

# AN OVERVIEW OF OVERACTIVE BLADDER (OAB) IN MEN WITH BENIGN PROSTATIC HYPERPLASIA (BPH)



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## Background

Overactive bladder (OAB) is a subset of storage-related symptoms that can occur with lower urinary tract symptoms (LUTS). Historically, LUTS in men were largely attributed to bladder outlet obstruction (BOO) resulting from benign prostatic hyperplasia (BPH), particularly as the prevalence of both LUTS and BPH increases with age.<sup>1,2,3</sup> However, while BPH remains a common cause of LUTS, it is now well recognized that overactive bladder (OAB) contributes to storage-related symptoms in men.<sup>1,2</sup> The clinical presentations of OAB, BPH, and LUTS often overlap, making diagnosis more complex.<sup>4,5</sup> The relationship between OAB, BPH, LUTS, benign prostatic enlargement (BPE), and BOO requires careful evaluation to avoid misdiagnosis.<sup>2,6</sup> (Figure 1)

Despite the clinical complexity of OAB in men with BPH, research in this area remains extremely limited. Focused studies are urgently needed to characterize the interplay of pathophysiology, symptom burden, and treatment outcomes — particularly in patients with additional comorbidities.

## BPH Overview

BPH is a histologic diagnosis characterized by the nonmalignant<sup>11</sup> proliferation of smooth muscle and epithelial cells within the prostate, commonly observed in aging men.<sup>3</sup> BPH is a well-established cause of LUTS, which can arise due to either BOO or irritative mechanisms.<sup>3</sup>

Specifically, BPH leads to compression of the urethra, increasing resistance to urinary flow—a condition known as BOO. The resulting obstruction can induce compensatory changes in bladder function, including detrusor overactivity or impaired contractility. (Figure 2) BOO may present as LUTS, recurrent urinary tract infections, urinary retention, or other urological complications.<sup>3</sup>

The terminology surrounding BPH varies in the literature, which can complicate the interpretation of epidemiological studies. Terms such as BPH, BPE, BOO, and benign prostatic obstruction (BPO) are often used interchangeably, though they refer to distinct aspects of the condition. Not all men with BPE and LUTS will develop obstruction or BPO<sup>1,6</sup>; thus, a comprehensive assessment is essential for accurate diagnosis and management.

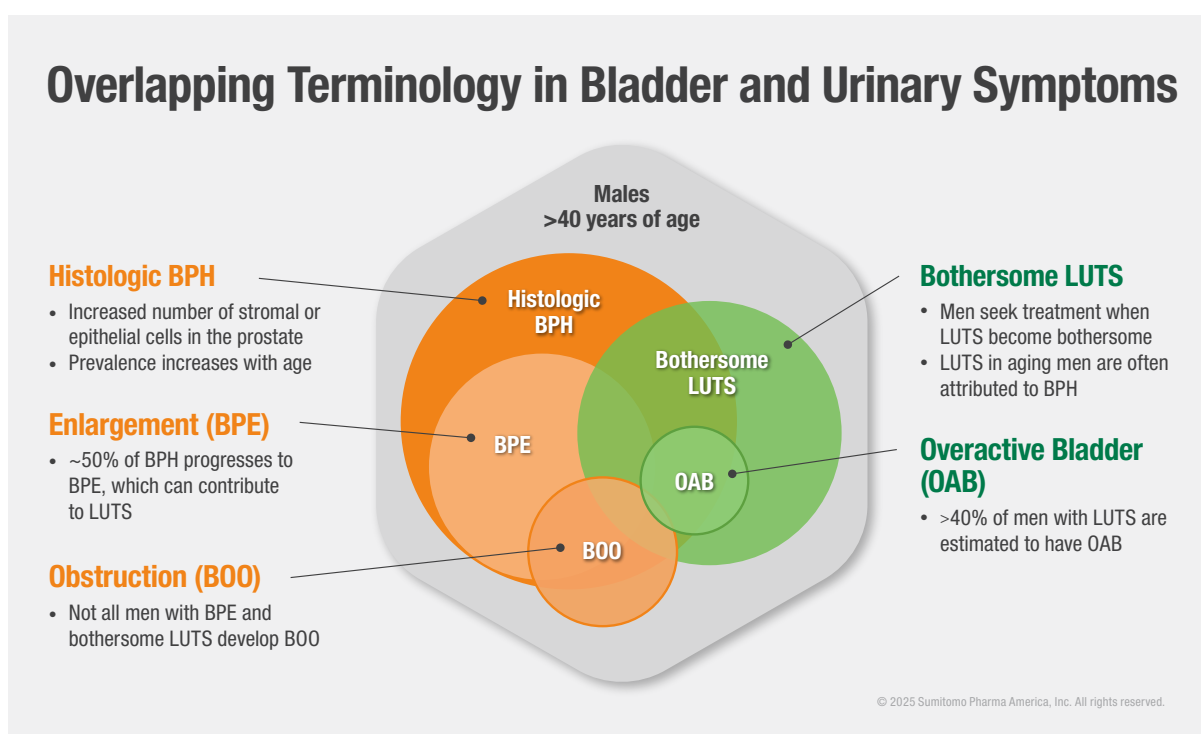


Figure 1. Relationship between OAB, BPH, LUTS, BPE, and BOO in males >40 years<sup>3,4,6,7,8,9</sup> (Chart adapted from Roehrborn<sup>6,10</sup>)

## Male anatomy relating to OAB and BPH

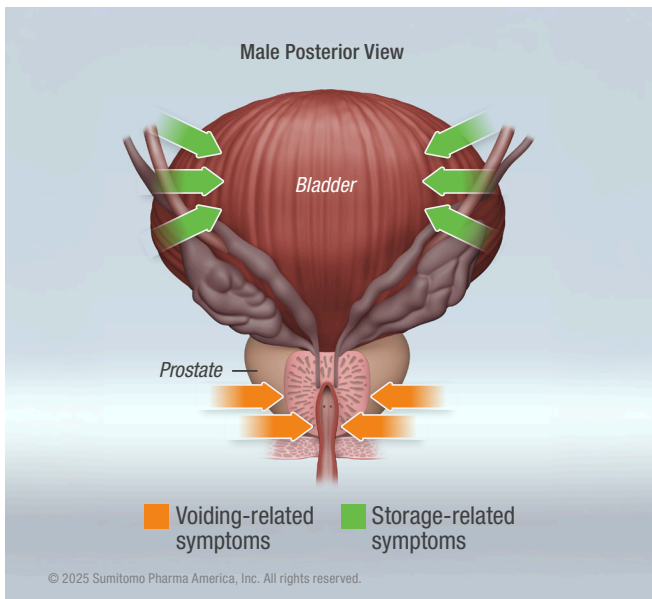


Figure 2. BPH may lead to voiding-related symptoms due to obstruction, while storage-related symptoms due to OAB may also present.<sup>3,10,12</sup> (Illustration adapted from Tortora<sup>13</sup>)

## Risk Factors

BPH development is influenced by both non-modifiable and modifiable risk factors<sup>3</sup>:

- Non-modifiable risk factors include increasing age, genetics, and geographical location.
- Modifiable risk factors can include sex steroid hormones, metabolic syndrome, cardiovascular disease, obesity, diabetes, diet, physical activity, and inflammation.

## Anatomical Impact

The anatomical changes associated with BPH significantly contribute to LUTS.<sup>10</sup> The urethra may become obstructed due to hyperplasia of prostatic tissue in the transition zone. Additionally, prostate enlargement can lead to obstruction-induced adaptive changes in the bladder, specifically detrusor (smooth muscle) hypertrophy, overactivity, decreased compliance, and/or reduced contractility.<sup>3,4,11</sup> Prostate enlargement and obstruction can lead to progressive tissue remodeling of the bladder.<sup>14</sup> The bladder wall may develop trabeculation or thickening.<sup>3</sup> Of note, approximately 50% of BPH cases progress to BPE, which is a key factor in the development of LUTS.<sup>8</sup>

## OAB and LUTS in Men with BPH

LUTS is a broad term encompassing storage-related symptoms, (including OAB), voiding-related symptoms, and post-voiding symptoms.<sup>12</sup>

The prevalence and severity of LUTS tend to progressively increase with advancing age.<sup>1</sup> In the management of bothersome LUTS, healthcare providers should recognize the complex interplay between the bladder, bladder neck, prostate, and urethra. Further, symptoms may result from interactions among these structures, as well as with the central nervous system and systemic conditions such as metabolic syndrome or congestive heart failure.<sup>1</sup>

Although LUTS in men have historically been attributed to BPH, their etiology may be more complex, and clinical symptoms frequently overlap. The interconnected relationship between OAB, BPH, LUTS, BPE, and BOO requires an understanding to aid in optimal patient management.<sup>6</sup> Notably, one study showed over 40% of men with LUTS had OAB symptoms with no evidence of BOO, further highlighting the complexity of these conditions.<sup>4,9</sup>

## Voiding-Related Symptoms and Storage-Related Symptoms

LUTS in men are generally associated with 2 components: voiding-related symptoms and storage-related symptoms.<sup>1,15</sup> (Figure 3)

The International Prostate Symptom Score (IPSS), a validated self-administered questionnaire, provides clinicians with insight into the severity and frequency of LUTS. The tool includes 7 questions focused on various symptoms (i.e., incomplete bladder emptying, frequency, intermittency, urgency, weak stream, straining, and nocturia), which are rated on a scale from 0 to 5, plus 1 question related to quality of life (QoL).<sup>1,15</sup>

Male LUTS may be caused by a variety of conditions, including BPE and BPO.<sup>1</sup> Presentation of these symptoms can include slow stream (perception of reduced urine flow), intermittent stream (flow that starts and stops during voiding), straining (muscular effort required to initiate or maintain stream), terminal dribble (flow slows to a trickle or dribble at the end of urination), as well as post-micturition symptoms of incomplete emptying (sensation of residual urine after voiding) and post-void dribble (leakage of urine after voiding).<sup>16</sup>

As mentioned earlier, prostate enlargement may induce bladder remodeling, which may contribute to storage-related symptoms.<sup>14</sup> Storage-related symptoms are primarily associated with OAB and can include frequency (voiding too often), urgency (sudden, compelling need to urinate that is difficult to defer), nocturia (waking up at night to urinate), and incontinence (any involuntary leakage of urine).<sup>16</sup> Storage-related symptoms have been reported to be more bothersome and embarrassing for patients than voiding-related symptoms.<sup>4,17</sup>

**Clinical Perspective: Symptoms in OAB and BPH**

The American Urological Association (AUA) Guideline on Management of LUTS Attributed to BPH (LUTS/BPH) confirms that men with LUTS/BPH often experience storage symptoms characteristic of OAB, such as urgency and nocturia.<sup>1,16</sup> Recognizing the coexistence of OAB and BPH is essential, as these conditions frequently present together but have distinct underlying causes.

## Complex Relationship Between OAB, BPH, and LUTS

A central factor linking storage-related LUTS associated with BPH and symptoms of OAB is the bladder's reduced capacity to accommodate increasing urine volumes during filling.<sup>4</sup> As discussed earlier, LUTS in men with BPH can be broadly classified as either voiding-related or storage-related.<sup>4,15</sup> Voiding symptoms (typically associated with BPH) and storage symptoms (more characteristic of OAB) are clinically distinct but often coexist and influence one another (Figure 3).

Initially, men may present with only a few symptoms, but as they age, the prevalence of nocturia, urgency, weak stream, intermittent stream, and incomplete emptying may increase.<sup>18</sup> However, the symptoms most frequently reported are not always those most bothersome to patients. In a survey of 475 men aged 50–89 years with LUTS suggestive of BPH, the most commonly reported symptoms were both voiding-related (e.g., weak urine stream) and storage-related (e.g., frequency, urgency). However, the number one and two most bothersome symptoms identified were storage-related symptoms (urgency and nocturia), which are more characteristic of OAB.<sup>17</sup> (Figure 4). Bothersome LUTS can significantly interfere with activities of daily living (ADLs) and impair QoL.

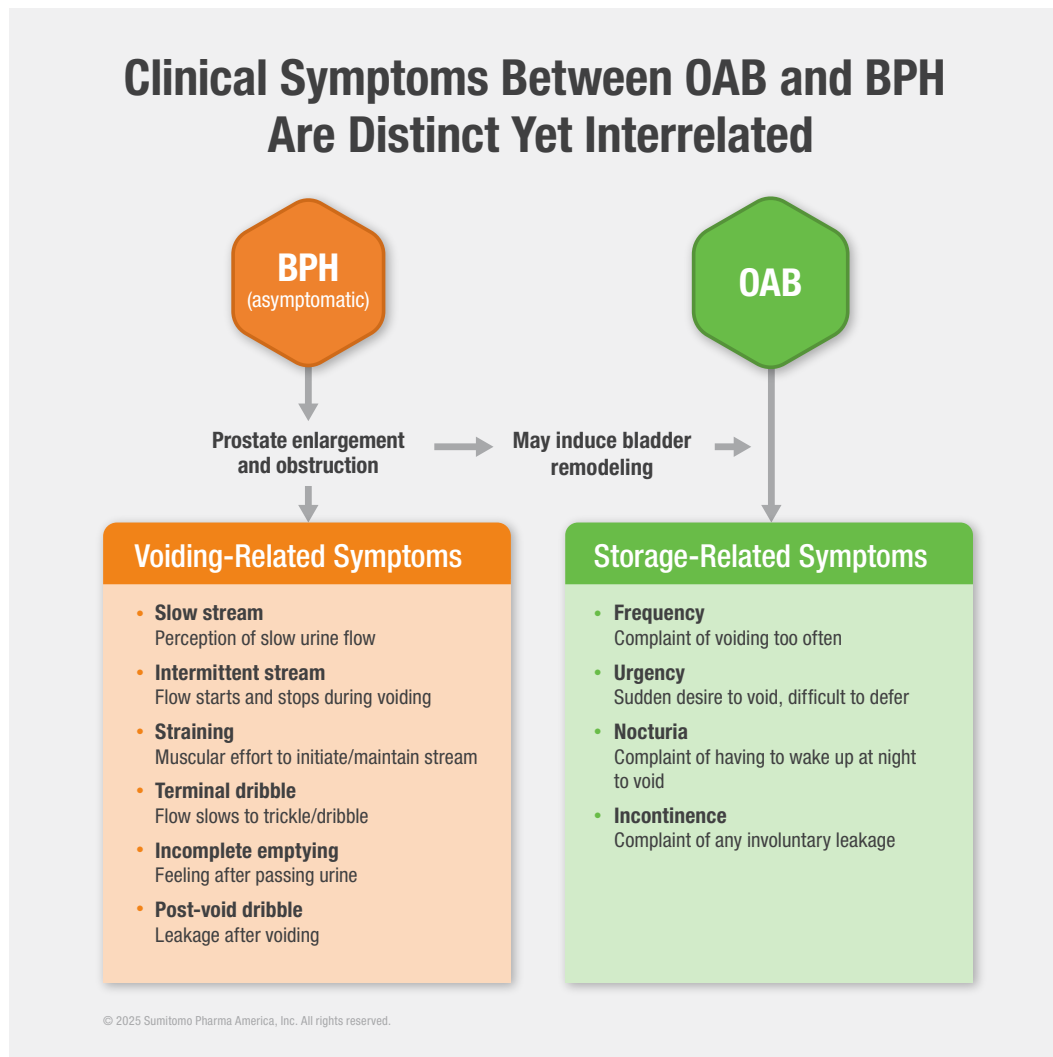


Figure 3. Symptoms of LUTS are categorized into voiding-related symptoms attributed to BPH and storage-related symptoms attributed to OAB.<sup>4,5,14,16</sup>

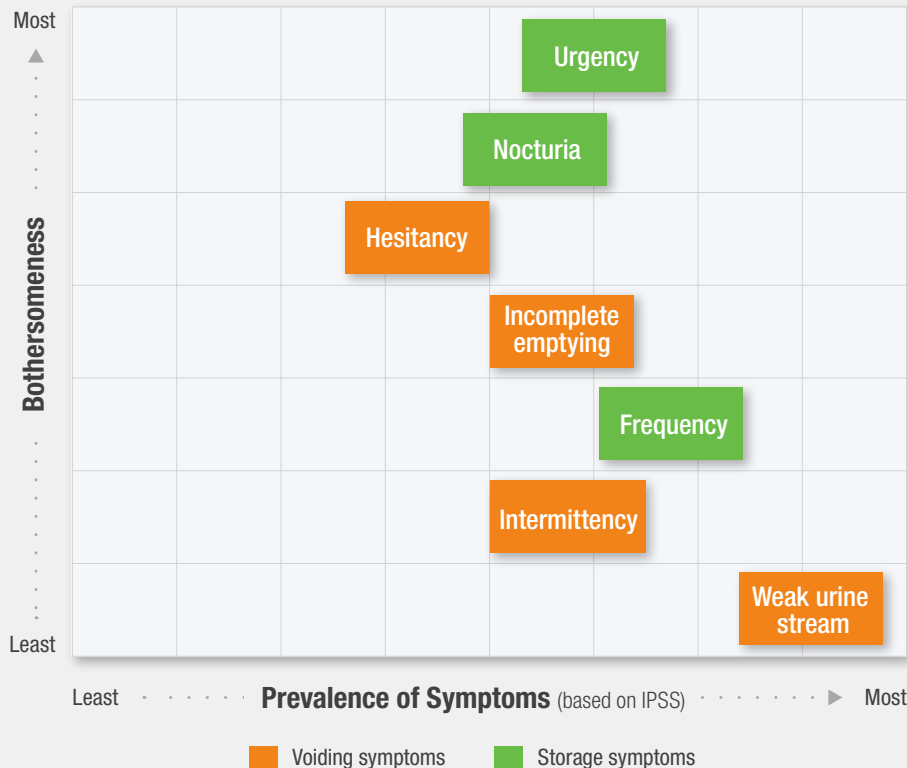
**Clinical Perspective: QoL Impact of OAB and BPH**

The AUA Guideline on Management of LUTS/BPH emphasizes that LUTS attributed to BPH, while not life-threatening, can have a profound impact on QoL.<sup>1</sup> The AUA/Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction (SUFU) Guideline on Diagnosis and Treatment of Idiopathic OAB recognizes that men experiencing OAB symptoms often face disruptions in daily activities, sleep, psychological well-being, and overall social engagement, yet many may not fully recognize or acknowledge how much these symptoms affect their physical and psychological health.<sup>19</sup>

## Prevalence of LUTS with OAB

A secondary analysis of the EPIC study—a landmark, population-based survey of more than 19,000 adults across 5 countries<sup>20</sup>—was conducted to describe the prevalence, severity, and symptom bother associated with LUTS in the

## Prevalent and Bothersome Urinary Symptoms in Men



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Figure 4. In a survey of 475 men with LUTS suggestive of BPH, voiding-related symptoms were most commonly reported, whereas storage-related symptoms of urgency and nocturia, suggestive of OAB, were identified as most bothersome.<sup>17</sup>

overall male population (n = 7210) and in men with OAB (n = 502). Key findings included:

- A higher percentage of men reported storage symptoms (51.3%) compared with voiding (25.7%) or postmicturition symptoms (16.9%).
- Nocturia was the most commonly reported symptom (48.6%).
- Urgency was reported by 10.8% of respondents.

There was also substantial overlap among storage, voiding, and postmicturition symptoms. Men with OAB symptoms were more likely to experience multiple LUTS subtypes and report more severe symptoms. Symptom bother increased with both the number of LUTS reported and the severity of urgency.<sup>20</sup>

## Claims-Based Data on LUTS/BPH Prevalence

LUTS/BPH is a common disorder in men aged  $\geq 65$  years, affecting approximately 1 in 3 men, with ~600,000 new BPH cases diagnosed annually.<sup>21</sup> The data presented reflect men with LUTS, among whom OAB represents a distinct subset.

Overview of Overactive Bladder in Men with Benign Prostatic Hyperplasia

Not all patients with LUTS attributed to BPH will exhibit storage symptoms consistent with OAB.<sup>22</sup>

A US claims-based analysis from the Urologic Disease in America project confirmed the age-related increase in LUTS/BPH prevalence<sup>21</sup>:

- Privately insured men (2012–2021): 5%–6% (aged 40–64 years)
- Medicaid (2016–2021): ~6% (aged  $\geq 40$  years)
- Medicare fee-for-service (FFS) (2012–2021): 29%–33% (aged  $\geq 65$  years)
- Medicare Advantage (2015–2021): 31%–35% (aged  $\geq 65$  years)

## Underdiagnosis of Storage-Related Symptoms

A US retrospective, observational study analyzed 462,400 men aged  $\geq 40$  years using claims data (2012–2017) from the IBM MarketScan and

Medicare Supplemental databases (Figure 5) and found that<sup>2</sup>:

- BPH was diagnosed and treated more frequently than OAB, suggesting potential undertreatment of storage-related symptoms in men with LUTS.
- The age-standardized prevalence of LUTS (including diagnoses or treatment for either OAB or BPH symptoms) was estimated at 12.2%.



### Clinical Perspective: The Prevalence Puzzle

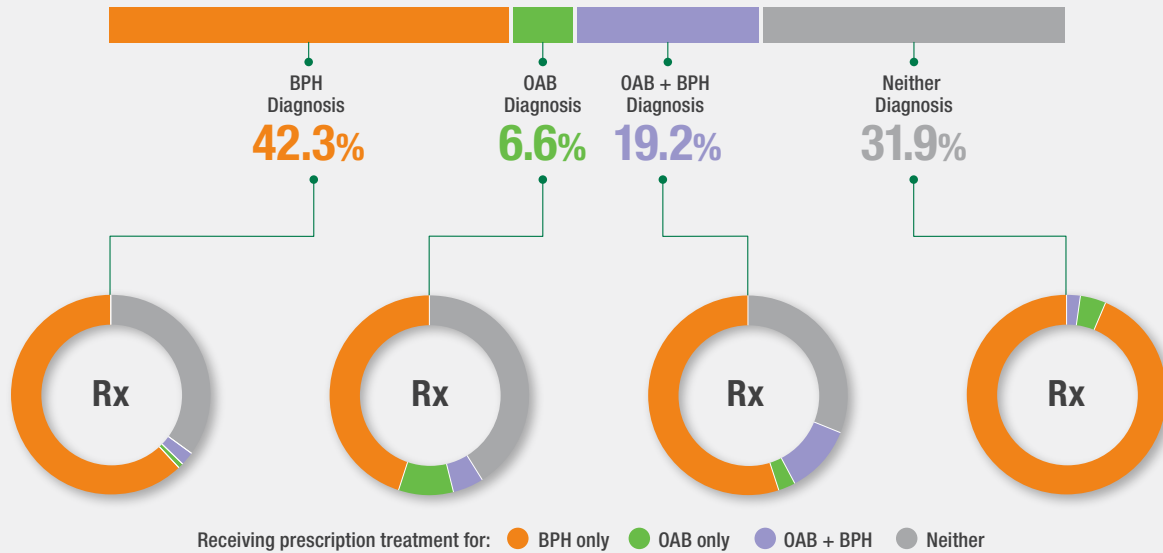
The AUA Guideline on Management of LUTS/BPH notes that LUTS (including OAB) increases in prevalence with age, often leading to a complex symptom profile in older men.<sup>1</sup> Distinguishing between storage and voiding symptoms becomes increasingly important as men age, given the high likelihood of overlapping conditions.<sup>4,6</sup>

## Annual Incidence of LUTS/BPH

From 2015 through 2021, the mean annual incidence of LUTS/BPH in men aged  $\geq 65$  years was ~600 per 10,000 men (6%), with rates across all age groups ranging from 4% to 8%.<sup>21</sup>

## OAB and BPH Diagnosis and Treatment Rates

BPH is diagnosed and treated more frequently than OAB, highlighting the potential undertreatment of storage-related symptoms in men  $\geq 40$  years with LUTS (N = 462,400)



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Figure 5. Retrospective analysis of MarketScan Commercial and Medicare Supplemental databases (2012-2017), including 462,400 men  $\geq 40$  years, diagnosed or medically treated for OAB and/or BPH<sup>2</sup>

### OAB in Aging Men with BPH

LUTS development increases linearly with age,<sup>11</sup> although men typically seek help only when symptoms become bothersome.<sup>1,6</sup> LUTS in aging men are often attributed to BPH, but in one study, over 40% of men with LUTS had OAB symptoms, with no evidence of BOO.<sup>4,9</sup> (Figure 6)

In a survey among 20,000 US adults, OAB prevalence was estimated as follows<sup>23</sup>: (Figure 6)

- 27.2% of men aged  $\geq 40$  years report experiencing OAB symptoms at least “sometimes”
- 49.4% of men aged  $\geq 76$  years report experiencing OAB symptoms at least “sometimes”

### Clinical and Humanistic Burden of OAB in Men with BPH

#### Clinical Burden

The worsening of LUTS is the most common indicator of BPH progression, which can lead to complications such as acute urinary retention (AUR), urinary tract infections (UTIs), and hematuria. As symptoms progress, patients may decide to seek medical therapy that may have long-term implications and may lead to consideration of surgical treatment.<sup>1,11</sup>

### OAB in Aging Men



Over  
**40%**

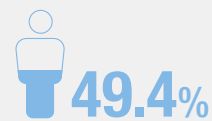
of men with LUTS had OAB symptoms, with no evidence of BOO

Men aged  $\geq 40$  years



27.2%  
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Men aged  $\geq 76$  years



49.4%  
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Figure 6. In one study, over 40% of men with LUTS had OAB symptoms,<sup>4,9</sup> while another study showed OAB-related symptoms increase with age.<sup>23</sup>

## Humanistic Burden

Bothersome symptoms associated with OAB and BPH can exert a substantial impact on daily life. Their influence on different aspects of health can significantly diminish QoL (Figure 7) including: sleep patterns, psychological and emotional well-being, work and cognitive function, social and lifestyle impacts, physical function and safety, personal hygiene and self-care, and sexual health and relationships.<sup>19,24,25,26</sup> Following are a few examples of how these bothersome symptoms can negatively affect the patient:

### Sleep patterns<sup>19,25</sup>

- Impact: Repeated nighttime awakenings to urinate lead to fragmented sleep, resulting in daytime fatigue, difficulty concentrating, and reduced energy levels
- Effect on ADLs: Impaired ability to engage in daytime activities such as work, caregiving, and social interactions due to sleep interruption, disruption, or deprivation

### Psychological and emotional well-being<sup>19,25</sup>

- Impact: The unpredictability of urgency and incontinence can cause anxiety, embarrassment, and depression
- Effect on ADLs: Patients may avoid social gatherings or have reduced work productivity due to fear of accidents, affecting interpersonal relationships and emotional health

### Sexual health and relationships<sup>19,24,25</sup>

- Impact: OAB and BPH can contribute to difficulty maintaining an erection, and urinary leakage (in women) during sexual activity, leading to performance anxiety and relationship stress
- Effect on ADLs: Reduced intimacy, leading to strained relationships and decreased marital satisfaction

## Humanistic Burden



### Sleep Patterns

- Nighttime awakenings leading to interrupted, fragmented sleep
- Daytime fatigue and reduced concentration
- Impaired ability to engage in work and social interactions



### Work and Cognitive Function

- Focus disruption and decreased concentration
- Daytime fatigue affecting workplace engagement
- Reduced productivity due to time management challenges
- Missed opportunities and decreased job performance



### Psychological and Emotional Well-Being

- Anxiety
- Embarrassment and social withdrawal
- Depression and decreased emotional resilience
- Impact of pain and discomfort on mental health



### Personal Hygiene and Self-Care\*

- Challenges in maintaining personal hygiene due to urinary leakage
- Skin irritation, infections, and odor concerns
- Decreased self-confidence related to hygiene issues

\* in patients experiencing urgency urinary incontinence (UUI)

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### Sexual Health and Relationships

- Difficulty maintaining an erection and leakage during sexual activity
- Performance anxiety and relationship stress
- Decreased intimacy and sexual satisfaction



### Physical Function and Safety

- Mobility challenges and impairments
- Increased risk of falls and injury, particularly in older adults
- Rapid movements during urgency episodes leading to accidents
- Physical deconditioning due to reduced physical activity



### Social and Lifestyle Impacts

- Avoidance of social gatherings due to incontinence concerns
- Limited participation in social activities and travel
- Anxiety around bathroom accessibility in public spaces
- Decreased overall well-being due to reduced social interaction

Figure 7. The bothersome symptoms associated with OAB, BPH, and LUTS can exert a substantial impact on daily life.<sup>19,24,25,26</sup>

See Figure 7 for a more complete list of the bothersome symptoms associated with OAB, BPH, and LUTS.

In a survey of 1,500 men aged  $\geq 50$  years in the United Kingdom<sup>26</sup>, it was observed that as severity of LUTS increased, there was a corresponding decline in QoL. This was measured using standardized tools:

- EuroQoL 5-dimensions (EQ-5D) for overall QoL
- Visual Analogue Scale (VAS) for self-reported health status

As LUTS severity increased, a greater proportion of men reported problems with mobility, self-care, usual activities, pain or discomfort, and anxiety or depression.<sup>26</sup>


## Summary

Evaluating OAB symptoms in men with BPH presents a complex clinical challenge due to the overlapping nature of LUTS related to storage and voiding symptoms. As highlighted in the AUA Guideline on Management of LUTS/BPH, it is important that healthcare providers recognize the complex dynamics of the bladder, bladder neck, prostate, and urethra. Further, symptoms may result from interactions of these organs as well as with the central nervous system or other systemic diseases.<sup>1</sup> The clinical and humanistic burden of LUTS/BPH is substantial, with OAB-related symptoms like urgency and nocturia contributing disproportionately to QoL impairment. Despite its prevalence, OAB symptoms in men remain underdiagnosed, often mistaken for or overshadowed by BPH-related voiding symptoms. This underscores the importance of accurate and comprehensive diagnostic evaluations to differentiate between OAB and BOO, ensuring that the true scope of the condition is recognized and appropriately managed.

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