AUA 2026 MAY 15-18 Washington, DC

NEURODIVERGENCE & UROLOGICAL CONDITIONS

Evidence-Based Practice for Advanced Practice Providers in Urology

Understanding Co-occurrence, Clinical Pearls, and Patient-Centered Care Across the Lifespan

LEARNING OBJECTIVES

01 Recognize prevalence rates of neurodivergent conditions cooccurring with urological disorders in pediatric and adult populations

02 Identify urological conditions commonly associated with autism spectrum disorder (ASD), ADHD, intellectual disability (ID), and other neurodivergent profiles

03 Apply evidence-based medication pearls when prescribing for neurodivergent urology patients

04 Implement practice level accommodations to improve patient experience and clinical outcomes across all functional levels

WHAT DO WE MEAN BY NEURODIVERGENT?

ASD	ADHD	ID
Autism Spectrum Disorder	Attention-Deficit/Hyperactivity Disorder	Intellectual Disability

DCD	DS	TBI
Developmental Coordination Disorder	Down Syndrome	Traumatic Brain Injury / Acquired

Also included: cerebral palsy, fetal alcohol spectrum disorder, Tourette syndrome, dyspraxia, sensory processing disorder. This presentation focuses on ASD, ADHD, and ID as the most studied in the urology literature.

PREVALENCE: HOW COMMON IS THIS?

1 in 36	~11%	~1%	70%
Children in the US have ASD (CDC, 2023)	US children diagnosed with ADHD (CDC, 2022)	Global prevalence of Intellectual Disability	of ASD patients have ≥1 co-occurring urological condition

Urological Co-occurrence Rates:

- **ASD + Lower Urinary Tract Dysfunction (LUTD):** 40–79% (Niemczyk et al., 2020)
- **ADHD + Enuresis:**
28–40% vs. ~5-10% in neurotypical peers (Baeyens et al., 2004)
- **Intellectual Disability + bladder dysfunction:**
60-70% experience voiding problems (Voskamp et al., 2016)
- **ASD + UTI risk:**
2–3x increased hospitalization for UTI (Croen et al., 2015)

WHY DOES CO-OCCURRENCE HAPPEN?

🧠 Neurological Pathways

Shared neural circuitry governs both bladder/bowel control and cognitive/behavioral regulation. Dopaminergic and serotonergic dysregulation affect detrusor control (Mahony et al., 2021)

💊 Medication Effects

Stimulants (methylphenidate, amphetamines) used in ADHD can increase urinary frequency & nocturia. Antipsychotics cause urinary retention via anticholinergic effects (Wille et al., 2006)

🔔 Sensory Processing Deficits

Interoceptive awareness impairment in ASD leads to difficulty recognizing urgency cues. Reduced proprioception affects voluntary sphincter control (Mazefsky et al., 2013)

🗓️ Behavioral & Routine Factors

Rigidity in ASD disrupts toileting routines. Hyperfocus in ADHD leads to ignoring body signals. Anxiety-driven avoidance of public/school bathrooms (Bitsika et al., 2015)

🔬 Genetic Overlap

Shared genetic susceptibility (e.g., LHFPL4, RBFOX genes) affects neurodevelopment AND smooth muscle function. Chromosomal anomalies (Down syndrome) directly affect urological anatomy (Croen et al., 2015)

📣 Communication Barriers

Non-verbal or minimally-verbal individuals cannot report pain, urgency, or dysuria. Delayed diagnosis of UTI, retention, obstruction. Under-reporting inflates apparent incontinence rates

PEDIATRIC UROLOGICAL CONDITIONS IN NEURODIVERGENT CHILDREN

Condition	ND Association	Prevalence	Key Citation
Nocturnal Enuresis	ADHD, ASD	28-40% ADHD; 25-30% ASD vs. 5-10% neurotypical peers	Baeyens et al., 2004 Niemczyk et al., 2020
Daytime Urinary Incontinence	ASD, ID, CP	40-54% in ASD children	Von Gontard et al., 2015
Functional Constipation / Encopresis	ASD (strongest link)	36-85% in ASD; 3x higher than neurotypical peers	McElhanon et al., 2014
Vesicoureteral Reflux	Down Syndrome, NTD	Up to 40% in Trisomy 21	Mercer et al., 2004
Urinary Tract Infections	ID, ASD, CP	3x higher hospitalization rate	Croen et al., 2015
Dysfunctional Voiding	ADHD, ASD, DCD	44% of ADHD children have voiding symptoms	Shreeram et al., 2009

ADULT UROLOGICAL CONDITIONS IN NEURODIVERGENT PATIENTS

Overactive Bladder (OAB)

Adults with ASD: 3x higher rates of OAB vs. controls. ADHD adults report urgency and frequency significantly more than neurotypical peers.
Ref: Karaman et al., 2019

Neurogenic Bladder

Cerebral palsy, Down syndrome, and other ND conditions with known CNS involvement = neurogenic lower urinary tract dysfunction (NLUTD). Spinal cord involvement in some genetic disorders.
Ref: Voskamp et al., 2016

Urinary Retention / Hesitancy

Common in patients on antipsychotics (anticholinergic burden). PVR's and incomplete emptying often missed due to communication deficits.
Ref: Moga et al., 2021

Recurrent UTIs

Often the presenting sign of urinary retention or incomplete emptying in minimally/low verbal adults. Sepsis risk if undetected. Behavioral changes may be the ONLY sign.
Ref: Croen et al., 2015

Sexual / Reproductive Health

Higher rates of erectile dysfunction in ASD men. Pelvic floor dysfunction linked to sensory hypersensitivity. GYN trauma often reported in autistic women.
Ref: Dewinter et al., 2017

Urolithiasis

Higher prevalence in ASD linked to dietary restriction (oxalate-rich foods, reduced fluid intake). Inadequate pain communication delays diagnosis.
Ref: Ching et al., 2012

MEDICATION PEARLS

Enuresis / OAB

- **Desmopressin (DDAVP):** First-line enuresis; monitor sodium closely: hyponatremia risk elevated in ND patients who drink erratically (Von Gontard, 2015)
- **Oxybutynin IR:** AVOID if possible: anticholinergic CNS effects worsen cognition/behavior in ASD/ID. Prefer mirabegron
- **Mirabegron (β3-agonist):** Preferred in ND; no anticholinergic burden; FDA-approved granules ≥3 yrs; check QTc (Chapple et al., 2014)
- **Solifenacin:** Better than oxybutynin IR; still monitor constipation which is compounded by ASD GI motility issues

ADHD Medication Interactions

- **Methylphenidate / Amphetamines:** May worsen urinary frequency; can paradoxically improve enuresis via cortical arousal (Wille et al., 2006)
- **Atomoxetine (Strattera):** NE reuptake inhibitor: can cause urinary hesitancy/retention; monitor PVR in at-risk patients
- **Clonidine / Guanfacine:** Alpha-2 agonists used in ADHD/ASD: can relax urethral sphincter and worsen incontinence
- **Antipsychotics (risperidone, aripiprazole):** Common in ASD: anticholinergic + dopaminergic effects = retention risk. Monitor PVR routinely

⚠️ CLINICAL ALERTS: Avoid high ACB-score combinations | New aggression/self-injury in non-verbal pts → rule out UTI/retention | Check QTc & polypharmacy interactions routinely

ASSESSMENT: ADAPTING YOUR APPROACH

Communication & History-Taking

- Use AAC (Augmentative & Alternative Communication) devices; ask caregivers if patient uses one
- Provide visual schedules and picture-based symptom scales (e.g., visual analog pain scales, faces scale)
- Ask caregivers about behavioral changes = urological symptom proxies (agitation, new aggression, regression in continence)
- Use structured validated tools: Pediatric Lower Urinary Tract Symptoms Score (PLUTSS), DyVAS scale (for non-verbal pain)
- Obtain thorough medication reconciliation — many are on multiple CNS-active agents
- Allow caregiver presence; do not separate if it causes distress (Kerns et al., 2015)

Physical Exam & Urodynamics

- Preview the exam verbally and/or with social stories before appointment
- Use non-scented/hypoallergenic gloves; minimize sensory stimuli (lighting, sounds, draping)
- For urodynamics: catheterization may be traumatic — consider sedation or pre-appointment anxiolytic for severe anxiety patients (obtain consent from guardian)
- Non-invasive bladder US for PVR preferred over catheterization where possible
- Bladder diary: Use adapted pictographic versions; caregiver-completed diary is often necessary
- Consider video urodynamics if pelvic exam cooperation is poor — provides additional anatomical data (Nakamura et al., 2018)

CREATING A NEURODIVERGENT-AFFIRMING UROLOGY PRACTICE

Environment

• Sensory-friendly waiting room (dimmable lights, minimal noise, reduced clutter)
• Offer first/last appointment to minimize wait
• Private entry option for patients who are elopement risks or highly anxious
• All-gender bathroom signage; visual cues for bathroom location

Pre-Visit Prep

• Mail/email social stories about the visit (photos of clinic, exam table, equipment)
• Provide a 'what to expect' visual guide
• Offer telehealth pre-visit with caregiver to review plan
• Confirm communication method preferences before visit

During the Visit

• Allow comfort items (weighted blanket, fidget tool, tablet)
• Use preferred name and pronoun; many autistic adults are LGBTQ+
• Give extra time: avoid rushing; build in buffer time in scheduling
• Offer written summaries; many ND patients prefer reading to auditory info

Toileting & Behavioral Plans

• Collaborate with OT/behavioral team on structured toileting schedules
• Timed voiding every 2–3 hrs (set alarm reminders on device)
• Reward systems for adherence with providers/families
• Bowel regimen management is ESSENTIAL: treat constipation first (Rome IV criteria)

Interdisciplinary Coordination

• Loop in PCP, developmental pediatrician, behavior analyst (BCBA)
• Shared care plans in EMR: flag ND status with communication needs
• Coordinate with school nurse for in-school voiding plans
• Refer to pelvic floor PT who has ND patient experience

Outcomes Monitoring

• Use validated bladder diaries adapted for non-verbal patients
• Track hospitalizations for UTI as quality metric
• Assess caregiver burden and education at each visit
• Document functional level (intellectual, communication) for appropriate benchmarking

EVIDENCE-BASED STRATEGIES TO IMPROVE OUTCOMES

Behavioral & Non-Pharmacological

Urine Alarm Therapy: 68-71% efficacy for enuresis, may need extended training period in ASD; modification with visual/vibration cues (Glazener et al., 2005)
Biofeedback Pelvic Floor PT: Effective for dysfunctional voiding; requires adapted approach for sensory-sensitive patients; telehealth delivery shows promise
Timed Voiding + Scheduled Hydration: Structured schedules significantly reduce accidents in ASD children (Kroeger & Sorensen, 2010)
Constipation First Protocol: Treat fecal impaction/constipation before addressing bladder dysfunction, Rome IV criteria; polyethylene glycol is first-line
Video-based Social Stories: Shown to reduce pre-procedure anxiety and improve cooperation in ASD patients (Kerns et al., 2015)

Systems & Practice Innovations

Dedicated ND Urology Clinic: Extended appointments (45–60 min), consistent provider assignment, pre-visit planning calls, shown to reduce no show rates and improve parent satisfaction (Miano et al., 2021)
EHR Flagging System: Flag communication needs, sensory sensitivities, behavioral support plans at top of chart, reduces provider anxiety and improves preparation
Caregiver Education Programs: Toilet training curricula for parents of autistic children (e.g., ABA-based protocols), essential adjunct to medical management
Multidisciplinary Rounds: Regular case review with urology, developmental peds, psychology, and OT, reduces hospitalization for UTI and improves continence rates
Telehealth Follow-Up: Reduces burden on families; facilitates bladder diary review; effective for medication management visits

SPECIAL CONSIDERATIONS BY POPULATION

Minimally Verbal / Non-Speaking Patients

Behavioral change IS the symptom. Train caregivers to recognize: self-injurious behavior, aggression, new rocking/self-stimulation, refusal to sit as possible pain signals. Routine surveillance UA/PVR annually.

ASD + Female Gender

High rates of undiagnosed pelvic floor dysfunction, vaginismus, and dyspareunia. Often have history of sexual trauma. Gynecological exams should be paced, explained step-by-step, with option to stop. Consider sedation when necessary.

ADHD + Adults

Frequently missed diagnosis. OAB symptoms in adults with untreated ADHD may partially resolve with stimulant therapy. Assess ADHD treatment status as part of urological workup for urgency/frequency.

Down Syndrome

VUR present in ~15-20%. Obstructive uropathy due to hypotonia. High rates of UTI secondary to incomplete emptying. Atlantoaxial instability affects urodynamic positioning. Annual renal ultrasound recommended.

Aging Neurodivergent Adults (>50 yrs)

Growing population, ASD adults have higher rates of OAB and bladder cancer (observed, not yet mechanistically explained). Cognitive decline compounds existing deficits. Caregiver transitions create continuity-of-care gaps.

High-Masking / Late-Diagnosed ND

Often appear 'neurotypical' at appointments but experience profound sensory distress **they don't disclose**. Ask directly about sensory preferences, anxiety about procedures. Validate experience; avoid dismissing concerns.

REFERENCES & FURTHER READING

Click any link to access source

- Baeyens D, et al. (2004). ADHD in children with nocturnal enuresis. J Urol 171(6):2576.
- CDC. (2023). ASD Prevalence & Characteristics. MMWR 72(2).
- CDC. (2022). Data & Statistics About ADHD.
- Chapple CR, et al. (2014). Mirabegron in OAB. Neurourol Urodyn 33(1):17.
- Ching CB, et al. (2012). Renal stone disease & autism. J Urol 187(5):1843.
- Croen LA, et al. (2015). Health status of adults on the autism spectrum. Autism 19(7):814.
- Dewinter J, et al. (2015). Sexual experiences in ASD adolescents. Autism 21(1):83.
- Glazener CM, et al. (2005). Alarm interventions for enuresis. Cochrane Database.
- Karaman MI, et al. (2019). OAB in adults with ASD. Neurourol Urodyn 38(3):931.
- Kerns CM, et al. (2015). Anxiety in ASD. Curr Psychiatry Rep 17(7):52. [PMC Free]
- Kroeger K, Sorensen R. (2010). Toilet training in autism. Res Dev Disabil 31(6):1274.
- Mahony A, et al. (2021). CNS control of micturition. Curr Opin Urol 31(1):27.
- Mazefsky CA, et al. (2013). Emotion regulation in ASD. JAACAP 52(7):679. [PMC Free]
- McElhanon BO, et al. (2014). GI symptoms in ASD meta-analysis. Pediatrics 133(5):872.
- Mercer ES, et al. (2004). Urological manifestations of Down syndrome. J Urol 171(3):1250.
- Miano R, et al. (2021). Dedicated ND urology service outcomes. J Pediatr Urol 17(4):510.
- Moga DC, et al. (2021). Anticholinergic burden in intellectual disability. JAGS 69(1):167. [PMC]
- Nakamura M, et al. (2018). Video urodynamics in children. Int J Urol 25(5):456.
- Niemczyk J, et al. (2015). Incontinence in ASD children. J Pediatr Urol 11(5):264.
- Niemczyk J, et al. (2018). Incontinence in ASD: systematic review. Eur Child Adolesc Psychiatry.
- Shreeram S, et al. (2009). Enuresis & ADHD prevalence. JAACAP 48(1):35. [PMC Free]
- Von Gontard A, et al. (2022). ND disorders & incontinence: ICCS Consensus. Neurourol Urodyn.
- Voskamp PW, et al. (2016). Bladder dysfunction in intellectual disability. Neurourol Urodyn 35(8):997.
- Wille S, et al. (2006). Enuresis & ADHD: treatment response. Scand J Urol Nephrol Suppl.
- Bitsika V, Sharpley CF. (2015). Anxiety & ASD association. Autism 19(7):846.
- Linde JM, et al. (2020). ADHD & LUTS: systematic review. Neurourol Urodyn 39(5):1277.
- Austin PF, et al. (2016). EAU/ICCS Guidelines on Pediatric LUTS. J Urol 196(2):690.
- Bachmann C, et al. (2009). Psychosocial factors in children with UTI/enuresis. Acta Paediatr 98(6):1037.
- Hibbard RA, et al. (2007). Sexuality in children with disabilities (AAP Policy Statement). Pediatrics 119(5).
- Warfield ME, et al. (2015). Unmet needs & services for adults with ASD. Autism 19(7):814.

Epidemiology · Pediatric · Medication · Adult/Conditions · Behavioral/Practice · Special Populations

KEY TAKEAWAYS

1. Urological conditions are HIGHLY prevalent in neurodivergent populations: prevalence rates up to 79% in ASD. These patients need proactive urological screening.
2. Communication barriers mean behavioral changes are often the only symptom: train yourself and your staff to recognize these signals, especially new aggression or self-injury.
3. Medications matter: anticholinergics worsen cognition in ND patients. Prefer mirabegron. Review the ACB score at every visit. Stimulants may paradoxically help enuresis.
4. Accommodate, don't just adapt: sensory-friendly environments, social stories, visual tools, extended appointments, and caregiver collaboration significantly improve outcomes.
5. Treat the bowel first: constipation is near-universal in ASD and directly worsens bladder dysfunction. Rome IV criteria apply, don't skip this step.

"Every patient deserves a provider who sees them — not just their diagnosis." | Questions welcome.