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# Barriers and facilitators to optimising inpatient bladder management after spinal cord injury

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## Abstract

**Study design** Qualitative survey.

**Objectives** Examine clinicians' perspectives on adherence to published evidence-based guidelines and clinician-perceived barriers, and facilitators to optimising inpatient bladder management within one Spinal Cord Injury (SCI) service.

**Setting** Surgical Hospital (acute care) and SCI Unit (sub-acute, rehabilitation) in Western Australia (WA).

**Methods** Clinicians reviewed an 'Evidence Matrix' summarising published clinical practice guidelines and recommendations for SCI bladder management. Focus groups examined the extent to which current practice adhered to recommendations and identified perceived barriers and facilitators to optimal management. Data were analysed thematically using a deductive approach.

**Results** Current management closely mirrors published recommendations. Key facilitators included long-standing prioritisation of rapid progression from urethral indwelling (IDC) to a 6 hourly intermittent catheterisation (IC) protocol; regular competency audits of catheterisation technique; and a Spinal Urology Clinical Nurse Consultant (CNC) position. Barriers included limited resources/staffing; restricted access to Neuro-urology consultation; inter-disciplinary communication gaps; and delays in determining and implementing long-term bladder management.

**Conclusions** Inpatient SCI bladder care in WA closely emulates published evidence, although adherence at other sites may reveal different practices. Bladder management was found to have been facilitated by a strong culture of practice led by Neuro-urologists, informed by evidence and embraced by Senior Clinicians. Further reduction in duration of initial IDC, provision of early and ongoing Neuro-urology consultations as part of standard care, increased interdisciplinary communication and dedicated SCI Urology theatre lists would further optimise management.

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## Introduction

After spinal cord injury (SCI), changes in bladder function are associated with altered urinary voiding dynamics, bladder hypoperfusion, damage to the urothelial barrier and dysregulated inflammatory responses render patients susceptible to urinary tract infection (UTI) and other urological complications [1].

Initial management is directed at preventing bladder over-distension, usually by indwelling catheterisation (IDC), to allow continuous drainage until post-injury diuresis resolves, often at 7–10 days [2]. Subsequent management varies according to clinical presentation, hospital policy and patient preference. During in-patient stay, although IDC may still be required for some patients, research evidence shows that intermittent catheterisation (IC) may reduce UTI risk [3–6]. Indeed, our recent cohort study demonstrated associations between longer duration of

IDC, earlier occurrence of UTIs and higher UTI rates [7]. While IDC is associated with a high urological complication rate [8] and IC is generally preferred [9, 10], early IC is not always practiced [11]. A recent study on SCI bladder management in Australia and New Zealand reported variation in catheterisation methods between centres and highlighted gaps between evidence and practice [12]. Perceived challenges to implementing best practice included social, economic, and resource factors.

As a follow-up to that study [12], we therefore conducted an investigation to 1) examine the extent to which recommendations in published SCI bladder-related clinical practice guidelines are followed and 2) determine Clinician-perceived barriers and/or facilitators to optimising bladder management, during acute care and sub-acute rehabilitation at one centre following new traumatic SCI.

A number of quantitative studies have investigated outpatient (chronic) neurogenic bladder management by engaging with consultant urologists, for example using a national data base [13] and written surveys [14–17]. Our investigation is qualitative in nature and extends these findings by examining in detail the approaches of complete medical and nursing teams in the delivery of bladder care during the entire in-patient journey.

## Methods

This paper is reported in accordance with the Consolidated Criteria for Reporting Qualitative Research [18].

### Approach

A qualitative approach incorporating focus groups was taken, since this is amenable to in-depth discussion that can provide practical answers to questions relevant to clinicians and policy makers.

### Participant recruitment

Purposive sampling was undertaken to explore a range of views held by Clinicians involved in post-SCI inpatient care in Western Australia (WA). Senior staff at the two hospitals managing SCI in the state distributed written invitations and study information to senior and non-senior medical and nursing staff in relevant positions. Eleven focus groups were held, attended by 44 consenting staff at the ‘Surgical Hospital’ (Royal Perth Hospital): 1 Spinal Registrar, 6 Senior Nurses: 5 in Orthopaedics, 1 in Intensive Care; and at the ‘SCI Unit’ (Fiona Stanley Hospital): 2 Spinal Rehabilitation Consultants, 3 Neuro-urologists, 10 Senior Nurses, 16 Registered/Enrolled Nurses. The sample of 44 participants represented ~70% of relevant nursing and medical staff.

## Procedure

Focus groups were semi-structured, allowing exploration of emerging themes and salient issues in relation to optimal bladder-related clinical practice [19]. Prior to focus groups an ‘Evidence Matrix’ [20] (Supplementary File 1) summarising findings from a recently published systematic review of SCI bladder management guidelines [21] was distributed to medical and nursing staff in relevant positions at the Surgical Hospital and SCI Unit. Care was taken to group participants in a way to minimise reservations in responding associated with seniority hierarchies. Each focus group, of ~1 h duration, was led by an independent facilitator with a nursing background, audio recorded and attended by female authors with more than 50 years research and 40 years clinical experience collectively (Clinical Researchers: LG, background in Neuro-physiotherapy, and GK, SCI background in Nursing; and Professor of Research: SD, background in basic and clinical neurotrauma research). The authors, who were acquainted with some of the Participants in each focus group, introduced themselves and outlined the study objectives, procedures and intended methods for data analysis. Participants were assured that anonymity would be protected and the Chatham House Rule was observed [22], so that participants were aware they could speak freely about their personal views, without comments being attributed to specific individuals or interpreted as being representative of an institution/employer. The facilitator asked semi-structured questions, using an interview guide developed by the research team and pre-tested at the SCI Unit (see Fig. 1). Questions were based on elucidating the extent to which practice aligned with evidence, exploring Clinicians’ reflections on barriers and facilitators of practice and on how management might be optimised. After 11 focus groups involving 44 participants, ‘saturation’ was reached, with no new themes arising.

### Data analysis

Interview recordings were transcribed verbatim, with data de-identified, coded and analysed thematically by a deductive approach [23], using computer-assisted qualitative data analysis software (NVivo11, QSR International) [24]. Thematic analysis focused on current practice in relation to the Evidence Matrix [20] (Supplementary File 1), barriers and facilitators to practice and potential change strategies. Transcripts were coded according to these themes and emerging relevant topics. Initially, two randomly selected transcripts were independently coded by two authors (LG & GK), who were previously aware of the main policies for inpatient SCI bladder management in WA, but not the extent to which these were adhered to in

## Interview Guide

Participants were asked the following questions. The prompts in italics, and other questions, were asked as necessary to encourage elaboration of answers or explore responses further.

### Questions

*Prompts to use as needed (optional)*

1. **How are you/your colleagues/your department doing an excellent job in SCI bladder care generally?**

*What is working really well, i.e. that you most pleased with / proud of?*
  
2. **How are you/your department doing in terms of mirroring published best practice ('SCI Bladder Care Recommendations Matrix')? Specifically:**
  - **How closely do your/your department's practices mirror the Recommendations?**
    - Intermittent catheterisation
 

*Do you feel that appropriate patients are encouraged to undertake CISC?*
    - Indwelling catheterisation
 

*What factors determine whether patients have SPC/continue IDC? How are these decisions made and at what stage of rehab?*
    - Assessment
 

*Do patients on CISC receive training as per the guidelines? Do staff teaching patients CISC receive training as per the guidelines*
    - Education/training
 

*Do patients on CISC receive training as per the guidelines? Do staff teaching patients CISC receive training as per the guidelines*
  - **Where practices match Matrix recommendations, do they match entirely/consistently?**
  
3. **What has facilitated this high standard of care/practice?**

*Are there systems / training programs / protocols that are particularly effective?  
What do you think is working well?*
  
4. **Are there any barriers/challenges you believe limit the ability of this service to follow particular recommendations in the matrix?**
  
5. **What would make it easier or help you/your colleagues to optimise SCI bladder care or ensure practices are in line with published best practice?**
  
6. **If you had the power to provide anything at all to facilitate/support the implementation of these recommendations, what would it be?**

**Fig. 1 Interview guide for focus groups.** Questions (1–6) are shown in bold on the left side of the figure, with prompts (optional, used as necessary) shown in the boxes on the right.

practice. These authors then met to resolve discrepancies and refine the coding framework (Table 1) before analysing all transcripts. To maximise trustworthiness, two Investigators (LG & GK) met several times to discuss and refine categorisation, minimising interpretation error by continually referring back to transcripts and checking accuracy.

## Results

### Current bladder management practice

In WA, acutely injured patients with SCI are admitted to the Surgical Hospital where initial bladder management is by

**Table 1** Coding framework for data analysis.

CATEGORY
<b>WORKING WELL, FACILITATORS</b>
Assessment
Catheterisation
IDC, SPC
CISC
Staff-IC
Other Treatment (e.g., med's)
Patient education & training
Staff training & expertise
Systems
<b>WORKING LESS WELL, BARRIERS</b>
Assessment
Catheterisation
IDC, SPC
CISC
Staff-IC
Other treatment (e.g., med's)
Patient education & training
Staff training & expertise
Systems
<b>PRACTICES NOT CLEARLY NEGATIVE/POSITIVE</b>
<b>IDEAS FOR IMPROVEMENT</b>
Catheterisation
Education
Research suggestions
Resources and systems
Other treatment
<b>PRE-LUBRICATED/HYDROPHILIC CATHETERS</b>
Arguments for using these
Barriers to using these
<b>SILICON VS LATEX INDWELLING CATHETERS</b>

IDC. Once medically and orthopaedically stable, patients are transferred to the SCI Unit for rehabilitation, including urodynamic bladder assessment and specialist bladder management. At the SCI Unit, if there are no contraindications, such as sepsis, urethral trauma or a requirement for surgery, the IDC is generally removed. Unless/until satisfactory spontaneous voiding returns, that is with minimal associated post-void residual volumes on ultrasound scanning and acceptable detrusor pressures according to Urology review of urodynamic assessment, patients are managed by nursing staff-administered IC ('staff-IC'). The staff-IC regimen involves complete bladder emptying at least 6 h to reduce infection risk due to stasis, in combination with controlling fluid intake to prevent bladder volumes over 500 mL and upper urinary tract damage. Staff-IC is usually continued until long-term management is implemented;

preferably by clean intermittent self-catheterisation (CISC), otherwise via suprapubic catheterisation (SPC), which may be suitable when hand function is very limited, promoting functional independence; or, much less frequently due to known association with increased risk of UTI, via IDC.

### Extent to which best practice management is followed

Clinicians reported that in-hospital bladder management closely mirrors the Evidence Matrix, with close adherence to recommendations across all three categories: catheterisation, assessment and patient education/training.

Practice differed partly from one recommendation with 'B' grade evidence: patient education and training in CISC is extensive, but not 'standardised', and the quality and quantity of teaching and follow-up is inconsistent, depending on staffing levels and experience. The only other differences were in relation to recommendations with '0' grade evidence: catheters are not always changed prior to urine collection for pathology testing; sterile technique is not considered for individuals conducting CISC experiencing recurrent UTIs; and standard polyvinyl rather than pre-lubricated/hydrophilic catheters are used for IC.

### Barriers and facilitators to optimal management

In relation to all Evidence Matrix recommendations, and to additional aspects of bladder care, the following major themes concerning key areas of service delivery with potential to impact urological health outcomes were identified (Table 2 lists all barriers and facilitators, and additional representative quotes):

### Surgical hospital

Clinicians described consistent acute management according to hospital protocol and Nursing Practice Standards.

#### Theme 1.1: Catheterisation is limited to IDC

Urethral IDC is used predominantly, unless contraindicated, such as in the rare event of concomitant pelvic trauma/urethral injury, when SPC may be implemented. For patients with severe cervical injury, while SPC may be appropriate long-term management, this option is usually only considered during rehabilitation at the SCI Unit.

Staff-IC is not conducted at the Surgical Hospital despite recommendations indicating, and SCI Unit Neurourologists in agreement, that it is safe and beneficial after resolution of diuresis and once the patient is medically stable. Clinicians described several perceived barriers to

**Table 2** Perceived facilitators and barriers to optimal practice at each site and representative participant quotes.

SITE	FACILITATORS OF OPTIMAL PRACTICE BY THEME and "Representative Quotes"	BARRIERS TO OPTIMAL PRACTICE BY THEME and "Representative Quotes"
Surgical Hospital	<p>Theme 1.1: Catheterisation is limited to IDC</p> <p>Protocol for IDC is straight-forward and closely adhered to</p> <p>"IDC's are used... we follow the acute spinal Nursing Practice Standards and we change their catheters weekly"</p> <p>Silicone catheters are used for IDC (appropriate for IDC durations &gt;2 weeks)</p> <p>"From ED they're standard latex ones, but the ones we put in in theatre are almost routinely the silicone ones with a temperature probe"</p> <p>Theme 2.1: Health service changes have impacted delivery of care</p> <p>"...the advantage of having the single rooms", allowing night-time ICs without disturbing other patients (NB: Single rooms were also identified as a barrier:</p> <p>"So you're doing an IC, you're under stress, because the bell's going outside and you can't get back to the other [patient]...")</p>	<p>Theme 1.1: Catheterisation is limited to IDC</p> <p>Barriers to commencing staff-IC when patient medically stable:</p> <ul style="list-style-type: none"> <li>*Critically unwell patients "...urological concerns are understandably put to one side"</li> <li>*Patient's mental/emotional state: "They are already dealing with so much"</li> <li>*Lack of resources "we need more Nurses", staff education and expertise on staff-IC</li> <li>*Multiple interventions already: "...it's a procedure... and you've got someone potentially poly-traumatised, then you're doing repetitive catheters and suddenly, 'oh, we're doing one at midnight', and 'we can't get it back in'"</li> <li>*Assumption that SCI Unit staff prefer to instigate IC</li> <li>"...we tend not to because we find that they go down to rehab and they're like, why have we started doing that, when we need to do this and that, so we don't bother"</li> <li>*Absence of mechanism for neuro-urological consultation. Doctor: "I think there needs to be a protocol to be involved earlier"</li> </ul> <p>Theme 2.1: Health service changes have impacted delivery of care</p> <p>Urology consultation is by referral only (weekly review was previously standard care)</p> <p>"So it's no longer the overarching medical support... I think that has an impact on care"</p>
SCI Unit	<p>Loss of experienced Clinical Nurses (CNs) with relocation of SCI Unit in 2014</p> <p>"...CNs then shifted to other areas"</p> <p>Education for new Nurses now generated centrally by hospital rather than by SCI Unit educators</p> <p>"...you're given these online things you can do, but they don't get checked, so nobody does it"</p> <p>"...guidelines need to be clearer, particularly (for) new staff..."</p> <p>Theme 2.2: Maintaining high-standard staff-IC is increasingly challenging; Theme 2.3: Determining appropriate long-term bladder management is complex</p> <p>"The Spinal Urology CNC is over-stretched... I think we currently are not resourced enough to provide the best evidence-based care to both inpatients and outpatients"</p> <p>Nurses sometimes unaware of policy changes/updates</p> <p>"I don't know, I heard that along the grape vine"</p> <p><b>BARRIERS, Theme 2.2 and 2.3 contin.</b></p> <p>Too few Nurses experienced in sterile staff-IC, related fluid intake/output monitoring and CISC training per shift, which "...impacts our ability to educate our patients"</p> <p>Lower than optimal nursing-patient ratios</p> <p>"It's rushed like everything else. (Patients) probably don't get enough time spent with them."</p>	<p>Loss of experienced Clinical Nurses (CNs) with relocation of SCI Unit in 2014</p> <p>"...CNs then shifted to other areas"</p> <p>Education for new Nurses now generated centrally by hospital rather than by SCI Unit educators</p> <p>"...you're given these online things you can do, but they don't get checked, so nobody does it"</p> <p>"...guidelines need to be clearer, particularly (for) new staff..."</p> <p>Theme 2.2: Maintaining high-standard staff-IC is increasingly challenging; Theme 2.3: Determining appropriate long-term bladder management is complex</p> <p>"The Spinal Urology CNC is over-stretched... I think we currently are not resourced enough to provide the best evidence-based care to both inpatients and outpatients"</p> <p>Nurses sometimes unaware of policy changes/updates</p> <p>"I don't know, I heard that along the grape vine"</p> <p><b>BARRIERS, Theme 2.2 and 2.3 contin.</b></p> <p>Too few Nurses experienced in sterile staff-IC, related fluid intake/output monitoring and CISC training per shift, which "...impacts our ability to educate our patients"</p> <p>Lower than optimal nursing-patient ratios</p> <p>"It's rushed like everything else. (Patients) probably don't get enough time spent with them."</p>
SCI Unit contin.	<p>Expert Nursing Staff with good understanding of SCI bladder care and good time management</p> <p>Doctor: "I think we do it well because we've been doing it for a long time, so we have certain established processes..."</p> <p>Nurse new to SCI Unit: "...you guys have a standard and it is exceptional, it's the best I've seen" have to the management of bladders"</p> <p>Nursing Staff "work as a team" and "give each other constructive criticism"</p> <p>Effective Nursing Staff education: "...it's this history of having a dedicated Spinal "Urology head of department... and having the Urology CNC on the floor so much... and switched on CNs who know exactly what they're doing..."</p> <p>Competency assessments for new Nurses; annual audits of IC technique for all Nurses: "...new Nurses have to through their competencies... when they're comfortable enough... they do it themselves under supervision"</p>	<p>Barriers to patients understanding/retaining educational messages:</p> <ul style="list-style-type: none"> <li>*Education in CISC is not standardised: "The way that I teach patients, could be completely different to the next Nurse"; "There needs to be better guidelines or clarity as far as us teaching patients, and we need to be taught to teach them"</li> <li>*Gaps in patient training due to inconsistencies, time pressure for Nursing Staff; limited information materials (a lack of digital education resources)</li> <li>*Insufficient mental capacity (e.g., brain injury), prior mental health and/or addiction issues affecting compliance/learning/consistent effort</li> <li>*Poor motivation/mental health, denial/acceptance issues (expecting functional recovery), competing priorities: "These patients are going through so much affecting every single system of their body, the bladder's the last priority"</li> </ul>



Table 2 (continued)

SITE	FACILITATORS OF OPTIMAL PRACTICE BY THEME and "Representative Quotes"	BARRIERS TO OPTIMAL PRACTICE BY THEME and "Representative Quotes"
	<p>Careful patient monitoring and thorough Nursing hand-overs (help prevent IC complications)</p> <p>"...if there is a problem we're able to, say, go down to a 4 h IC as opposed to a 6 h IC, and it is part of the main hand over"</p> <p>"...so we would hand over that that's a low IC, so bring the next one forward, so maybe 11 o'clock as opposed to 12 o'clock. We're always monitoring the balances cos night staff get quite large volumes sometimes, because the patient started getting up in the chair..."</p> <p>"Best practice" long-term bladder drainage method is recommended by Consultant, but "the patient ultimately makes the final decision"</p>	<p>Barriers to appropriate/timely decision on long-term management:</p> <p>*Lack of clinical guideline to determine suitability of long-term CISC: "The biggest current challenge in SCI bladder care"</p> <p>*Lack of clear reporting mechanism (to consultant) when patient is struggling to achieve CISC</p> <p>*Disagreement on whether certain patients should persevere with CISC: "...it's been tried for months and months, despite nurses saying he is not compliant - he can not do it"</p> <p>*Nurses' perspective/patients' wishes not always considered in management decisions: "I get urodynamic reports, and they're high level quad's, and I'll write on there, 'need to explore other bladder emptying, i.e., SPC', and (the Neuro-urologist) just crosses it out and writes 'patient needs to do learn CISC'"</p> <p>*Difficulty in balancing 'best practice' with each patient's unique situation</p> <p><b>BARRIERS, contin.</b></p>
SCI Unit contin.	<p><b>FACILITATORS, Theme 2.2 and 2.3 contin.</b></p> <p>Facilitators to patient education on CISC:</p> <p>*The Patient Educator role: "No other spinal unit in Australia has a Patient Educator"</p> <p>*Nursing Staff with high-level expertise in CISC training</p> <p>*Some patients able to "adapt very well"</p> <p>*Excellent male/female anatomy models for patient education and training</p> <p>*Continuous informal CISC training starts during staff-IC period, ensuring patients become familiar with and understand it; plus ongoing evaluation and revision</p> <p>*Consulting Neuro-urologists' strong support for CISC: "...trying to make sure that we throw everything at them to enable them to do it"</p> <p>*Coordinated input from specialities, including Urodynamics, Occupational Therapy, Psychology and Pharmacy, to help patients achieve CISC</p> <p>*Patients gain perspective during Urodynamic and cystoscopy assessments (viewing bladder function on-screen)</p>	<p>Barriers to patients mastering CISC:</p> <p>*Being older/obese/having pre-existing comorbidities/mobility issues, difficulty viewing/reaching the genitals: "They're not simple cases, there's so many things happening in each patient"</p> <p>*Emotional vulnerabilities associated with young age (15-18 years)</p> <p>Theme 2.4: Delayed implementation of suprapubic catheterisation</p> <p>Delays committing to SPC: patient not fit for general anaesthetic/surgery or emotionally ready, or Neuro-urologist reluctant to implement too early</p> <p>"...sometimes a bit confronting, too early in the piece"</p> <p>"But on the other hand you get people who don't want the SPC because they're waiting for their spinal shock, or return, or they're hoping that their bladder function will come back"</p> <p>"Neuro-urologists have historically minimised the use of indwelling catheters at the SCI Unit due to the potential for bacterial colonisation"</p>
	<p>Other/general facilitators</p> <p>Staff keeping abreast of SCI research (e.g., by attending annual 'Australian &amp; New Zealand Spinal Cord Society' scientific meetings)</p> <p>"... it's good to see the research is being done to prove that what we do is actually working"</p>	<p>Theatre waitlists delay SPC insertion; patients being discharged from hospital with IDC in situ for weeks/months awaiting SPC</p> <p>"They just go in the general Urology list... there are people there who need urgent urological theatre - who's going to get bumped off?"</p>
Both Sites	<p>Other/general facilitators</p> <p>Staff consistently follow hospital Nursing Practice Standards</p> <p>"I guess it's an awareness, if that's what the practice standards says, then we should be doing it because it's best practice"</p>	<p>Standard polyvinyl catheters used for IC, despite known advantages of more costly pre-lubricated catheters</p> <p>"...we're not talking about the right to have something fancy. We're talking about the basic human right to pass your urine clear, and not get infections and have issues relating to it. At the end of the day, we're talking about the right to pee."</p> <p>Tolteridime is not prescribed, despite advantages over oxybutimin:</p> <p>"It's too expensive, it's not on the PBS (Pharmaceutical Benefits Scheme)"</p> <p>Theme 2.1: Acute care and rehabilitation are delivered by different hospitals</p> <p>The separation of acute care and rehab impacts continuum of care</p> <p>"At least with Royal Perth and Shenton Park we were the same hospital, there was a lot more communication"</p> <p>Inconsistently changing IDC prior to CSU collection: "...it depends on the severity of the (UTI) and if they're quite unwell. If they're not, we'll just do a clamp and catch."</p>

staff-IC (see Table 2), however, Senior Nurses expressed a willingness to conduct staff-ICs if this policy were to be adopted and adequate education provided.

### **Theme 1.2: Acute care and rehabilitation are delivered by different hospitals**

Care being delivered by two different hospital services was perceived by Senior Clinicians at both sites as a barrier limiting communications and continuum of care. Only during rehabilitation at the SCI Unit is Neuro-urological consultation and specialist SCI bladder nursing provided. There was agreement across sites that, in early acute SCI, the priority is ensuring the survival of highly traumatised, often critically unwell, patients while “*urological concerns are understandably put to one side*”. However, as one SCI Unit Doctor noted, once patients are medically stable, the absence of a mechanism for Neuro-urological referral at the Surgical Hospital is a barrier to optimal management for patients with longer acute admissions. Earlier assessment would enable consideration of clinically indicated treatments, such as pharmaceutical support to prevent/reduce development of detrusor overactivity and reflux.

### **SCI unit**

Clinicians described the complexity of bladder management during rehabilitation, highlighting a number of facilitators and barriers to optimal practice.

### **Theme 2.1: Health service changes have impacted delivery of care**

Until 2014, a dedicated Neuro-urological team at the SCI Unit prioritised weekly consultation for every patient via ward rounds and a high degree of staff development in bladder rehabilitation. Senior Nurses attributed the high standard of current management to this culture of practice, which evolved at the SCI Unit over several decades. The policy of early removal of IDCs to instigate staff-IC stems from a ‘*long-standing mantra*’ of WA Neuro-urologists and a subsequent ‘*collective mindset*’ at the SCI Unit that prevention of urinary complications is essential and 6 h IC should be implemented consistently, without compromise. Senior Nurses with extensive experience and expertise continue to manage staff-IC protocols, but following health service changes in 2016, there is no longer a Neuro-urology Consultant and Registrar dedicated to the Unit; patients are seen only upon referral, rather than per standard practice. Senior Clinicians expressed concern that this change has compromised bladder care and a powerful mechanism for early identification of bladder-related issues has been lost. While two of three participating Neuro-

urologists expressed satisfaction with the current system, many Clinicians described the transition between service models as difficult, with impacts on patient care not well appreciated by hospital policy/decision makers.

### **Theme 2.2: Maintaining a high-standard staff-IC protocol is increasingly challenging**

According to Senior Nurses, factors associated with (nursing) staff experience and education continue to facilitate effective administration of early staff-IC; however, Nurses described growing barriers in relation to staffing and gaps in staff education (details provided in Table 2).

### **Theme 2.3: Determining appropriate long-term bladder management is complex**

During rehabilitation, the advantages/disadvantages of various bladder drainage methods are discussed with patients in the context of their individual preferences and goals. One Doctor stated that ‘best practice’ determines appropriate long-term management, which is recommended to the patient, who considers the advice and ultimately makes the final decision. However, determining what is best for the patient is not straight forward and barriers to this process are listed in Table 2.

Patients with potential to master CISC are encouraged to commence one-to-one training as early as possible with experienced, confident Nursing Staff. Clinicians described a number of facilitators to this process, involving multi-disciplinary collaboration (see Table 2).

However, Clinician responses again indicated that SCI inpatient demographics are changing, with an increasing proportion of older patients with pre-existing mobility issues and comorbidities, which are barriers to performing CISC (these and other barriers are listed in Table 2). In relation to this, Nurses described the “*insistence by Urologists*” for certain patients to continue trying (with great difficulty) to self-catheterise as detrimental. Some Nurses called for earlier implementation of SPC for select patients with poor mobility/dexterity to facilitate in-hospital coping, rehabilitation and long-term lifestyle, expressing concern that their perspectives (and those of patients) were not being adequately considered. Neuro-urologists acknowledged that self-catheterisation was enormously challenging for some patients, but described a determination to address each obstacle, rather than viewing obstacles as reasons to “*give up*” and opt for permanent IDC.

### **Theme 2.4: Delayed implementation of suprapubic catheterisation**

This was a major topic concerning Senior Clinicians. Responses across disciplines consistently agreed that for

patients with severe, high-level SCI, SPC should commence early during rehabilitation, however barriers to best practice associated included scheduling delays (detailed in Table 2) and according to Senior Nurses, Neuro-urologists being reluctant to implement SPC until just prior to hospital discharge “...puts pressures on theatres” and “...sets them up for failure”.

Long theatre waitlists were also consistently identified across focus groups as a major barrier. Senior Nurses recounted that in previous years, patients with SCI were referred to a dedicated SCI-Urology theatre list, whereas procedures are now scheduled by the hospital’s general Urology department, prioritising life-saving surgeries. Subsequent delays frequently require patients to be sent home with IDC and readmitted weeks/months later for SPC insertion—a practice described by Senior Clinicians as “unacceptable”. Neuro-urologists described a preparedness to recommend early SPC for those with high cervical injuries, although agreed that implementation delays had been an obstacle to this.

## Discussion

To our knowledge, this is the first study demonstrating the extent to which in-hospital SCI bladder management aligns with evidence and describing Clinician-perceived barriers and facilitators to optimal practice.

### Early bladder care and timing of IDC removal

IDC is an appropriate method for the 7–10 day post-SCI diuresis period, allowing continuous bladder drainage and hourly urine output monitoring as part of major trauma medical care. Thereafter, while alternative management may reduce UTI risk [3, 4], it is not uncommon for IDC to continue. In WA, the median duration of initial IDC is 21.5 days, but higher (40.4 days) for patients with complete tetraplegia, reflecting Surgical Hospital length of stay [7]. A study conducted at another Australian service reported median IDC duration of 58 days [6].

Such prolonged IDC is likely to increase UTI risk. A prospective study of inpatients with new SCI showed that IDC duration of more than 30 days increased the risk of UTI fourfold compared with other bladder drainage methods [25].

### SCI bladder rehabilitation is a complex speciality

The historical context and medical stewardship in the evolution of rehabilitation protocols are important. Senior Clinicians described a culture of high-standard evidence-based practice dating back to strong leadership during the

1950s and research that led to establishing early staff-IC, with improved urological outcomes [26]. A ‘Neuro-Urology and Urodynamics Unit’ was established at the SCI Unit in 2002, providing specialist consultation to all patients and world-class staff training.

### Challenges in maintaining and further optimising care

Budgetary pressures and system changes can be challenging for any SCI service. At this centre, a new health model and relocation of the SCI Unit in 2014 presented specific challenges to maintaining established standards. A down-sized Neuro-urology team and cessation of weekly specialist reviews were perceived barriers, resulting in fewer interdisciplinary discussions about patient progress. This may explain the disconnect between perspectives on realistic long-term management for certain patients. Neuro-urologists, consulting infrequently, are focused on patients’ potential to achieve optimal outcomes, whereas Nursing Staff observe day-to-day progress, motivation levels and the struggle associated with achieving goals. Clinicians indicated that without regular discussions, differences of opinion were not resolved and it was inevitable for patients to receive mixed messages about appropriate management. The timing of SPC implementation, for example, is not a simple decision and has no evidence-based guideline associated with it. At some centres, patients with high level, neurologically complete SCI, commence SPC acutely [11, 27]. While some Nurses in the current study favoured this option, Senior Clinicians preferred SPC to be considered only during the sub-acute phase when the patient’s prognosis is clearer. It would seem appropriate to at least avoid extensive delays once the decision to adopt SPC is made, as this will in turn reduce long-duration IDC, which increases the risk of UTIs and other complications [28, 29].

Not all challenges are unique to WA. One study of brain injury also found organisational culture and interdisciplinary communication were important domains [30]. Another identified long waiting lists and limited resources affecting delivery of SCI-related interventions as practice barriers, describing the development of a clinical care pathway to overcome region-specific obstacles [31].

### Implications for practice and clinician suggestions

To minimise IDC durations, it may be beneficial to establish a staff-IC protocol for select patients once medically stable, who are at higher risk for UTI. In WA this would require support from Senior Clinicians at the Surgical Hospital, clear policy regarding patient selection, IC training and ongoing competency auditing and a mechanism for Neuro-urological consultation. Quality improvement activities at



the SCI Unit may also be considered, since our recent cohort study [7] described several instances of IDC being prolonged for >3 weeks after patients were transferred to the Unit.

Establishing Case Coordinator/Liaison positions may improve continuum of care and provide greater patient support following SCI, particularly when acute care and rehabilitation are provided by different Clinicians and/or at separate sites. Adopting a clinical care pathway for SCI bladder management might also be beneficial, emphasising facilitators identified by this study and others, such as the international ‘Ability Network’ in relation to spasticity management [31], which also found an individualised approach and interdisciplinary coordination of care to be positive factors.

Interdisciplinary discussions, which will potentially enhance and expedite clinical decision-making, would be fostered by adopting regular patient progress meetings. At the SCI Unit, this might involve reinstating weekly Neuro-urology rounds. One Senior Clinician suggested greater Neuro-urology input is required, ideally from a dedicated Consultant and Registrar. Expanding the Spinal Urology CNC position, which was repeatedly identified as a key facilitator of best practice, was recommended, as was formalised education on SCI-specific bladder dysfunction and management for medical Residents rotating through the Spinal Unit.

Finally, centres managing SCI should make available a range of catheter types to enable patients with different abilities and circumstances to conduct CISC properly and safely. Catheter type for IC may also impact on UTI risk. Although high-quality published evidence on this topic has been conflicting [32–35], a systematic review in 2017 found hydrophilic-coated catheters decreased the risk of UTI and urethral trauma, as well as improving patient satisfaction [36]. Senior Nurses in WA favoured the use of pre-lubricated catheters for staff- and CISC, believing this also obviates poor CISC practices, such as applying lubricant directly with the hands. Indeed, pre-lubricated catheters have been introduced at the SCI Unit since the conclusion of this study.

### Study limitations

Rather than audit data, this study involved self-reporting, with some recall bias likely. Some findings were supported, however, by data from our recent cohort study [7], conducted in parallel. While purposive sampling ensured a wide representation of views, including those of experienced SCI Clinicians, further studies are needed to examine practice at other sites, where other barriers/facilitators might be revealed.

## Conclusions

In-hospital SCI bladder management in WA closely emulates published clinical guidelines. This study demonstrates that despite the evolution of a robust culture of practice, underpinned by Clinicians embracing evidence-based recommendations, systems-related barriers can arise, eroding quality of care. Study findings could inform national guidelines for optimising SCI bladder management.

### Data availability

Data are stored on a password protected USB and on NVivo. The datasets generated and/or analysed during the current study will be made available in The University of Western Australia’s research repository; <https://research-repository.uwa.edu.au/en/datasets>.

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### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** All applicable Institutional and governmental regulations concerning the ethical use of data from consenting hospital staff participants were followed. The South Metropolitan Health Service Human Research Ethics Committee provided ethical approval (16-148).

**Informed consent** All participants (Clinicians) were provided with a Participant Information and Consent Form requiring their signatures.

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