

SCI and the CAUTI Quality Measure

DOES THE CURRENT FORM OF CAUTI SURVEILLANCE PROVIDE ANY BENEFIT FOR SCI?

Can we prevent UTIs by promoting earlier transition from Foley catheters to intermittent catheterization (IC)?

SCI patients experience the SCI-Immune Deficiency Syndrome (SCI-IDS), a profound deficiency that is most pronounced in those with more severe neurological impairment, and in the early stages of initial injury.¹⁻⁵ This demographic is also closely tied to indwelling catheter use.⁶ This represents an obvious confounder that could be expected to skew research results to favor IC.

A recent systematic review⁷ found that the overwhelming majority of articles in the SCI literature do not report higher rates of UTI with indwelling catheters compared to IC. Articles with statistically significant findings (and those with non-significant “trends” in favor of IC) were found to be at high risk of bias related to this confounding influence. In other words, the scientific literature argues against the notion that transitioning from indwelling to IC is an effective means of preventing UTI. In fact, several studies actually found higher rates of UTI in those using IC⁸⁻¹³, one of which reached statistical significance.⁹

Can the NHSN’s CAUTI Quality Measure provide a meaningful estimate of UTIs in the SCI population?

Most SCI patients cannot safely empty their bladder voluntarily. They typically require some sort of instrumentation (indwelling or intermittent catheterization, sphincterotomy, etc.)¹⁴⁻¹⁶ These interventions fail to produce lower UTI rates than indwelling catheters.^{8,9,12,14,17-24} However, the CAUTI quality measure only tracks CAUTI related to urethral indwelling catheters.

Since 2014, numerous Neuro-ICUs around the country have adopted aggressive indwelling catheter removal policies, transitioning to IC in the SCI population.²⁵⁻³⁰ These Neuro-ICUs with SCI patients can claim they achieved “zero CAUTIs,” even while the literature suggests they are trading one category of CAUTI for another, unmeasured category of CAUTI.

The CDC suggests it performs risk adjustment for SCI. Unfortunately, it fails to adjust for the most important confounder: duration of indwelling catheterization (duration is an *optional* field on the CAUTI reporting form). Thus, adequate risk adjustment cannot occur for SCI. In its current form, the CAUTI measure can only provide an *inherently inaccurate estimate* of CAUTI incidence in this population.

Can we prevent CAUTIs by promoting better Foley catheter insertion and maintenance in SCI patients?

- The studies of “catheter bundles” that have shown improved infection rates combine elements of catheter insertion with elements directed at expeditious catheter removal. Reduction of catheter usage and duration appear to be the only intervention that has consistently demonstrated benefit in reducing CAUTIs in short-term catheter users.³¹ However, those with SCI are not short-term catheter-users. They typically do not achieve normal bladder emptying, so catheter removal is not a reliable means of CAUTI reduction.

- Eight systematic reviews (including the CDC’s CAUTI guidelines)³²⁻³⁹ of the various individual elements of catheter insertion and maintenance document their *consistent failure* to demonstrate any significant UTI reduction when compared to usual practice. Likewise, various available types of catheters and coatings have consistently failed to demonstrate significant improvement in symptomatic UTI.⁴⁰⁻⁴⁵

- Saint et al, 2016 conducted a very large study involving hundreds of hospital wards that failed that to show a benefit in UTI risk in units that focused on Foley insertion and maintenance but did not remove Foleys.⁴⁶ These findings were duplicated in a followup study in 2020⁴⁷ – without catheter removal, there did not appear to be any change in CAUTI rate.

Does performance on the NHSN’s CAUTI Quality Measure reflect quality of care for this population?

- It appears that the only way to score well on this measure is to reduce duration of catheterization, adopting the one-size-fits-all approach of switching all SCI patients to IC – which does not appear to reduce UTI rates.

- However, the Consortium for Spinal Cord Medicine clinical practice guidelines for SCI neurogenic bladder⁶ discuss the risks and benefits of the various bladder management methods in great detail, recommending a patient-centered, tailored approach that accounts for each individual’s living situation and personal preferences.

- A significant portion of SCI patients cannot perform IC independently.^{15,48} Transitioning these patients from indwelling to intermittent catheterization creates barriers to community reintegration and can adversely affect quality of life.⁴⁹⁻⁵²

- The majority of patients who are discharged from the hospital on intermittent catheterization but cannot do so independently choose to return to indwelling catheters after discharge, citing concerns about dependence on caregivers and leaking between catheterizations.^{53,54}

In summary, the CAUTI measure is more likely to penalize hospital units that practice guideline-congruent, patient-centered care, while rewarding units that adopt a one-size-fits-all approach that fails to reduce UTI rates and that can introduce other problems.

RISKS INHERENT TO CURRENT METHOD OF CAUTI QUALITY MEASUREMENT AND INCENTIVES:

- Autonomic Dysreflexia (AD):

- seen in 50-90% of SCI patients⁵⁵⁻⁵⁷

- most common cause is bladder overdistension.^{56,58} Overdistension is a reliable, consistently reproducible trigger for AD,^{59,60} and the blood pressure rises increasingly as bladder volume increases.⁶⁰

- If untreated/unresolved, AD can result in symptomatic hypertension with BPs exceeding 200/120. This can be associated with the types of catastrophic outcomes that would be expected for this extreme HTN (stroke, seizure, death)^{56,61}

- Renal Deterioration due to high bladder pressures and reflux:

- Renal failure due to high bladder pressures and inept bladder drainage was the *most common cause of death* in SCI in the 1940s-1950s -- (38% of SCI deaths)⁶²

- In the *general population*, bladder scanners are used to measure post-void residuals (PVRs) to assess adequacy of bladder emptying. PVRs are frequently followed those with SCI as well, but PVRs do not predict future renal health or correlate with any meaningful long-term outcome in SCI.⁶³ Low PVRs often give hospital staff a misleading sense of reassurance in SCI.

Clinical Practice Guidelines:

- **The CDC's CAUTI guidelines from 2009**³² acknowledge that the evidence supporting a benefit to alternatives to Foley catheters in SCI is "very low quality." (p 34) They include a weak recommendation to "Consider alternatives to chronic indwelling catheters, such as intermittent catheterization, in spinal cord injury patients." (p 11) This is a Category II recommendation. The Category II designation indicates the recognition of a "trade off between clinical benefits and harms" (p 10) and is therefore "not intended to be enforced." (p 32) If the CDC had been confident that the benefits outweighed harms, this recommendation would have been assigned a "Category IB" designation. Thus, it appears that in 2009, the CDC recognized that the benefits of alternatives to indwelling catheters may not outweigh the risks, and that penalties should not be used to encourage Foley removal in this population.

- **American Urological Association's CPGs for Urodynamics**⁶³ recognize that bladder distension is a common trigger for Autonomic Dysreflexia (AD), acknowledge that AD can be life-threatening, and recommend that a urologist who performs this procedure that reliably triggers AD in susceptible patients "must be prepared to monitor, promptly detect and initiate rapid treatment in the event AD occurs."

If this is such a problem, why aren't Infection Preventionists reporting adverse events in SCI patients?

CDC has expressed skepticism about reports of adverse events from SCI providers – based on a lack of events reported by their Infection Preventionists. However, nonspecialty hospital staff (physicians and nurses) are not well-versed in recognizing, preventing, and treating the complications that predictably occur with Foley removal in SCI patients. Furthermore, the resulting adverse events are often latent in onset and do not typically manifest themselves until after hospital discharge.

- There is a well-documented lack of expertise recognizing and treating AD.⁶⁴⁻⁷⁰ This would be expected to lead to problems with under-reporting of AD among precisely the healthcare providers who are most likely to inadvertently adopt practices that could trigger AD.

- Educational initiatives to teach non-SCI-specialty staff about AD have met with very limited success^{66,68,70}

- Lack of expertise in understanding safe bladder management methods in SCI.⁷¹ This is even reported among non-specialist urologists⁷² and general rehabilitation staff.⁷³⁻⁷⁶ ACGME requirements for general Rehabilitation Medicine and for Urology residency programs contain little or no emphasis on SCI neurogenic bladder,⁷⁷⁻⁷⁸ thus accounting for variable degrees of exposure and expertise.

- SCI patients present with varying degrees of paralysis and sensation, making the recognition of safe vs unsafe bladder emptying quite complex. Since patients themselves typically lack normal bladder sensation, they cannot reliably report symptoms of dysfunction. Non-specialty staff often mistake overflow incontinence with volitional voiding at safe pressure. ^(unpublished survey data)

- A substantial portion of these patients never gain access to SCI specialty care.^{79,80} Since these patients face transportation barriers that limit access to outpatient medical followup,⁸¹ tracking the frequency of these adverse outcomes would be exceedingly difficult.

- Even in cases when intermittent catheterization (IC) orders are entered correctly, non-specialty nursing staff often have difficulty with safe IC implementation due to the challenges related to overflow incontinence and reflex bladder contractions with uncontrolled emptying. ^(unpublished survey data)

- For most with SCI, the propensity to develop AD does not manifest until weeks after the initial injury. Renal dysfunction typically has an even longer latency. This delay prevents acute hospital staff from learning from adverse events related to their inappropriate bladder management.

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