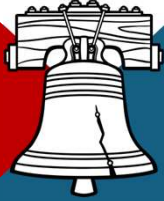


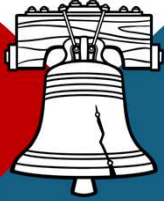
# Urinary Tract Infections After SCI: Advocating for Optimal Evaluation, Management, and Prevention

Brittany Snider, DO  
Todd Linsenmeyer, MD  
Ellia Ciammaichella, DO, JD  
Jeff Berliner, DO  
Jon Rose, PhD



# DISCLOSURES

1. Dr. Ciammaichella is the Chair of the Advocacy Committee.
2. Dr. Linsenmeyer is a member of the Advocacy Committee.
3. Dr. Linsenmeyer serves on the ConvaTec Scientific Advisory Board



# LEARNING OBJECTIVES

1. Recognize common misconceptions about UTI evaluation, management, and prevention in persons with SCI/D.
2. Understand the most up-to-date clinical practice guidelines for UTI in persons with neurogenic lower urinary tract dysfunction.
3. Describe strategies to advocate for optimal UTI care in those with SCI/D.



**ASCIP 2025**  
PHILA.PA | SEPTEMBER 3 - 6



## ***Advocacy Strategies***

**Ellia Ciammaichella, DO, JD**  
Assistant Clinical Professor, University of  
Nevada at Reno  
Osteopathic Wellness and Rehabilitation PLLC  
*Reno, NV*

# Advocacy Committee

## Advocacy Committee Goals

*To provide education and resources to promote increased knowledge and awareness for participation in advocacy activities that enhance rehabilitation healthcare and the lives of individuals with SCI/D.*

## Grassroots Advocacy

The Advocacy Committee has been pursuing grassroots efforts by creating user-centric pamphlets and mobile applications. Grassroots advocacy involves citizens personally affected by an issue by planting the seeds of concern and thus embraces self-advocacy through empowerment and support. It includes organizing, mobilizing, and engaging the public to advocate for themselves. To be able to self-advocate, the person must have knowledge about what their options include.

## Committee Leadership



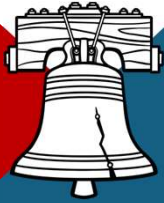
**Jeff Berliner, DO**  
Co-chair  
Pronouns: he/him (APS)



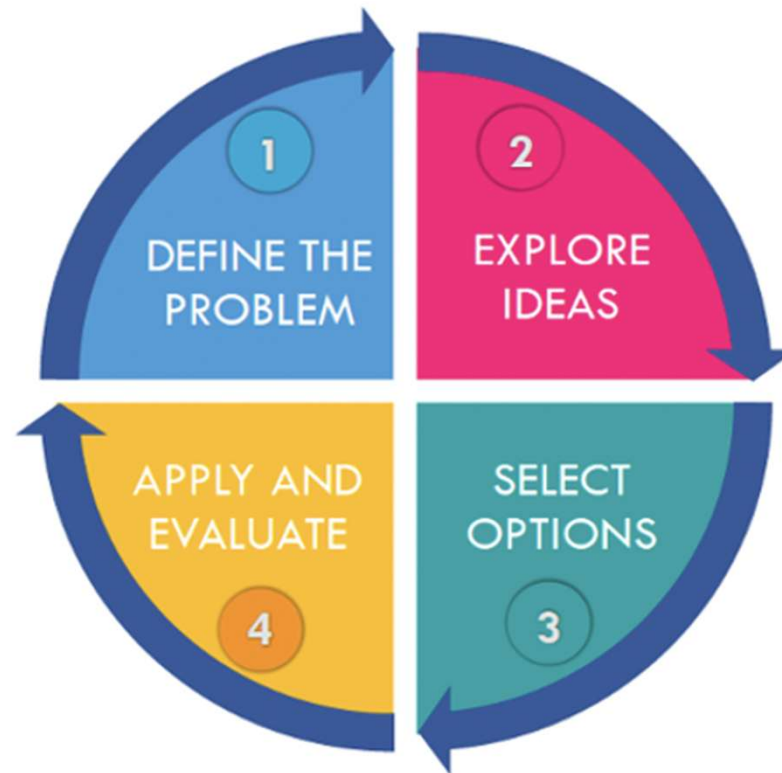
**Ellia Ciammaichella,  
DO, JD**  
Co-chair  
Pronouns: she/her (APS)

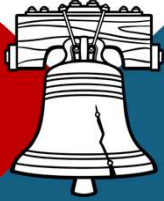


**Becky Thayer, MSN,  
RN, CRRN**  
BOD Liaison  
(SCIN)



# Knowledge is key to advocacy





# Advocacy is Essential

- **Education is key to appropriate health**
  - **Teaching the entire team**
    - **Nursing**
    - **Psychology**
    - **PT**
    - **OT**
    - **SLP**
    - **Physicians**
    - **Recreational therapy**
  - **Rehab setting**
  - **Non rehab setting**
-

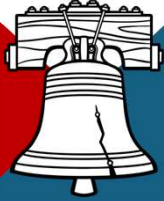


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## *The Guidelines*



**Brittany Snider, DO**  
Senior Associate Consultant  
Mayo Clinic



# UTI Epidemiology

- UTIs are common in persons with neurogenic lower urinary tract dysfunction (NLUTD)
- Overall rate of approximately 2.5 UTIs per year
- Most common cause of rehospitalization
- Associated with decreased QOL

# Canadian Urological Association guideline: Diagnosis, management, and surveillance of neurogenic lower urinary tract dysfunction – Full text

*Alex Kavanagh, MD<sup>1\*</sup>; Richard Baverstock, MD<sup>2</sup>; Lysanne Campeau, MD<sup>3</sup>; Kevin Carlson, MD<sup>2</sup>; Ashley Cox, MD<sup>4</sup>; Duane Hickling, MD<sup>5</sup>; Genviève Nadeau, MD<sup>6</sup>; Lynn Stothers, MD<sup>1</sup>; Blayne Welk, MD<sup>7\*</sup>*

<sup>1</sup>Department of Urologic Sciences, University of British Columbia, Vancouver, BC, Canada; <sup>2</sup>vesia [Alberta Bladder Centre]; Division of Urology, Department of Surgery, University of Calgary, Calgary, AB, Canada; <sup>3</sup>Department of Urology, Jewish General Hospital, McGill University, Montreal, QC, Canada; <sup>4</sup>Department of Urology, Dalhousie University, Halifax, NS, Canada; <sup>5</sup>Division of Urology, Department of Surgery, The Ottawa Hospital, Ottawa, ON, Canada; <sup>6</sup>Division of Urology, CIUSSS-Capitale Nationale Université Laval, Quebec City, QC, Canada; <sup>7</sup>University of Western Ontario, London, ON, Canada

*Can Urol Assoc J* 2019;13(6):E157-76. <http://dx.doi.org/10.5489/cuaj.5912>



American  
Urological  
Association

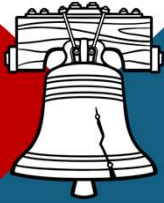
# Neurogenic Lower Urinary Tract Dysfunction: AUA/SUFU Guideline (2021)

- Ginsberg DA, Boone TB, Cameron AP et al: The AUA/SUFU Guideline on Adult Neurogenic Lower Urinary Tract Dysfunction: Diagnosis and Evaluation. J Urol 2021; **206**: 1097.
- Ginsberg DA, Boone TB, Cameron AP et al: The AUA/SUFU Guideline on Adult Neurogenic Lower Urinary Tract Dysfunction: Treatment and Follow-up. J Urol 2021; **206**: 1106.

# EAU Guidelines on Neuro-Urology

*EAU Guidelines. Edn. presented at the EAU Annual Congress Madrid 2025. ISBN 978-94-92671-29-5.*

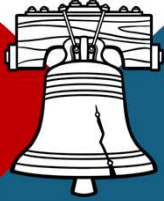
## 3.5 Urinary tract infection in neuro-urological patients



# Asymptomatic Bacteriuria

- Asymptomatic bacteriuria is common in those with SCI
- Antibiotic resistance is increasing
- **Do not screen for or treat asymptomatic bacteriuria in patients with neuro-urological disorders**
- Exceptions include pregnancy, colonization with urease-producing organism, and prior to certain urological procedures (e.g., urodynamics, cystoscopy)

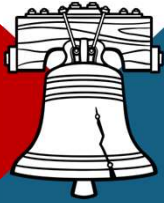




## UTI Definition

# Symptoms + Bacteriuria

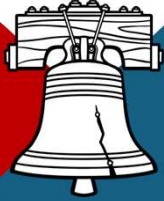
- The onset of new signs/symptoms accompanied by laboratory findings of UTI (e.g, bacteriuria, leukocyturia, and positive culture)
- No evidence-based cutoff laboratory values



# Significant Bacteriuria & UTI

- $>10^2$  cfu/mL – CIC
- $>10^4$  cfu/mL (clean void)
- Any detectable concentration in suprapubic aspirates

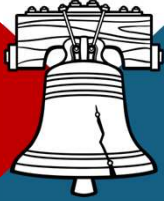




# Leukocyturia & UTI

- 100 WBCs/mL or any leukocyte esterase activity
- $\geq 10$  WBCs/HPF

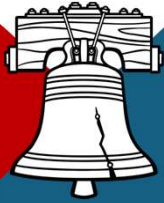




# CAUTI

- Indwelling catheter and presence of symptoms or signs compatible with UTI with no other identified source of infection along with  $10^3$  cfu/mL of  $\geq 1$  bacterial species





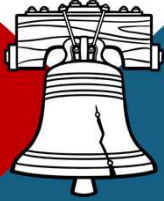
# CAUTI



Table 1. Urinary Tract Infection Criteria

Criterion	Urinary Tract Infection
SUTI 1a  Catheter-associated Urinary Tract Infection (CAUTI) in any age patient	<p><b>Symptomatic UTI (SUTI)</b> Must meet at least <b>one</b> of the following criteria:</p> <p>Patient must meet 1, 2, <u>and</u> 3 below:</p> <ol style="list-style-type: none"> <li>1. Patient had an indwelling urinary catheter that had been in place for more than 2 consecutive days in an inpatient location on the date of event AND was either: <ul style="list-style-type: none"> <li>• Present for any portion of the calendar day on the date of event<sup>†</sup>,</li> <li><b>OR</b></li> <li>• Removed the day before the date of event<sup>†</sup></li> </ul> </li> <li>2. Patient has at least <b>one</b> of the following signs or symptoms: <ul style="list-style-type: none"> <li>• fever (&gt;38.0°C)</li> <li>• suprapubic tenderness*</li> <li>• costovertebral angle pain or tenderness*</li> <li>• urinary urgency ^</li> <li>• urinary frequency ^</li> <li>• dysuria ^</li> </ul> </li> <li>3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of <math>\geq 10^5</math> CFU/ml</li> </ol>

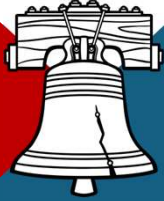




## Scenario 1

- **John is a 45 yo male with T12 paraplegia for five years.**
- **He has been in the hospital twice in the past 12 months for UTI.**
- **He presents to your office with urinary leaking in between intermittent cathing, cloudy urine, and is requesting antibiotics.**
- **Afebrile, no dysuria, no suprapubic tenderness.**

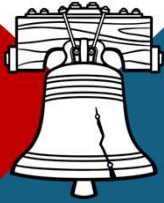
# Antibiotics????



# UTI Signs/Symptoms

## INTERNATIONAL SPINAL CORD INJURY URINARY TRACT INFECTION BASIC DATA SET – Version 1.0

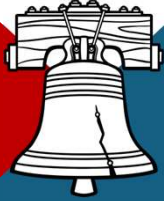
- **Cloudy, malodorous urine**
- **Pyuria/Leukocyturia**
- **Malaise, lethargy**
- Urgency and frequency
- **Fever**
- **Dysuria**
- **Suprapubic pain**
- **Flank/back pain**
- **New or increase in incontinence (including leakage around catheter)**
- **Increased spasticity and/or neuropathic pain**
- **Autonomic dysreflexia**



# UTI Diagnostic Evaluation

- **In patients with NLUTD who have signs and symptoms suggestive of a urinary tract infection, clinicians should obtain a urinalysis and urine culture. (*Moderate Recommendation; Evidence Level: Grade C*)**
- **Urine cultures should always be obtained prior to antimicrobial therapy due to the increased risk of nosocomial and multidrug-resistant microorganisms. (GOR A, LOE 2)**
- **Urine culture and urinalysis are the optimum tests for the diagnosis of UTI in neuro-urological patients. A dipstick test is more useful to exclude rather than to prove UTI and is not recommended.**

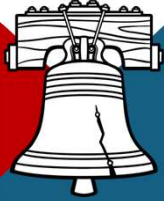




# UTI Diagnostic Evaluation

- In NLUTD patients with a suspected urinary tract infection and an indwelling catheter, clinicians should obtain the urine culture specimen after changing the catheter and after allowing for urine accumulation while plugging the catheter. Urine should not be obtained from the extension tubing or collection bag. (*Clinical Principle*)
- Any catheter in place for >2 weeks should be removed immediately and replaced, and the urine specimen should only be obtained from the new catheter before initiation of antimicrobial therapy.

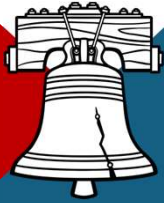




# UTI Diagnostic Evaluation

- If UTIs persist, then additional investigations, such as UDS or 3D imaging (US or CT), should be considered to rule out further complicating factors (e.g., elevated PVRs or bladder stones).
- **Recurrent UTIs in patients with neuro-urological disorders may indicate suboptimal management of the underlying functional problem. Improvement of bladder function as early as possible is mandatory. (LE 3)**

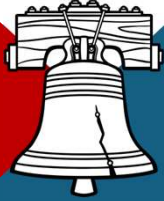




# UTI Diagnostic Evaluation

- **In NLUTD patients with a febrile urinary tract infection, clinicians should order upper tract imaging if:**
  - **the patient does not respond appropriately to antibiotic therapy.**
  - **the patient is moderate- or high-risk and is not up to date with routine upper tract imaging, regardless of their response to therapy.**  
(Clinical Principle)
- **In NLUTD patients with recurrent UTIs and an unremarkable evaluation of the upper and lower urinary tract, clinicians may perform urodynamic evaluation.** (Clinical Principle)

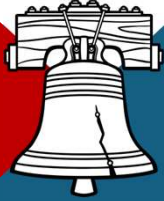




# UTI Treatment Selection

- The choice of antibiotic therapy should be based on the results of the microbiologic testing.
- If immediate treatment is mandatory (e.g., fever, septicemia, extensive AD), the choice of empiric treatment should be based on local and individual resistance profiles, as well as on results of previous cultures.
- In patients with afebrile UTI, an initial non-antibiotic treatment may be justified.
- Antimicrobial selection following culture collection should be based on local resistance patterns and antibiograms should be consulted when determining empiric therapy if required.

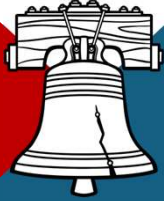




# UTI Treatment Duration

- UTIs in persons with neuro-urological disorders are by definition a complicated UTI; therefore, single-dose treatment is not advised. There is no consensus in the literature about the duration of treatment as it depends on the severity of the UTI and the involvement of the kidneys and prostate. Generally, a 5- to 7-day course of antibiotic treatment is advised, which can be extended up to 14 days according to the extent of infection.
- **A 7-day course of antimicrobials is recommended for patients with prompt clinical response and 10-14 days for those with significant infection or a delayed response. (GOR A, LOE 3)**

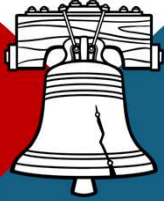




# UTI Prevention



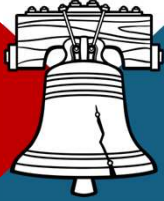
- **In patients with recurrent UTIs, optimize treatment of neuro-urological symptoms and remove foreign bodies (e.g., stones, indwelling catheters) from the urinary tract. (Strong)**
- **Low-dose, long-term antibiotic prophylaxis can reduce UTI frequency, but increases bacterial resistance. (LE 2a)**
- Intravesical gentamicin has been shown to reduce UTIs and oral antibiotic use, without increasing antimicrobial resistance.
- **There is currently no preventive measure for recurrent UTI in patients with neuro-urological disorders that can be recommended without limitations. (LE 3)**



# UTI Prevention



- **When possible, CIC should be used over other methods. (GOR A, LOE 2).**
- In patients with indwelling catheters, frequent violation of the closed drainage system increases the risk of UTI and should be avoided. The drainage bag and tubing should always be situated below the level of the bladder to avoid retrograde contamination.
- It is generally recommended that indwelling urinary catheters be changed every 2-4 weeks.
- **Routine antimicrobial prophylaxis for NLUTD UTI is not recommended for most patients. (GOR A, LOE 1)**
- Evidence is insufficient to recommend routine use of any non-antimicrobial prophylaxis measure, including phytotherapy (e.g., cranberry), probiotics, methenamine salts, urine acidification, D-Mannose, oral immunostimulation, or bacterial interference.



# UTI Prevention



- **In NLUTD patients who manage their bladder with an indwelling catheter, clinicians should not use daily antibiotic prophylaxis to prevent urinary tract infection.** (Strong Recommendation; Evidence Level: Grade B)
- **In NLUTD patients who manage their bladder with clean intermittent catheterization and do not have recurrent urinary tract infections, clinicians should not use daily antibiotic prophylaxis to prevent urinary tract infection.** (Moderate Recommendation; Evidence Level: Grade B)

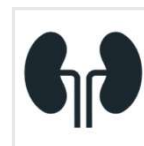
# Resources



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## Creating An Accessible World

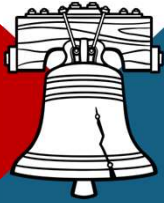
Self-advocacy for people with SCI/D



## Urinary Tract Infection

### Preventing Urinary Tract Infections (UTIs)

People with SCI may have neurogenic bladders, where the bladder doesn't work the usual way. It's normal for some bacteria to live in the bladder without causing problems, and they don't need treatment unless symptoms appear. Keeping the bladder from overfilling can help prevent infections.



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## Urinary Tract Infection (UTI)

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### Urology Facts

#### 1. **Bacteria in the Bladder**

Most people with nerve damage in the bladder have bacteria that live in it. These bacteria usually don't cause harm and actually help keep other, more harmful bacteria from taking over. You don't need to treat these bacteria unless they start causing symptoms.

#### 2. **When You Need Treatment**

Sometimes, it's necessary to treat the bacteria. For example:

- If the bacteria can form stones (like *Proteus* bacteria), or
- If someone is having a medical procedure that affects the bladder, like a cystoscopy or urodynamics test.

#### 3. **Fever and Infections**

Bacteria in the bladder usually don't cause a fever unless they reach the kidneys. If someone with a bladder infection has a fever, doctors need to find out if something else might be causing it.

#### 4. **Antibiotics for Prevention**

Taking antibiotics for a long time to prevent bladder infections isn't recommended, especially for people who use catheters (like a Foley catheter or a suprapubic tube). Using antibiotics too much can make the bacteria stronger and harder to treat if there's an infection.

#### 5. **Preventing Bladder Infections**

One of the main causes of bladder infections is letting the bladder get too full. It's important to empty the bladder before it gets too full or empty it often if using a catheter. Drainage bags should be emptied when they are  $\frac{1}{2}$  or less full.

#### 6. **Catheter Types and Infection Rates**

Using a suprapubic catheter has a similar rate of bladder infections as using intermittent catheterization (periodically emptying the bladder). Suprapubic catheters work better for draining the bladder than Foley catheters, which can cause more infections.

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### Choosing the Right Bladder Management Plan

Deciding on the best long-term bladder management plan should consider personal resources, job needs, sports, sex, and the latest medical options.

# Urinary Tract Infection and Spinal Cord Injury

March 2017

www.msktc.org/sci/factsheets

SCI Fact Sheet

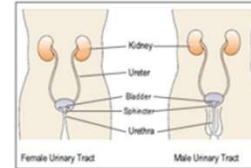
If you have a spinal cord injury (SCI), you have a higher risk for urinary tract infection (UTI). UTI is one of the most common medical problems after SCI. This fact sheet explains your risk for UTI, how to best prevent it, and what to do if you get it.

## What is a urinary tract infection?

A urinary tract infection (UTI) is an infection in your urinary system. This system includes your kidneys, ureters, bladder, and urethra.

## What causes UTI?

The most common cause of UTI starts when bacteria enter the bladder through the urethra. The bacteria may multiply in the bladder to become UTI.



## What are bacteria?

Bacteria are tiny, living organisms. Good bacteria in your body help you to digest food and protect you from bad bacteria. Bad bacteria cause infections and make you sick.

## Is UTI common after spinal cord injury (SCI)?

Yes. Here are 3 of the more common reasons people with SCI develop UTIs.

1. Most people lose normal urinary function after SCI. They need a bladder management option to empty the urine from their bladder to keep their bladder and kidneys healthy. Most bladder management options make it easier for bacteria to enter the bladder through the urethra.
  - Please read "[Bladder Management Options Following Spinal Cord Injury](#)" to learn more about normal urinary function, how it changes after SCI, and bladder management options.
2. Most people lose normal bowel function after SCI, and contact with stool is common during bowel management. Stool has bacteria that can cause a UTI. UTIs are often caused when bacteria from stool gets into the bladder when the bladder is being emptied.
  - Please read "[Bowel Function after Spinal Cord Injury](#)" to learn more about normal bowel function, how it changes after SCI, and bowel management options.
3. Once in the bladder, bacteria are hard to get rid of. People with normal bladder function can usually get rid of most bacteria by fully emptying their bladder when they urinate. However, many people with SCI can't fully empty their bladder, even with good bladder management. This allows bacteria to stay in the bladder almost all of the time, making it easier for a UTI to develop.

## What is my risk for UTI?

Anyone can get UTI. However, people with SCI have a higher risk than normal.

- People with SCI who use an indwelling Foley or suprapubic catheter may be at higher risk for UTI than those who use a clean intermittent catheterization technique or have an external sheath or condom catheter.
  - Talk to your health professional about lowering your risk for UTI if you average more than one UTI per year. Your health professional may suggest another method of bladder management that works better for you.
- Women may be at a higher risk for UTI than men because a woman's urethra (see diagram above) is shorter and located closer to the anus. This can make it easier for bacteria from the colon to enter the bladder through the urethra.

The contents of this fact sheet are based on research evidence and/or professional consensus and has been reviewed and approved by an editorial team of experts from the Spinal Cord Injury Model Systems, which is sponsored by the National Institute on Disability, Independent Living, and Rehabilitation Research (See [www.msktc.org/sci/model-system-centers](http://www.msktc.org/sci/model-system-centers) for more information).



SPINAL CORD MEDICINE

BLADDER  
MANAGEMENT

CONSUMER GUIDE:

# Bladder Management Following Spinal Cord Injury: What You Should Know

**A Guide for People  
with Spinal Cord Injury**

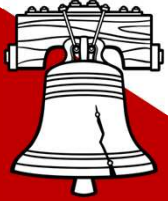
consortium for  
**SPINAL CORD  
MEDICINE**  
CLINICAL PRACTICE GUIDELINES  
Administrative and financial support provided by Paralyzed Veterans of America

Academy of  
Spinal Cord Injury  
Professionals, Inc.<sup>™</sup>  
Many Minds. One Vision.



### **UroSTeP: Urology**

UroSTeP, ASIA's newest online learning tool features Urology Standards for physicians, medical students, residents, nurses, and nurse practitioners who participate in caring for spinal cord injury patients experiencing neurogenic dysfunction.



# Q & A

**THANK YOU!**

**Last updated 3/17/2026**

**More at:**

**<https://www.academyscipro.org/advocacy/>**