

# **Output Report: Optimal bladder health following Spinal Cord Injury**

## **Project 138**

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### **List of outputs**

- Goodwin D, Brock J, Dunlop S, Goodes L, Middleton J, Nunn A, Wright B, Bragge P, Optimal bladder management following spinal cord injury: Evidence, practice and a cooperative approach driving future directions in Australia, ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION (2018), doi: 10.1016/j.apmr.2018.04.030
- Peter Bragge, Denise Goodwin, Alyse Lennox, Catherine Byrne, Andrew Nunn: Testing a behaviour change strategy to promote best evidence-based management of the neurogenic bladder following spinal cord injury. Abstract accepted for presentation at the 57<sup>th</sup> ISCoS Annual Scientific Meeting, Sydney, September 2018
- Goodwin D, Lennox A, Byrne C, Nunn A, Braaf S, Bragge P : UNDERSTANDING DRIVERS OF BEHAVIOUR TO SUPPORT KNOWLEDGE TRANSLATION: THE EXAMPLE OF URINARY CATHETER CARE MANAGEMENT FOLLOWING SPINAL CORD INJURY. Presented at the ANZSCOS Meeting 2017, Brisbane, November 2017
- Bragge P, Goodwin D, Nunn A, Byrne C, Brock J: Developing a new model of BLADDER Management for spinal cord injury (SCI). Presented at the ANZSCOS Meeting 2017, Brisbane, November 2017

See summary table for status of other outputs (draft reports supplied but not published)

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## Abbreviations

Abbreviation	Description (using lay language)
AQA	Australian Quadriplegic Association
IDC	Indwelling Catheter
IMC	Intermittent Catheter
ISC	Intermittent Self Catheter
KT	Knowledge Translation
SCI	Spinal Cord Injury
UTI	Urinary Tract Infection
VSCS	Victorian Spinal Cord Service

## Purpose

The objective of this research was to implement a behaviour change strategy to optimise the early use of intermittent catheterisation (IMC) in individuals with newly acquired spinal cord injury (SCI) admitted to the Victorian Spinal Cord Service (VSCS). Specifically, this project aims to reduce the time at which IMC is implemented following SCI. Earlier and better bladder care can improve quality of life and other outcomes for people with SCI and reduce the costs to hospitals and insurers related to the readmission and management of secondary complications of Neurogenic Bladder.

## Hypothesis

The primary research hypothesis is that introduction of a bladder catheter management practice change in newly acquired SCI individuals admitted to the VSCS will decrease the time taken to remove the IDC and commence IMC in this patient group.

Longer-term lag indicators of this research project are:

- a) Decrease in the incidence of UTIs during the SCI inpatient (acute and rehabilitation) phase;
- b) Decrease in readmissions from SCI rehabilitation care back to SCI acute hospital care owing to bladder complications.
- c) Increase in the number of patients discharged from rehabilitation performing IMC.

The qualitative evaluation of the behaviour change strategy (i.e. the perspectives of staff and patients on the new model of care) will be independently undertaken by Project 139

## Background

The loss of voluntary control of the bladder immediately post SCI requires patients to receive a urethral IDC to extract urine from the bladder. The prolonged use of a urethral IDC has shown an increased risk of UTI particularly within the first few weeks following injury (Street et al. 2013). UTIs early after injury increase the propensity of acquiring more UTIs throughout life which can lead to poorer long-term bladder health and a reduction in overall health and wellbeing.

For SCI individuals, UTIs are the largest cause of presentation to the ED and hospital readmissions which includes patients being readmitted to acute care from rehabilitation (Cardenas et al. 2004; Henley 2009). The impact for people living with SCI, their family and community is significant. SCI individuals rank bladder related issues as one of the greatest problems they face in the long term. (Braaf et al 2017)

As SCI patients do not have normal or any bladder sensation, they often fail to detect the onset of UTIs which in the able bodied often produce pain. Consequently, by the time UTIs when detected, the SCI individual can be very ill with the infection having spread to other organs such as the kidney or prostate. This requires prolonged periods in hospital being harder to treat with more complex antibiotics, with a concomitant increased risk of an antibiotic resistant infection (Goetz et al. 2013).

The use of intermittent catheterisation (IMC) in SCI has been shown to reduce urological complications, specifically UTIs, compared with use of IDCs. However, there is evidence from an audit of SCI patients within the Victorian Spinal Cord Service (VSCS) of delays in implementing IMCs following acute SCI and retaining the use of IMC on discharge to the community. Such delays increase the chance of urological complications, UTIs, leading to readmissions to acute care facilities. (Gabbe & Nunn, 2016) These readmissions adversely affect quality of life (Braaf et al 2017) and result in substantial costs to the healthcare system. Thus the removal of the IDC should be performed early post injury once the patient is stabilised (Chancellor et al 2006; Horton et al 2004; Daneshgari 2002; Jamil 2001).

## Method

### *Study Design*

Single-centre before-after trial.

### *High level Methods:*

**Determining best evidence-based practice:** Conduct a review of primary (RCT) and secondary (systematic review, guideline) research evidence to establish best evidence-based standards for catheterisation following acute SCI. Convene a national expert panel to deliberate upon the evidence gathered and determine best principles of catheter management following acute SCI, which can be enacted locally using jurisdiction-specific protocols.

**Measuring current practice:** Previous projects have established baseline behaviours for the transition from IDC to IMC. An audit was completed in 2016 to identify any trends in management compared with the previous 2013 audit and provide an up-to-date baseline prior to the implementation of the change strategy.

**Understanding the drivers of (barriers to, and facilitators of) best practice:** Explore clinician (nursing, medical, specialist urology at inpatient and community level) views about what hinders and helps best SCI catheterisation practice through one on one interviews and / or focus groups.

**Developing a behaviour change strategy:** Collaborate with clinicians, consumers including AQA and other relevant stakeholders to design acute SCI catheterisation protocols based upon best available evidence and knowledge of practice drivers. These may include education/information packages tailored to different end users, for example to allow the individual with a newly acquired SCI to develop early understanding of the importance of optimal catheter care. Determine / refine expected outcomes to be measured.

**Implement the behaviour change strategy:** User perceptions of the behaviour change strategy during implementation will be used to refine the behaviour change processes and / or materials. [Note – evaluation of the success of the change strategy will be conducted independently in project 139].

Through an active partnership with the AQA, information and resources developed through this project will be made available for dissemination to the community setting as appropriate. For example, key messages regarding appropriate catheter care will be incorporated into available online GP resources as well as into regular reviews undertaken by the VSCS.

Through this partnership with AQA the patients involved in this practice change process will also be supported to continue best practice following discharge.

### ***Ethics statement***

Ethics approval for this project was obtained from Austin Health's Human Research Ethics Committee (HREC) – Project Number LNR/15/Austin/342; LNR/17/Austin/245; LNR/17/Austin/415.

### ***Participants***

In the formative research (qualitative interview based study) to establish the barriers to earlier implementation of bladder management, Clinicians involved in day-to-day bladder catheter management following newly acquired (acute) SCI within the VSCS, people involved in support of the the newly acquired SCI: paid staff and volunteers of AQA Victoria; and people who have experience a newly acquired SCI were interviewed by two members of the research team.

Those people with newly acquired Spinal Cord Injury, who are admitted to the Victorian Spinal Cord Service from August 1<sup>st</sup>, 2017.

## Research Findings:

### Summary of project aims, methods and key findings

Aim	Method	Summary of findings
<p>1. Review SCI bladder catheter care research evidence</p>	<p>Literature review:</p> <ul style="list-style-type: none"> <li>•4 Clinical Practice Guidelines</li> <li>•18 Systematic Reviews (last 5 years)</li> <li>•11 primary studies (last 5 years)</li> </ul>	<p><b>[publication 1]</b> – Bragge et al. final draft complete: for submission in late 2018</p> <p><b>Results:</b> Searching yielded 204 citations and four relevant CPGs. Collectively the CPGs contained 200 recommendations, over half of which pertained to assessment (37 recommendations), surgery (35) or education / support (31). Most of the surgery recommendations (23) were from a 2006 CPG – more recent CPGs emphasise conservative therapy. Methodological quality was good in the areas of clarity of presentation’ (84% mean domain score), ‘scope and purpose (73%) and ‘rigor or development’ (64%). There were shortcomings in the areas of ‘applicability’ (38%), ‘stakeholder involvement’ (42%) and ‘editorial independence’ (50%).</p> <p><b>Conclusion:</b> CPGs for management of neurogenic bladder following SCI are generally robust in the areas of systematic search, selection and appraisal; clearly articulating scope and producing unambiguous, clearly identifiable recommendations. Future guidelines should focus on providing implementation and audit resources; incorporating patient perspectives; and recording and addressing conflicts of interest.</p>
<p>2. Describe current practice</p>	<p>Retrospective file audit</p> <ul style="list-style-type: none"> <li>•637 acute SCI admissions from 2008 – 2011 &amp; 2012 - 2014</li> </ul>	<p><b>[publication 2]</b> – Nunn / Gabbe, published: August 2016</p> <p><b>Results:</b> Of the 356 cases, 141 (40%) experienced 366 (median 2, range 1–11) readmissions to hospital for secondary conditions. 95 (27%) visited an ED at least once, within two years of injury for a secondary condition. The cost of hospital readmissions was AUD\$5,553,004 and AUD\$87,790 for ED visits. The mean <math>\pm</math> SD cost was AUD\$15,172 <math>\pm</math> \$20,957 per readmission and AUD\$670 <math>\pm</math> \$198 per ED visit. Urological conditions (e.g. urinary tract infection) were most common, followed by pressure areas/ulcers for readmissions, and fractures in the ED.</p> <p><b>Conclusions:</b> Hospitalisation for complications within two years of traumatic SCI was common and costly in Victoria, Australia. Improved bladder and pressure area management could result in substantial morbidity and cost savings following SCI.</p>

		<p><b>[publication 3]</b> – Hennessey et al. to be submitted Feb 2018:</p> <p>Results</p> <p>143 patients with a new SCI were enrolled. 36 (25%) were female, median age was 42 years and median length of stay was 15 days. An indwelling urethral catheter (IUC) was the initial bladder management for all patients before appropriate alternative bladder management strategies were initiated. Median duration post-SCI before trial of alternative bladder management was 58 days. 55 (38%) patients using IUC developed a UTI, at rate 8.7/1000 inpatient days. When the IUC was removed and alternative bladder management initiated, the UTI rate halved (4.4/1000 inpatient days). In decreasing frequency, alternative bladder drainage methods were intermittent self-catheterisation (ISC), voiding on sensation, IUC reinsertion, suprapubic catheter (SPC), reflex voiding and condom drainage. The respective UTI rate for these strategies was 27%, 6%, 38%, 29%, 25% and 0%.</p> <p>Conclusion</p> <p>Substitution of IUC with either ISC or SPC was associated with a reduction in UTI rate. This study reinforces the importance in SCI patients of early IUC removal and initiation of alternative bladder management.</p>
<p>3. Explore clinician (nursing, medical, urology) &amp; patient views on SCI bladder catheter care</p>	<p>•66-person forum, ANZCOS 2015</p>	<p><b>[publication 4]</b> – Goodwin et al. published April 2018</p> <p><b>Results:</b> A national, facilitated discussion forum was held during the annual Australian and New Zealand Spinal Cord Society (ANZSCoS) conference. The discussion examined current catheterisation practices and issues in both inpatient SCI units and the community in light of the material presented. The discussion highlighted both gaps between evidence and practice, and variation in practice between centres and settings. Reported challenges to implementing best practice included social, economic and resource influences. A disconnect between clinical and community practice was also identified as an important barrier to long-term uptake of intermittent catheterisation following acute SCI.</p> <p><b>Conclusion:</b> The discussion identified three proposed activities: 1] explore current practice and bladder health following SCI in greater depth across SCI units and in local communities through audits and standardised biochemical analysis 2] determine the</p>

	<ul style="list-style-type: none"> <li>• 21 clinicians &amp; patient interviews 2016</li> </ul>	<p>behavioural drivers of current practice and 3] develop a knowledge translation strategy to better align practice with current CPGs.</p> <p><b>[publication 5]</b> – Results presented at ANZSCOS 2017, Brisbane; Goodwin et al. to be submitted late 2018</p> <p><b>Results:</b> From the 14 domains included in the Theoretical Domains Framework (TDF), six were deemed to be dominant themes in what drive behavior for bladder management following acute SCI. These were: environment and context; skills; knowledge; belief about consequence; belief about capabilities and social influence. Although staff generally recognised that transitioning from IDCs to ICs was best evidence-informed practice, multiple factors influenced this behaviour. Participants reported access to resources (e.g. staff time and catheter type) and social influences as strong drivers of staff and patient behaviour. Staff beliefs, many of which were not aligned with best practice, strongly influenced both their colleagues and patients. Lack of emotional and physical readiness for ICs was frequently cited as a reason to delay transition to IC, despite little group consensus on what ‘readiness’ meant. There were strong beliefs around whether patient’s capability or inclination to perform ICs, particularly beyond the clinical setting. These factors were a greater influence on practitioner behaviour than current evidence.</p> <p><b>Conclusion:</b> This study identified a number of drivers of behaviour for bladder management following acute SCI that were not just related to a knowledge-gap (i.e. the problem could not be addressed with just skills and education alone).</p> <p>Understanding the drivers of behaviour among clinical staff and patients has been pivotal to tailoring the knowledge translation approach and developing interventions to maximise evidence based practice in SCI urinary catheter care.</p>
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<p>4. Develop intervention to optimise best evidence-informed SCI bladder catheter care</p>	<p>Draft algorithm incorporating evidence, pathophysiology, barriers and facilitators to best evidence-informed practice</p>	<p>Intervention presented at ANZSCOS 2017, Brisbane.</p> <p>Multifaceted intervention developed:</p> <ol style="list-style-type: none"> <li>1. Algorithm (see attached)</li> <li>2. Mandatory staff training (online learning through Austin Health learning management system)</li> <li>3. Peer support / Clinical champions (key staff identified and asked to participate in full day interactive workshops, with peers)</li> <li>4. mybladdermylife.com (peer developed online learning tool see attached table of feedback)</li> </ol>
<p>5. Implement &amp; evaluate intervention</p>	<p>2017 August 1<sup>st</sup> (change of practice)</p>	<p>Abstract accepted for ISCoS 2018; publication under preparation</p> <p>See below</p> <p>Project 139 will undertake quality follow up</p>

## **Key findings**

The audit conducted of bladder management on newly admitted spinal cord injured between January and December of 2016 (pre behaviour change strategy) showed the time taken to remove indwelling urethral catheter, and commence an alternate management was 66.7 days.

The intensive intervention period occurred over the 3-months of May 2017 till August 2017, with the new model of care introduced to patients admitted after August 1st, 2017.

From August 2017 till December 2017 there were 37 new Acute spinal cord injured patients admitted to the VSCS. There were 5 patients that did not receive bladder management in line with the developed algorithm. Two of these patients were transferred to facilities closer to home (1 x NSW and 1 x Wangaratta). Two were deemed not appropriate by the treating spinal clinician due to age, with an alternative bladder management initiated earlier (Supra Pubic Catheters requests). The final of the 5, had ongoing issues with aggression, and subsequently the initiation of IMC was delayed to minimise aggressive outbursts and the increased risk to nursing staff.

Of the remainder of newly admitted SCI patients (28), One patient was admitted without an IDC (was subsequently discharged from the service three days later) all other catheters were removed on average within 19.5 days of injury (alternatively average of 4.25 days of admission to the VSCS acute ward).

Further evaluation of this project is to be undertaken by ISCRP Project 139.

## **Limitations**

A limitation to this project and ultimately achieving the timely catheter removal, related to when the patient was admitted to the Victorian Spinal Cord Service (VSCS) from other care providers, or major trauma hospitals. Between August and December of 2017, the shortest time of admission to Austin Health was on the day of injury, with the longest at 36 days from injury. Some of these direct admits to Austin Health needed support from other services, and were not always admitted to the VSCS, rather ICU or Victorian Respiratory Support Service. Some of these newly injured SCI met the criteria for having their IDC removed, but as this project targeted staff on the acute and rehabilitation wards and within the VSCS, the skill level of those alternate wards was not considered appropriate to remove the catheter safely.

## **Use of the Research**

This project has demonstrated that with appropriate design and thorough implementation, behaviour change relating to a clinical care task is achievable. Using in depth consultation, as a part of the knowledge translation approach, allowed our team to understand the barriers and facilitators to achieving the primary objective of removing the urethral IDC earlier.

Two abstracts and posters were presented at ANZSCoS 2017 in Brisbane, along with a presentation of overall project presented at the nursing disciplinary meeting. There are multiple publications either submitted or due to be submitted in the near future (see table above).

This model of behaviour change could be easily replicated to achieve similar outcomes in other areas of variable care, such as bowel management or pressure area management within the VSCS. The patient education website [mybladdermylife.com](http://mybladdermylife.com) was well received among the peer community with requests for a similar page relating to bowel management. The associated intervention strategy could also be reproduced within other spinal cord injury units across Australia, with strong interest noted at ANZSCoS 2017.

## **Conclusion/Potential impact of the Research**

The findings of this project strongly support the use of knowledge translation, to achieve behaviour change within the hospital setting. Providing optimal bladder health to patients within the VSCS, allows the newly

injured to make better more informed decisions around the long-term implications of and take responsibility for bladder health enabling the patients to reduce the complications.

This research project has also driven great interest from major manufacturing companies, further development into alternative equipment , and in hospital data collection on urological complications.

Ensuring that the neurogenic bladder is protected during their inpatient acute and rehabilitation phase, allowing an agreed long term management to appropriately chosen and trialled by the individual supported by an educated team based on thorough assessment and a multidisciplinary approach.

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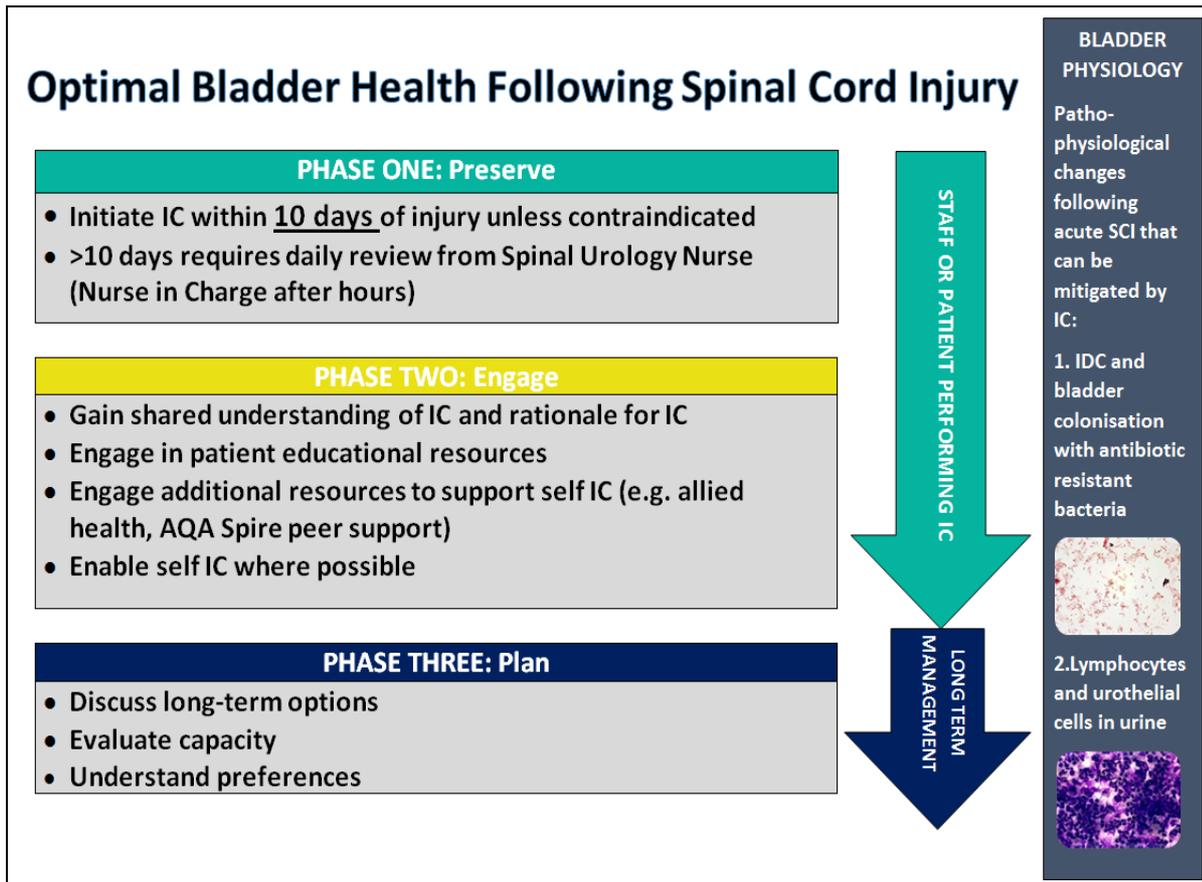
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## Appendix 2: Initial review of mybladdermylife.com

RESPONDENT 1	<i>Including a FAQ page alongside some form of portal where people can submit general questions to be answered by specialists. For example one question I would ask is, why does my urine smell after I drink coffee.....</i>
RESPONDENT 2	<i>I like the website.  The layout is cool.  I think they could go a little more in depth with the info and cover more topics. For example they give one example of surgeries to do with the bladder, an augmentation, but there are many others. This is a great resource mate.</i>
RESPONDENT 3	<i>It will be great if there were some blogs from people both male and female using each different method and how they find it.</i>
RESPONDENT 4	<i>I put comments on the web site. Would have been good to have this sort of site when I went through rehab 17 years ago. Makes me feel so ancient and out of date!</i>
RESPONDENT 5	<i>I don't have any real issues these days, having gone through the learning process in my early years. I tried to look at it from a newly injured person's perspective (someone of my level injury). It seemed to advise everything they need to know. I wouldn't know about intermittent catheters and all that goes with them.  I'm not sure whether it said so, but I would also recommend having someone like RDNS scheduled to change a suprapubic catheter at regular intervals. Drink plenty of water (which was mentioned). Keep an emergency change kit with you at all times, just in case. If you start feeling sweaty (dysreflexia) then check that everything is okay with the catheter. If that's all okay, call the doctor.</i>
RESPONDENT 6	<i>This is a great resource. I made a few comments at the end esp "How about us girls!" It is very male focused, but that's ok as most of the sci community is men, but also need to relate it to women too.</i>
RESPONDENT 7	<i>The site looks very informative. I learnt a lot by going through it.  My first question is: Is the majority of visits expected by sci patients new to this world or bowel/bladder discussion? Or seasoned veterans who may need extra tuition &amp; updates?  In an ideal scenario I think a split screen, one side asking "are you new" to bladder management?  Other half asking "Are you seeking updated information", links etc?  The second question would go straight to current main page.  First question would refer to a toned down introduction acknowledging there is a lot of info to absorb. Helping the reader minimise anxiety levels before they move on to all the info accessible on main page. As it can be quite intimidating &amp; feel intrusive for some who are not accustomed to catheter &amp; bladder talk.</i>
RESPONDENT 8	<i>Overall I find the website an excellent resource for those with SCI.  The layout is well structured in terms of what you should know. It might be useful to include an Introduction stating that at some point most SCI will have bladder issues. "You are not alone in this". This resource is part of the help.  I would like to see more pictures/images and especially UTUBE videos if they are available. (or could be made). SEEING as well as reading can educate and reinforce the message. Simple pictures what to do/not to do as a summary after some sections may be useful in</i>

	<p><i>getting the message out. e.g. minimising infections.</i></p> <p><i>More specific case studies of individuals of various ages/sexes/ethnicities (diversity) may make the information more relevant and immediate to readers.</i></p> <p><i>While the biology/physiology of the bladder is necessary it is overdone.</i></p> <p><i>I find the language easy to read, however a person newly acquired with SCI may struggle. Hence, some pictures showing procedures, products etc may assist. Bladder washout, real pictures of individuals undergoing catheter changes may help.</i></p> <p><i>I am not a fan of your section on sex. It is glossed over. It requires a far more comprehensive, realistic and serious treatment. Sex is as important for those with a SCI as anyone else. It is just that some different methods/solutions/approaches need to be taken. Personally, I would like to see the section re-written by an expert in the field. It should not only read as a heterosexual act, but inclusive of all sexualities. It reads to me as something that would have been written 30 years ago. There are excellent resources out there, aids to assist, positions etc etc all highly relevant to those with a SCI, but swept under the carpet.</i></p> <p><i>Lastly, I get an impression the individual can readily change the type of bladder control. In most cases I doubt this. In consultation with the professionals a decision is made about bladder management which to the best of my experience usually holds.</i></p>
RESPONDENT 9	<p><i>I thought it is a great tool.</i></p> <p><i>I initially didnt realised to scroll down on the first page.</i></p> <p><i>It is great that there is personal reference from a Male. Where is the Female one????</i></p> <p><i>He talks about a bladder augmentation but does not go into detail as to what that is.</i></p> <p><i>Otherwise its great.</i></p> <p><i>Do we have a similar one for bowels?</i></p>
RESPONDENT 10	<p><i>I found the website was great, it was easy to read and more importantly was easy to follow. I was most happy that the bladder augmentation was included. I have found this to be the best thing I could have done as far as bladder management was concerned. I thought that this procedure was not encourage anymore. I would be the first person to say that this has made my life a lot easier and cleaner. Touch wood I have not had an infection for years.</i></p> <p><i>So if a mentor is needed for this procedure I am your man.</i></p> <p><i>The language was easy to read and in laymen's terms which is important.</i></p> <p><i>The best thing about my bladder is that after all this time 25 years, the bladder has always stayed the same so as far as management goes I just stick to the same routine. SpeediCaths are a big part of this.</i></p> <p><i>Basically the website is easy to follow and gives you all the answers. It's a HIT.</i></p>