testing as playing an important role in their diagnosis and management, men found testing acceptable, despite 28% experiencing discomfort, pain, or embarrassment. Of 16 men who had not experienced urodynamics, 14 would have been happy to undergo procedures if needed, although two wanted further information about the test.

Seven of 25 men reported that having urodynamics was embarrassing due to its intimate nature or not being well prepared (eg, not being told that urinating with catheter could lead to spraying). Sense of privacy proved to be important, with the degree of embarrassment related to the number of people in the room, room size, and location (larger rooms near a corridor led to greater embarrassment), and people walking into the room unexpectedly. Two of 25 men reported personal preferences around the sex of the person performing the test [37].

Men felt it important that they be fully informed, both prior to and following the test, regarding the procedure (what to expect) and the risks. Following the test, men preferred to receive the results from their clinician on the same day once fully dressed [37].

**3.4.2. Conservative treatment**

Three studies (429 participants) used semistructured interviews or standard gamble methodologies to address conservative, pharmacological, and surgical treatment for

**Table 2 – Summary of findings; question: what are the values and preferences of men regarding the investigation of lower urinary tract symptoms**

Health state/outcome (categories of values and preferences)	Estimates of outcome importance (range across studies)	No. of participants/ studies	Certainty of evidence	Interpretation of findings
<i>Paper bladder diary vs electronic bladder diary</i>				
Overall preference between paper and electronic bladder diary	Preference for paper bladder diary: range across studies: 30–50% Preference for electronic diary: range across studies: 42–62%	72 participants/2 studies <sup>a</sup>	⊕⊕○○ Low certainty due to risk of bias, inconsistency, and imprecision	Preferences between electronic and paper diaries varied between countries. In one study, US men preferred the electronic diary, whilst men from Slovakia had equal preferences between the formats. In another study, Czech participants also reported equal preferences between the formats. The discreteness and confidentiality of electronic diaries were a reported advantage by those who preferred this format, whilst those who preferred the paper format reported advantages of speed of completion and ability to change errors easily. Technical issues such as loss of battery power and incompatibility with telecommunications at the Slovakian site may have affected this overall preference outcome.
Ease of use	Of men, 92% could complete the electronic diary independently; 100% of men could complete the paper diary independently	48 participants/1 study <sup>a</sup>	⊕⊕○○ Low certainty due to risk of bias and imprecision	Perception of ease of use varied between countries. US participants found the e-diary easier to use, whereas Slovakian participants found the paper diary easier to use. All participants found the electronic diary slightly easier to read, although it was easier to go back and change answers with the paper version.
Convenience	Mean level of convenience on a scale of 0 (not at all convenient) to 100 (extremely convenient): Paper: mean 64–68 Electronic: mean 69–78	48 participants/1 study <sup>a</sup>	⊕⊕○○ Low certainty due to risk of bias and imprecision	Men reported the electronic diary to be slightly more convenient to keep with them.
Accuracy	Mean level of accuracy of data on a scale of 0 (extremely inaccurate) to 100 (not at all inaccurate): Paper: mean 85–85 Electronic: mean 84–87 89% of US men and 74% of Slovaksians felt that they could complete the e-diary for another 2 wk and still provide accurate data	72 participants/2 studies <sup>a</sup>	⊕⊕○○ Low certainty due to risk of bias and imprecision	Levels of data accuracy were similar across countries and formats, but the electronic diary was more likely to be completed after every urinary event and more men felt that they could continue to complete the electronic diary for ≥2 wk and still provide accurate data.
<i>Video urodynamics</i>				
Expectations of video urodynamics	>95% had no to moderate anxiety >95% anticipated no to moderate pain or embarrassment 73% were not concerned by exposure to radiation	78 participants/1 study <sup>b</sup>	⊕⊕○○ Low certainty due to risk of bias and imprecision	Younger patients may experience more pain than expected and were more likely to have a negative experience. Despite this, the majority would undergo video urodynamics again if medically recommended.

<sup>a</sup> Two studies, those of Abraham et al [13] and Krhut et al [24], compared preferences between paper and electronic bladder diaries. Only Abrahams et al [13] assessed the ease of use and convenience.

<sup>b</sup> Study of Scarpero et al [29].

**Table 3 – Summary of findings; question: what are the values and preferences of men regarding the pharmacological treatment of lower urinary tract symptoms**

Health state/outcome (categories of values and preferences)	Estimates of outcome importance (range across studies)	No. of participants/ studies	Certainty of evidence	Interpretation of findings
Efficacy (forced choice/ Likert scale)	Men expect to be prescribed pharmacological treatments for LUTS (the single most common answer; 43%), especially if their symptoms are severe, and expect pharmacological treatments to reduce voiding symptoms [36]. Rapid symptom improvement: 4 studies reported on the proportion of patients preferring a medication with rapid symptom relief [15,22,32,33]; 62–97% preferred a treatment that provided rapid improvement in symptoms (within a few weeks to months) [15,22]. On forced choice, 34–36% preferred a treatment with rapid symptom improvement [32,33]. Efficacy: One study comparing tamsulosin and silodosin reported a preference for tamsulosin due to good efficacy in 27% (vs 13%) [30]. However, 93% would stop $\alpha$ -blocker treatment if requested by their doctor [16].	1774 participants/7 studies	⊕⊕○○ Low certainty due to risk of bias and inconsistency	Studies assessed values and preferences on efficacy of pharmacological treatments variably. Most men may prefer a medication with rapid onset of symptom improvement.
Efficacy (conjoint analysis)	Willingness to pay:- To improve from urgency incontinence to mild urgency: £25 [27,40] - To reduce night-time frequency by one time: £7 [27,40] - For a 1-mo reduction in time to symptom improvement: €12/£2 [15,27,40] - To reduce daytime frequency by one time: £1 [27,40]	616 participants/3 studies	⊕⊕⊕○ Moderate certainty due to indirectness	Most men are likely to prefer a medication that improves urgency incontinence followed by night-time frequency followed by daytime frequency. Most men are likely to prefer a treatment that provides disease stabilisation.
Disease stabilisation (forced choice/Likert scale)	Stabilisation of disease: 2 forced choice studies reported that 36–38% of men preferred a treatment that stabilised symptoms and the disease [32,33]. One study reported that 76% were willing to take two medications to provide symptom relief and that 64% were willing to wait 3 mo for symptom improvement in preference for a medication that provides long-term treatment of the underlying condition [22].	1299 participants/3 studies	⊕⊕⊕○ Moderate certainty due to risk of bias	
Adverse events (forced choice/Likert scale)	Risk: 3 studies specifically reported that men preferred less risky options, with 47–67% choosing watchful waiting or nonsurgical treatment [28,34]. Sexual adverse events: 2 studies reported on preferences regarding sexual adverse events of pharmacological treatment, with 77–93% preferring a treatment with no sexual side effects. A forced choice study reported that a concern for sexual side effects was noted only by 7% [15,19]. Nonsexual adverse events: 73% prefer a treatment with no impairment of liver or kidney function and 3% were concerned about the side effects of dizziness [19].	1039 participants/4 studies	⊕⊕⊕○ Moderate certainty due to risk of bias	Men prefer less invasive management options with a low risk of adverse events, especially sexual adverse events.
Adverse events (conjoint analysis)	Willingness to pay: Sexual adverse events: - For a treatment with no side effect of impotence: €418/£30–66 - For a treatment with no side effect of reduced libido: €237/£20–46 - For a treatment with no side effect of abnormal ejaculation: €163 /£17–34 Nonsexual adverse events: - For a treatment with no side effect of dizziness: €70/£17–40 - For a treatment with no side effect of headache: €93/£16–£26 [15,27,31,40]	824 participants/4 studies	⊕⊕⊕○ Moderate certainty due to risk of bias	Most men prefer a medication with a low risk of side effects, with sexual side effects more important than nonsexual side effects. Men prefer a treatment that preserves erectile function above all other sexual side effects.
Complications of BPH (forced choice/Likert scale)	Reduced risk of surgery: - On forced choice, 24–27% prefer a treatment that reduces the risk of future surgery [19,32,33]. - On proportional choice, 68–85% would prefer a treatment that reduces the risk of surgery over rapid symptom relief, 56–67% of patients were concerned about the risk of requiring surgery, and 70% of men are more concerned about long-term complications than immediate symptom relief [15,17,22,23]. - Surgery was the least preferred treatment for the majority of respondents (63%) [26]. Reduced risk of AUR: - On forced choice, 24% prefer a treatment that reduces the risk of AUR. - 57–58% were significantly concerned about the risk of AUR [17,19,23].	2146 participants/8 studies	⊕⊕○○ Low certainty due to indirectness and inconsistency	Most men prefer a treatment that reduces the risk of complications of BPH (surgery and AUR) over rapid symptom relief, as most men were significantly concerned about requiring surgery or developing AUR.



**Table 3 (Continued)**

Health state/outcome (categories of values and preferences)	Estimates of outcome importance (range across studies)	No. of participants/ studies	Certainty of evidence	Interpretation of findings
Complications of BPH (conjoint analysis)	Reduced risk of surgery: for a 1% decreased risk of surgery—€41/£7 [15,31] Reduced risk of AUR: for a 1% decreased risk of AUR—€22/£3 [15,31]	308 participants/2 studies	⊕⊕⊕○ Moderate certainty due to indirectness and imprecision	Men prefer a treatment that would provide even 1% reduction in the risk of requiring surgery or developing AUR.
Burden of medication	2 studies reported on burden related to medication: - 12% reported that their medications were a burden - 17% preferred once-daily dosing compared with 0% preferring twice-daily dosing [30].	263 participants/2 studies	⊕⊕⊕○ Low certainty due to risk of bias and imprecision	Few men find medication to be a burden but would prefer less regular dosing.

AUR = acute urinary retention; BPH = benign prostatic hyperplasia; LUTS = lower urinary tract symptoms.

the management of LUTS/BPO (Table 3) [26,34,36]. Most men (63%) favoured less risky options with a preference for watchful waiting over pharmacological or surgical treatment unless symptoms were at least moderately severe [26]. Patients adhered to their primary choice after watching a videotape decision aid. The variation of men preferring watchful waiting over pharmacological or surgical treatment was 47–63% across studies. However, most men did not expect physiotherapy or lifestyle advice to improve their voiding LUTS. The study that used semistructured interviews reported that the factors men felt most important were severity of symptoms (84%), risks of treatment (79%), and treatment efficacy (75%). The opinion of a health care provider was considered only by 51% [34].

3.4.3. Pharmacological treatment

Fifteen studies reported on expectations or preferences related to pharmacological treatment [15,17–20,22,27,28,30–34,36,40]. Principal themes related to (1) efficacy of treatment, (2) effect on stabilising the underlying disease process, (3) type of adverse events, (4) prevention of complications of benign prostatic hyperplasia, and (5) burden/cost of treatment (Tables 3 and 5).

One cohort study reported that men (especially older men or those with more severe LUTS) expected to be prescribed pharmacological treatment and expected that this treatment would improve their voiding LUTS [36]. Two discrete choice experiments [27,40] reported that preferences for improvement in urgency incontinence were almost four times greater than that for nocturia (willingness to pay £25.30 vs £6.70) and 18 times greater than that for daytime frequency (willingness to pay £25.30 vs £1.40). Results were consistent with a report that men most commonly discussed urgency incontinence, nocturia, and daytime frequency [40]. Patient-reported daytime frequency was annoying, disruptive to daily activities and work, embarrassing, and confining, while urgency incontinence was restrictive to social lives and decreased self-confidence. Men reported nocturia as disrupting sleep, producing daytime tiredness and reduced confidence, and also disrupting partner's sleep with resultant worry about impact on the partner [40]. Time to onset of symptom improvement was less of a concern. Survey-based studies reported that 34–97% preferred a treatment that provided rapid symptom improvement within a few weeks to months [15,22,32,33]. In a US survey, 64% of men preferred disease stabilisation to rapid symptom improvement and 69% of men were willing to take two medications to provide symptom relief [22].

Men consistently preferred less invasive management options with a low risk of adverse events (seven studies, 1763 participants) [15,19,27,28,31,34,40]. Sexual adverse events (erectile dysfunction, loss of libido, and ejaculatory dysfunction) were more important in preference decisions than nonsexual adverse events (dizziness and headache), with up to 93% preferring a treatment with no sexual side effects. A qualitative analysis also reported sexual function side effects of greater importance than nonsexual side effects (eg, nausea, dizziness, and dry mouth) [40]. This was

**Table 4 – Summary of findings; question: what are the values and preferences of men regarding the surgical treatment of lower urinary tract symptoms**

Health state/outcome (categories of values and preferences)	Estimates of outcome importance (range across studies)	No. of participants/ studies	Certainty of evidence	Interpretation of findings
Efficacy (forced choice/ proportion)	Most men expect surgical treatment to improve their voiding symptoms [36]. Surgery is favoured when the success rate is high, and the spontaneous remission rate is low [25]. Surgery is favoured when the complication rate is low (1%), while at a high complication rate (25%) surgery becomes less favourable [25].	202 participants/2 studies	Moderate certainty due to imprecision	Men consider surgery as a preferred option when success rate of surgery is high, and complication and spontaneous remission rates are low.
Complications of surgery (forced choice/ proportion)	Sexual function: 72% of men are concerned with postoperative sexual (erectile and ejaculatory) dysfunction, more often younger (50–59 yr) than older (>70 yr) patients [35]. Odds ratio of choosing surgery for men with negative ratings of the prospect of postoperative impotence was 0.20 (0.08–0.48) compared with those who were not bothered or ambivalent [14]. Incontinence: 77% of men are concerned with postoperative urinary incontinence [35]. Pain on urination: 47% of men are concerned about postoperative pain on passing urine [35].	673 participants/2 studies	⊕⊕○○ Low certainty due high risk of bias and imprecision	Most men are concerned about risks of postoperative sexual dysfunction, especially younger men. Men are also concerned with urinary incontinence and pain on passing urine following surgery. Men with high baseline level of sexual function and negative ratings of the prospect of sexual dysfunction are less likely to prefer surgery.
Morbidity (forced choice/ proportion)	Catheterisation: 68–69% considered that insertion of catheter for AUR would be more detrimental on quality of life than surgery.	62 participants/1 study	⊕⊕○○ Low certainty due to risk of bias and imprecision	Men prefer surgery if the risk of requiring catheterisation for AUR is high.
Factors affecting decision for surgery	Predictive factors (1 study): - One cross-sectional study reported that 85% of men would choose to have a prostate surgery, but this preference was influenced by the following: (1) men who had previous prostate surgery were more likely to choose surgery (91% vs 74%) and (2) older men are less likely to choose surgery (91% aged 50–54 yr compared with 60% aged >85 yr) [21]. Symptom severity (3 studies): - Odds ratio of choosing surgery, compared with men with moderate symptoms, was 1.5 (0.6–4) for men with severe symptoms [14]. - Proportion of men choosing surgery: - Mild symptoms—8.5% - Severe symptoms—17.2% [28] - No relationship between symptom severity and proportion of patients choosing surgery (84% with mild symptoms vs 78% with severe symptoms) [21]. Symptom bother: - Odds ratio of choosing surgery for men who rated their symptoms negatively was 7 (3–17) compared with the ratio for those who had positive or mixed ratings of their symptoms [14]. - Another study showed no relationship between symptom bother and proportion of patients choosing surgery (83% of those with both no and large bother chose surgery) [21].	3053 participants/3 studies	⊕⊕○○ Low certainty due to risk of bias and inconsistency	Men who were younger, had previous prostate surgery, or had more severe and bothersome symptoms were more likely to prefer surgery.

AUR = acute urinary retention.

**Table 5 – Summary of findings for qualitative studies; question: what are the values and preferences of men regarding the investigation and treatment of lower urinary tract symptoms**

Health state/outcome (categories of values and preferences)	Key themes (range across studies)	No. of participants/studies	Certainty of evidence	Interpretation of findings
Urodynamic investigation	<p>Most men found the test acceptable, despite experiencing some pain or discomfort (acceptance).</p> <p>Most men perceived the test to be important in aiding the decision-making process (usefulness).</p> <p>Embarrassment due to (1) intimate nature or not being well informed about what to expect, (2) lack of sense of privacy, and (3) gender of person performing the test.</p> <p>Men would prefer to be better informed of what to expect, and to receive the results from their clinician on the same day.</p>	41 participants/1 study <sup>a</sup>	⊕⊕○○ Low certainty due to serious adequacy (imprecision)	Overall, men found urodynamic investigation acceptable, despite experiencing pain, discomfort, or embarrassment, as they felt that it provided valuable information to the decision-making process.
Pharmacological treatment	Men are concerned about sexual side effects of medication, but preferences vary between men based on individual circumstances and baseline level of sexual function.	96 participants/2 studies <sup>b</sup>	⊕⊕○○ Low certainty due to methodological limitations and adequacy <sup>b</sup>	Men have concerns about sexual side effects of medications, but there is heterogeneity of responses based on individual circumstances and baseline level of sexual function.
Surgical treatment	<p>Men tolerate their symptoms even when these have a negative impact on their quality of life.</p> <p>Men reported heterogeneous responses regarding sexual side effects of surgery. Concerns were related to perceived effect on their manhood and the impact that loss of sexual function would have on their partner and relationship. However, some men were accepting of this situation.</p>	87 patients/2 studies <sup>c</sup>	⊕⊕○○ Low certainty due to methodological limitations and adequacy <sup>c</sup>	Men tend to “put up” with their symptoms to avoid undergoing surgical intervention. Men reported varying preferences regarding sexual side effects, with feelings that it would cause them to lose their manhood, concerns about the effects on their partner and relationship, and ultimately acceptance of the situation for some men.

<sup>a</sup> One study: Selman et al [39].

<sup>b</sup> Two studies: Ikenwilo et al [40] and Kelly-Blake et al [41].

<sup>c</sup> Two studies: Pateman and Johnson [38] and Kelly-Blake et al [41].

not the case for men who were no longer sexually active, or already dealing with sexual dysfunction independently of LUTS.

Nine studies (2354 participants) addressing reduction in long-term disease-related complications [15,17,19,22,23,26,31–33] reported that 68–85% preferred treatment that reduced the risk of requiring surgery to a treatment that reduced the risk of the other principal long-term complication of acute urinary retention (AUR). Men were willing to pay twice as much for a treatment that offered a 1% reduction in the risk of surgery as for that offering a 1% reduction in the risk of AUR.

Two studies (263 participants) reported that only 12% of men found their medications burdensome [16,30]. When asked to choose between alpha-blockers (tamsulosin and silodosin), the majority (70%) preferred tamsulosin, with 24% reporting less frequent dosing as the reason for their preference selection.

#### 3.4.4. *Interventional/surgical treatment*

Six studies assessing preferences related to surgical treatment reported that men prefer less risky options [14,21,23,25,28,36], although surgery became more acceptable if complications were infrequent and the success rate was high [21,25]. More severe and bothersome symptoms increased the preference for surgery, although this was not consistently reported between studies [14,21,28]. A qualitative study of men who underwent transurethral resection of the prostate (TURP) [38] reported that men often tolerated their symptoms for a long period and that embarrassment was an important factor in leading men to choose surgery (Tables 4 and 5).

A cross-sectional survey of men who had undergone, or were due to undergo, surgery for BPO reported that the principal adverse events that men were concerned about were sexual dysfunction, urinary incontinence, and pain on urination; although younger men were more concerned with the risk of sexual dysfunction, the desire to maintain sexual function was important to men of all age groups [35]. A US study of almost 400 LUTS/BPO patients reported that men with a higher level of sexual function were less likely to prefer surgery [14]. A qualitative investigation reported variability in this regard, with responses of men who had undergone TURP varying from it not being an issue “at my age” to a relief at the reduction in libido, and finally a shared acceptance with wife in reduced sex [38]. Semistructured interviews with men who had not undergone surgery reported, however, that men were reluctant to accept surgical treatment that might negatively impact sexual functioning. Some men placed value on sexual function as a sign of integrity of their manhood and were deterred by concerns about the effect of loss of sexual function on their partner [41]. These concerns were restricted to men who had specifically mentioned the importance of sexual function in their treatment decision-making.

Men also reported negative attitudes towards catheterisation, with 68% reporting that catheterisation for AUR would have a more detrimental effect on quality of life than undergoing surgery [23].

### 3.5. *Discussion*

#### 3.5.1. *Principal findings*

This systematic review addressed values and preferences regarding the investigation and treatment of LUTS in men. As they believe in its usefulness in informing treatment decision-making, men find urodynamic testing acceptable despite discomfort or embarrassment (low certainty evidence).

In terms of treatment, men prefer less risky options, but this preference varies depending on baseline symptom severity and the risk/benefit characteristics of the treatment (moderate certainty). Most men prefer pharmacological treatment with a low risk of sexual side effects (especially erectile dysfunction). Men valued improvement in urgency incontinence over other symptom improvement (moderate certainty). Other important preference considerations included reduction in the risk of AUR or surgery (moderate certainty).

In terms of surgical treatments, men tolerate their symptoms until they reach a high level of bother or embarrassment (moderate certainty). Sexual side effects of surgery were important to those with a high baseline level of sexual function, but not to those with lower levels (low certainty).

#### 3.5.2. *Strengths and limitations*

Strengths of this review include a priori elements and methodology development informed by a multidisciplinary panel of clinical experts and methodologists. We set explicit eligibility criteria and used a sensitive search filter that included results from quantitative and qualitative research. We rated the certainty of evidence using the GRADE (quantitative) and CERQual (qualitative) approaches [9–11]. The use of two different but complementary bodies of evidence (mixed methods) and the use of a systematic, transparent, and rigorous approach to assess the certainty of the summary of evidence allowed greater confidence in the interpretation of results.

The limitations of our review are largely those of the eligible studies. First, almost two-thirds of the quantitative studies did not use validated research tools. Second, due to variability in measurement methodologies and the paucity of evidence based on standard gamble, time trade-off, or discrete choice methodologies, we were unable to conduct meta-analyses. Third, although qualitative studies are crucial in the area of values and preferences, only four qualitative studies proved eligible. Finally, this systematic review was focussed on preferences related to investigation and treatment of LUTS, but excluded data related to descriptions and experiences of symptoms and health care-seeking attitudes, drivers, and barriers.

#### 3.5.3. *How the review compares with previous reviews/guidelines*

This is the first systematic review to address values and preferences regarding all aspects of investigation and treatment of LUTS in men. Two previous reviews have focussed only on preferences for pharmacological treatment of LUTS [42,43], while our systematic review is much

more comprehensive. Our review also includes investigation of LUTS, as well as relative preferences for conservative, pharmacological, and surgical treatment. Our results are consistent with the findings of the earlier two reviews: men prefer therapies reducing long-term disease progression over those that provide short-term symptom improvement [42,43]. The earlier reviews, however, did not assess certainty of evidence using the GRADE and CERQual approaches.

In the present review, we did not include studies focussing on physician preferences or the influence that physician preferences may have on patient choices. A previous review studied these aspects and reported a considerable influence of urologists' personal preferences on men's treatment choices. The review further noted variability in urologists' perceptions of efficacy and adverse events of treatment, a variability likely to affect practice patterns and recommended treatments. Moreover, the review also reported variability in factors that urologists think that patients value [43]. Understanding physician attitude and behaviour towards the treatment of male LUTS, and the influence that this has on patient preferences and treatment choice represent important areas for further study.

#### 3.5.4. Implications for clinical practice

This review highlights the relative importance that men place on outcomes related to the investigation and treatment of LUTS with implications for health care professionals, pharmaceutical and medical device companies, policy makers, and guideline development groups. In an area where several pharmacological and surgical treatments exist, knowledge about men's values and preferences will aid in patient counselling and support shared decision-making for investigation and treatment selection, and might improve clinical outcomes and reduce possible complaints. Awareness of men's experiences will inform service improvement in areas such as information provision prior to urodynamic investigation and optimisation of posturodynamic consultations to incorporate patients' values and preferences (Table 6).

Knowledge about men's preferences regarding treatment-related adverse events is important for shared decision-making and for the development of novel pharmacological and surgical treatments (Table 6). Implications also include that we have to be able to combat the false information that exists in the media—both traditional and social—and make sure that studies always record honest results in a manner that is clear for patients to understand. Finally, this systematic review provides much needed information for the clinical practice guidelines, such as the European Association of Urology guidelines, that incorporate patients' values and preferences in their decision-making process [44].

#### 3.5.5. Future research

This review has highlighted the paucity of information assessing the values and preferences of LUTS in men (especially qualitative research), with overall moderate to

**Table 6 – Summary of key findings**

##### Diagnostics

- Preferences for paper vs electronic bladder diaries vary amongst different populations, but electronic diaries are easier to read, are discrete, and are more likely to be completed after each urinary event (low certainty).
- Despite experiencing pain and embarrassment, men find urodynamics acceptable because of its perceived diagnostic insight (low certainty).

##### Pharmacological therapy

- Men value improvement in urgency incontinence more than other symptoms, avoiding sexual side effects, and reduction in risk of urinary retention and need for surgery (moderate certainty).
- Men value rapid symptom improvement (low certainty).

##### Surgical therapy

- Men prefer less risky options and thus will tolerate symptoms to avoid risk; preference for surgery increases when symptoms become more severe or bothersome, and when surgery has a high rate of success with a low risk of complications (moderate certainty).
- Sexual side effects of surgery are important for those with a high baseline level of sexual function but not for those with lower levels (low certainty).

low certainty of evidence. Gaps exist in the current literature regarding values and preferences for conservative treatment options (eg, behavioural treatment) and some different diagnostic tests (eg, uroflowmetry and cystoscopy). Future research should use validated preference measurement tools in well-defined patient populations with more stringent methodological standards [45]. Specifically, researchers should recruit a representative population and implement a mixed-methods approach using both qualitative and quantitative methodology. To ensure that they address the most relevant attributes, researchers using quantitative methodologies, such as discrete choice experiment, should include patient input into selection of attributes of interest. Researchers should use qualitative methodology to explore and enrich the findings of quantitative analysis. Finally, authors should minimise RoB and acknowledge limitations regarding the RoB they have failed to avoid. The recent development of several novel, minimally invasive treatment options for LUTS/BPO, each with unique risk/benefit profiles, requires further preference assessment focussing on hospitalisation, catheterisation, and durability and preferences between pharmacological and minimally invasive surgical treatments. The findings of this systematic review may ultimately inform the development of a decision-making tool to aid men and their physicians in deciding between the numerous options for the treatment of LUTS based on their individual values and preferences.

## 4. Conclusions

We systematically reviewed the evidence assessing values and preferences regarding the investigation and treatment of male LUTS. Overall, preferences are for lower-risk management options, with a desire for treatments that have fewer sexual side effects and are primarily effective at improving urgency incontinence and nocturia. The overall certainty of evidence is low to moderate, with methodological limitations and a paucity of evidence (especially qualitative) in this area. This review has highlighted the

need for further research with better methodological quality, especially the use of validated assessment tools. Despite these limitations, the findings from this review can help aid the treatment decision-making process and will improve the strength of guideline recommendations.

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*Acquisition of data:* Malde, Umbach, Wheeler.

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*Drafting of the manuscript:* Malde, Wheeler, Tikkinen.

*Critical revision of the manuscript for important intellectual content:* All authors.

*Statistical analysis:* Malde, Guyatt, Tikkinen.

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## Appendix A. Supplementary data

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