

CLEAN INTERMITTENT URETHRAL CATHETERIZATION IN ADULTS

CANADIAN BEST PRACTICE
RECOMMENDATIONS FOR NURSES



Developed By Nurses Specialized in Wound,
Ostomy and Continence Canada, Canadian Nurse
Continence Advisors, Urology Nurses of Canada,
and Infection Prevention and Control Canada.

APRIL 2020

TASK FORCE MEMBERS

These best practice recommendations mark a collaborative project between Nurses Specialized in Wound, Ostomy and Continence Canada (NSWOCC), Canadian Nurse Continence Advisors (CNCA), Urology Nurses of Canada (UNC), and Infection Prevention and Control Canada (IPAC Canada).

NSWOCC

Debbie Cutting, RN, BScN, NSWOC, WOCC(C), NCA, Laura Robbs, RN, MN, NSWOC, WOCC(C), NCA, Laureen Sommerey, RN, MSN, NSWOC, WOCC(C), Nicholas Joachimides, RN, BScN, MCISc, MSc, IIWCC, NSWOC CHE, CpedN.

CNCA

Marcia Carr, RN, BN, MS, GNC(C), NCA, Nicole Simao Amaral, BComm, RN, BN, MN, NCA, Jennifer Skelly, PhD, RN.

UNC

Susan Freed, RN, BScN, Gina Porter, RN, NCA, Fran Stewart, RN, NCA.

IPAC CANADA

Madeleine Ashcroft, RN, BScN, MHS, CIC.

ACKNOWLEDGEMENTS

This position statement is made possible by educational grants. Gold – Coloplast Bronze –Bard, ConvaTec & Hollister, plus support from 3M. Edited and produced by John Gregory IIWCC, Opencity Inc.

HOW TO CITE

To reference these best practice recommendations, use the following citation: Clean Intermittent Urethral Catheterization in Adults – Canadian Best Practice Recommendations for Nurses. Developed by Nurses Specialized in Wound, Ostomy and Continence Canada, Canadian Nurse Conti-

nence Advisors, Urology Nurses of Canada, and Infection Prevention and Control.1st Ed. 2020.

DISCLAIMER

These best practice recommendations are not binding on nurses or the organizations that employ them. The application of these best practice recommendations should be based on individual needs and local circumstances. They neither constitute a liability nor a discharge from liability. While every effort has been made to ensure the accuracy of the contents at the time of publication, neither the authors nor the four collaborating organizations offer any guarantee as to the accuracy of the information contained in them nor accept any liability, with respect to loss, damage, injury, or expense arising from any error or omission in the contents of this work.

COPYRIGHT STATEMENT

This document may be produced, reproduced, and published in its entirety, without modification, in any form, including in electronic form, for educational or non-commercial purposes. Should any adaptation of the material be required, for any reason, written permission must be obtained from Nurses Specialized in Wound, Ostomy and Continence Canada (NSWOCC).



COLLABORATING ASSOCIATIONS



NURSES SPECIALIZED IN
WOUND, OSTOMY AND CONTINENCE
CANADA
INFIRMIÈRES SPÉCIALISÉES EN
PLAIES, STOMIES ET CONTINENCE
CANADA



UNC
Urology Nurses of Canada



EDUCATIONAL GRANTS

Gold



Coloplast

Bronze



Plus support from 3M

CONTENTS

Executive Summary 7

Best practice recommendation members 8

01 Methodology
page 9

02 Indications, contraindications and complications
page 12

03 Infection prevention and control
page 15

04 Impact of intermittent catheterization: patient quality of life
page 20

05 Catheter materials and types of catheters
page 22

06 Management of intermittent catheterization
page 29

07 Patient education
page 34

Glossary 39

List of Figures 40

Appendices**41**

Appendix i – Grading of the evidence reviewed

Appendix ii – Collecting a Mid-Stream Urine Specimen

Appendix iii – Patient Brochure

Appendix iv – Checklist for Patient Information

Appendix v – Teaching Intermittent Catheterization (Procedure)

Appendix vi – Intermittent Catheterization (Male Procedure) – Patient Handout

Appendix vii – Intermittent Catheterization (Female Procedure) – Patient Handout

References**57**



EXECUTIVE SUMMARY

The Clean Intermittent Urethral Catheterization in Adults / Canadian Best Practice Recommendations for Nurses

are the result of a collaboration between Nurses Specialized in Wound, Ostomy & Continence Canada (NSWOCC), Canadian Nurse Continence Advisors (CNCA), Urology Nurses of Canada (UNC) and Infection Prevention and Control Canada (IPAC Canada).

The document assists nurses in diverse practice settings to provide evidence-based care to adults requiring intermittent urethral catheterization.

The review panel consisted of expert nurse representatives from each of the four collaborating associations.

These best practice recommendations are for an audience of regulated professional nurses.

The four collaborating associations have sought to contextualize the guidelines developed by others.

We recognize the difference between the rigour of evidence in a guideline with those of recommendations such as these, which include the opinion of the authors. A systematic review of the literature and evidence grading complement the recommendations presented in other guidelines. Extra noted references, such as Ontario Health (Quality) and Canadian Agency for Drugs and Technologies in Health (CADTH) have been published during the development stage of these best practice recommendations.

Some catheters are manufactured for multiple use, while others are manufactured for single use. A single use catheter is licensed by Health Canada on the basis that it is to be used only once and then disposed after use. Single use catheters are not designed to be re-used and it is strictly against the original equipment manufacturers instructions.

The re-use of single use catheters is a contentious and evolving subject.

The collaborating associations recognize that from professional and practice liability perspectives, they are unable to support the re-use of catheters licenced for single use.

We are grateful to the European Association of Urology Nurses (EAUN) for granting permission to cite and include aspects of their *Catheterisation: Urethral intermittent in adults. Dilatation, urethral intermittent in adults. Evidence-based Guidelines for Best Practice in Urological Health Care*, published in 2013 and the edited summary produced in 2016.

It is envisioned that these best practice recommendations will help guide qualified nurses in Canada to provide education and improve patient outcomes for adult intermittent urethral catheterization.

BEST PRACTICE RECOMMENDATION MEMBERS

NSWOCC

Debra Cutting, RN, BScN, NSWOC, WOCC(C), NCA.
Wound Ostomy Continence Clinician, Sea to Sky Community Nursing, Vancouver Coastal Health Authority, British Columbia.

Laura Robbs, RN, MN, NSWOC, WOCC(C), NCA.
Clinical Nurse Specialist, Urology Resource Centre and Academic Advisor, WOC Institute. Toronto, Ontario.

Laureen Sommerey, RN, MSN, NSWOC, WOCC(C).
Manager Clinical Resources, Nightingale Medical Supplies Ltd. Vancouver, British Columbia.

Nicholas Joachimides, RN, BScN, MCISc, MSc, IIWCC, NSWOC CHE, CpedN.
Operation Manager, Brain Injury Rehabilitation Unit, Holland Bloorview, Toronto, Ontario.

CNCA

Marcia Carr, RN, BN, MS, GNC(C), NCA.
CNCA Board Member for British Columbia and Yukon Territories.

Nicole Simao Amaral, BComm, RN, BN, MN, NCA.
Registered Nurse at Pelvic Floor Clinic, Women's Health Ambulatory Care, Foothills Medical Centre in Calgary, Alberta.

Jennifer Skelly, PhD, RN.
Associate Professor, School of Nursing, McMaster University. Ontario.

UNC

Susan Freed, RN, BScN.
Operations Manager, Manager of Clinical Practice with Bayshore Home Care Solutions, Carleton Place, Ontario

Gina Porter, RN, NCA.
Nurse Continence Advisor, Urology Wellness Clinic, St. Joseph's Hospital, Saint John, New Brunswick.

Fran Stewart, RN, NCA
Nurse Continence Advisor, Clinical Trials, Sunnybrook Health Sciences Centre, Toronto, Ontario.

IPAC CANADA

Madeleine Ashcroft, RN, BScN, MHS, CIC.
Director of Standards and Guidelines, IPAC Canada and Regional Infection Prevention and Control Specialist, Public Health Ontario, Toronto, Ontario

CONFLICTS OF INTEREST

Laureen Sommerey is employed by a medical supply retailer. There are no other conflicts among the authors.



CHAPTER 01 - METHODOLOGY

LITERATURE SEARCH

Concurrent with the review of existing guidelines, a health sciences librarian conducted a systematic review for recent literature relevant to the scope of the recommendations.

Databases Searched: Cumulative Index to Nursing and Allied Health (CINAHL), Cochrane Controlled Trials (CT), Cochrane Systematic Reviews (SR), Embase, and MEDLINE. Years searched from 2010 to 2018.

The main question posed *“What is the evidence that supports nursing practise to use and teach the use of clean intermittent urethral catheterization?”*

Search Terms used included:

- urethral catheterization
- intermittent catheterization
- intermittent
- intermittent urinary catheter or urethral catheter
- intermittent catheter
- clean intermittent catheter or clean intermittent self-catheter or self-intermittent catheter or self-catheter
- coated catheter
- ready to use catheter
- catheter hydrophilic
- compact catheter
- single use catheter
- re-use catheter
- adult
- elder
- senior
- retire
- pensioner
- mid age
- 2010 - 2018

The initial search yielded 1,449 studies, of which abstracts were then reviewed with 93 studies identified for a full review.

Database	Reviewed	Included
CINHAL	127	33
EMBASE	892	37
Medline	480	26

Table 1 – Search yield by database

The studies were then sorted based on three topic groups.

- Compliance included the type of catheters used, the procedure used and any complications which resulted.
- Promotion included the success of teaching intermittent self-catheterization (ISC).
- Quality of Life included the impact on the individual performing intermittent self-catheterization (ISC)

Ninety-three studies were reviewed with sixty included in the final tables. Accounting for duplicates across the three tables 54 separate papers were reviewed that form the basis of the recommendations, in addition to the EAUN Guidelines. The 54 graded papers are summarized in Appendix i.

Topic Groups	Reviewed	Included
Compliance	55	33
Promotion	15	9
Quality of Life	23	18
Total	93	60

Table 2 – Studies reviewed by topic group

The Oxford Centre for Evidence-based Medicine Levels of Evidence 2011 criteria were used to focus the review of the evidence. Each study was reviewed by two individuals using these four questions.

1. What is the aim of the study?
2. What is the study design?
3. What were the outcomes determined?
4. What is the level of evidence using the Oxford Scale?

Question	Step 1 (Level 1*)	Step 2 (Level 2*)	Step 3 (Level 3*)	Step 4 (Level 4*)	Step 5 (Level 5)
How common is the problem?	Local and current random sample surveys (or censuses)	Systematic review of surveys that allow matching to local circumstances**	Local non-random sample**	Case-series**	n/a
Is this diagnostic or monitoring test accurate? (Diagnosis)	Systematic review of cross sectional studies with consistently applied reference standard and blinding	Individual cross sectional studies with consistently applied reference standard and blinding	Non-consecutive studies, or studies without consistently applied reference standards**	Case-control studies, or "poor or non-independent reference standard**"	Mechanism-based reasoning
What will happen if we do not add a therapy? (Prognosis)	Systematic review of inception cohort studies	Inception cohort studies	Cohort study or control arm of randomized trial*	Case-series or case-control studies, or poor quality prognostic cohort study**	n/a
Does this intervention help? (Treatment Benefits)	Systematic review of randomized trials or n-of-1 trials	Randomized trial or observational study with dramatic effect	Non-randomized controlled cohort/follow-up study**	Case-series, case-control studies, or historically controlled studies**	Mechanism-based reasoning
What are the COMMON harms? (Treatment Harms)	Systematic review of randomized trials, systematic review of nested case-control studies, n-of-1 trial with the patient you are raising the question about, or observational study with dramatic effect	Individual randomized trial or (exceptionally) observational study with dramatic effect	Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient.)**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning
What are the RARE harms? (Treatment Harms)	Systematic review of randomized trials or n-of-1 trial	Randomized trial or (exceptionally) observational study with dramatic effect			
Is this (early detection) test worthwhile? (Screening)	Systematic review of randomized trials	Randomized trial	Non-randomized controlled cohort/follow-up study**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning

Figure 1: Oxford Centre for Evidence Based Medicine 2011 Levels of Evidence.

FINAL GRADE RECOMMENDATIONS

Grade A – based on clinical studies of good quality and consistency addressing the specific recommendation and including at least one randomized trial.
Grade B – based on well-conducted clinical studies but without randomized trials.
Grade C – made despite the absence of directly applicable clinical studies of good quality.

EAUN INTERMITTENT URETHRAL CATHETERIZATION GUIDELINES IN ADULTS

The EAUN Intermittent Urethral Catheterization (IUC) Guidelines provide a good starting point for the development of the Canadian best practice recommendations. Permission was requested and received from EAUN for the use of their guideline as the basis for the Canadian recommendations.

The AGREE II evaluation tool (Brouwers, 2010) was used to assess the methodological rigour and transparency in which the EAUN Catheterisation – Urethral intermittent in adults (Vahr, 2013) was developed.^{1,2} The AGREE II consists of 23 items organized within six domains, followed by two global rating items (Overall Assessment). Each domain captures a unique dimension of guideline quality. These include scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, editorial independence, and overall quality of the guideline and whether the guideline would be recommended for use in practice. The guideline was independently reviewed by two individuals and the domain scores calculated as per the AGREE II guidelines, see Table 3. The EAUN guideline was strong in four of seven Agree domains and was recommended for use in practice with modifications. The primary focus of the EAUN guideline was urology practice. The Canadian practice recommendations are intended to appeal to a broad range of nurses and care providers in urology, gynecology, rehabilitation, geriatrics and continence care.

Domain	Scores
Scope of Purpose	55%
Stakeholder Involvement	36%
Rigour of Development	54%
Clarity of Presentation	77%
Applicability	41%
Editorial Independence	54%

Table 3 shows the Agree II scores for the six domains. Those in bold indicate the weakest areas to Canadian practice.

The authors considered it necessary to provide detailed references beyond those graded above. The scoping literature search question centred on intermittent urethral catheterization. These additional references relate particularly to Chapter 3 – Infection prevention and control. The abstracts were obtained and full papers reviewed. References outside the search period have been noted.

Peer reviewers were recruited from each of the four participating associations as well as individuals with expertise in the subject matter and patients. Reviewers were asked to read a full draft of the Recommendations and participate in the review before its publication. Stakeholder feedback was submitted by completing an online survey questionnaire. Stakeholders were asked to rate on a seven-point scale their agreement with the clarity of each recommendation and relevance to Canadian clinical practice. Stakeholders were able to include comments and feedback related to each section of the recommendations. A summary of the survey feedback was reviewed by the development panel to determine if there were any modifications required prior to publication. A total of 19 healthcare professionals completed the survey, plus one patient. Stakeholder overall agreement was 93%, consistent across all the chapters. We wish to acknowledge all the individuals who contributed to the review process.



Photo Credit: tirachardz / Freepik

CHAPTER 02 – INDICATIONS, CONTRAINDICATIONS, AND COMPLICATIONS

INDICATIONS

BLADDER DRAINAGE

Intermittent catheterization (IC) should only be performed in the presence of a residual volume of urine and symptoms or complications (Table 4) resulting from the residual volume.

Complications of high post void residual volume of urine

Urinary tract infection
Bladder calculi
Renal failure
Patient discomfort
Lower urinary tract symptoms, e.g., nocturia, urgency, or frequency
Incontinence

Table 4 - Complications of a large post-void residual volume (PVR) of urine.

Incomplete bladder emptying is generally due to one of three categories of lower urinary tract dysfunction:

- i. Detrusor underactivity: Low detrusor pressure or short detrusor contraction time, usually in combination with a low urine flow rate resulting in prolonged bladder emptying or a failure to achieve complete bladder emptying within a normal period measured by urodynamics.³ Neurological or idiopathic disorders are the most common causes of this type of dysfunction.
- ii. Bladder outlet obstruction: physical obstruction or blockage of the bladder outlet results in incomplete bladder emptying despite an adequately functioning detrusor muscle. The most common causes are a prostatic enlargement in men, high

bladder neck or urethral stenosis in both men and women. Urethral strictures may also cause bladder outflow obstruction. They are frequently a consequence of infection, post instrumentation or intervention, e.g., following transurethral resection of the prostate (TURP), radical prostatectomy (RP), or radiation of the prostate.

- iii. Iatrogenic - Following surgery: anesthetic technique, especially when an epidural anesthetic is used, may result in acute urinary retention. Surgery to restore continence can impair bladder emptying. Procedures for reducing urinary stress incontinence introduce a degree of obstruction to the bladder outlet, while procedures for resolving urinary urge incontinence aim to reduce intravesical pressure and increase functional bladder capacity. Both of these can impair the ability of the bladder to empty, possibly leading to increased residual volume. Specific reconstructive procedures create a channel, often using non-terminal ileum, through which IC is performed to facilitate draining of the bladder, augmented bladder, or reconstructed neobladder.

DILATATION OF URETHRAL STRICTURES

Urethral strictures are a common issue. They occur more frequently in men than women due to the length and curvature of the male urethra compared to the shorter, straight female urethra. They can occur at any point along the urethra but are most common in the bulbar urethra and at the urethral meatus. The cause of a stricture cannot always be identified but may include those noted above.

Intermittent dilatation is a well-established method of managing urethral strictures following either a urethral dilatation (as a surgical procedure) or an internal urethrotomy.² With the procedure of passing a urinary catheter or dilator carried out on a regularly scheduled basis, the patency of the bladder neck, urethra, or external urethral meatus may be maintained. This should only be done on medical advice.

A Cochrane review concludes that there are insufficient data to determine if urethral dilatation, endoscopic urethrotomy, or urethroplasty is the best intervention for urethral stricture disease in terms of balancing efficacy, adverse effects, and costs.² A small study comparing clean intermittent self-catheterization (CISC) and repeated sounds dilatation has shown that patients performing CISC had a significant improvement in flow rate compared with patients who had repeated sounds dilatation. Another small randomized control study to determine if CISC prevents the recurrence of urethral strictures post internal optical urethrotomy showed that four (22%) of the treatment group developed strictures while 12 (46%) of the control group (no CISC) developed strictures within the first year.⁴

CONTRAINDICATIONS

CONTRAINDICATIONS TO INTERMITTENT CATHETERIZATION

Absolute contraindications are urethral rupture/tear and high intravesical pressure, as it requires continuous drainage to avoid renal damage. Relative contraindications include poor manual dexterity, inability to access the perineum (e.g., obesity), or an impairing psychological or cognitive disorder in the absence of an appropriately trained caregiver. The contraindications for urethral dilatation are suspected or confirmed urethral rupture, urinary tract infection (UTI), or a false passage.

ALTERNATIVES TO INTERMITTENT CATHETERIZATION

Alternatives to IC for bladder drainage are suprapubic and indwelling urethral catheterization.

COMPLICATIONS

INFECTION

Urinary tract infection (UTI) is the most common complication of IC. This is explored in detail in Chapter 3.

TRAUMA AND MISCELLANEOUS

The complications that may be experienced by patients performing IC are outlined in Table 5.

Type	Frequency	Recommendation	Comment
TRAUMA			
Long-term urethral bleeding	Up to 30% of patients.	Use a hydrophilic or gel reservoir catheter or apply lubricant to uncoated catheter prior to use. (5–C) ⁵	Hydrophilic coating significantly reduces the risk of microscopic hematuria. The use of lubrication, either incorporated into the catheter device or externally applied reduces the risk of trauma.
False passage	Not known.	Administer antibiotics and use an indwelling catheter for several weeks.	
Urethral stricture	Prevalence varies within a range 5%-25%. ⁶	Take common-sense measures; gentle insertion, use lubrication.	Insufficient data to support recommendations.
Meatal stenosis	Only a few reported series, none of which have been in the modern era.	Cleaning or disinfecting of the urethral meatus. [†]	Water is suitable for the preparation of the periurethral area before inserting a catheter.
Bladder perforation	Rare.	Use an indwelling catheter for 7 to 10 days and antibiotic therapy. Consider laparotomy for persistent leaks.	Tends to occur in augmented bladders along anastomotic site.
MISCELLANEOUS			
Catheter knotting	Very rare.	Attempt evacuation with a flexible endoscope; use an endoscope or open extraction under anesthesia if this fails.	
Bladder calculus		Emphasize the importance of not allowing pubic hair or any other foreign object to be introduced with the catheter when carrying out IC.	
Pain and discomfort		Ensure appropriate training of a person carrying out catheterization. This can be achieved through proper preparation of the educator that teaches IC.	Pain can result from bladder spasm or UTI. Severe pain on the insertion of the catheter has a significant impact on quality of life (QoL).

Table 5 - Complications of intermittent catheterization. Adapted from the EAUN edited summary, 2016, table 12.7
References from EAUN edited summary 2016, unless otherwise shown. † noted in original 2013 Guideline.



03

CHAPTER 03 - INFECTION PREVENTION AND CONTROL

INFECTION

In this chapter, we will discuss infection, followed by prevention and treatment recommendations.

BACTERIURIA VERSUS INFECTION

The bladder may be colonized with bacteria without symptoms (asymptomatic bacteriuria), especially in those over 65 years of age or with frequent catheterization.⁸ With each catheterization, the risk of acquiring bacteriuria is estimated at 1-3%, and it is likely universal by the end of three weeks with an indwelling catheter and over 50% with IC.^{9,10,11}

URINARY TRACT INFECTION

Urinary tract infection (UTI) is by far the most common complication of IC although the incidence, prevalence, and relative risk vary across studies, related to their definition of UTI and means of reporting.^{8,12-18} Most studies have also been confined to specific patient cohorts, for example, neurogenic bladder (related to multiple sclerosis, Parkinson's disease, spina bifida, spinal cord injury), pregnant women, and long-term care residents.^{12,19-21}

UTIs are categorized as catheter-associated (CAUTI) and non-catheter-associated and vary across age groups and settings, e.g., community versus long-term care. The Center for Disease Control and Prevention (CDC) defines CAUTI as "a UTI where an indwelling urinary catheter was in place for >2 calendar days on the date

of the event.”^{22,23} As 70–80% of CAUTIs are attributable to use of an indwelling urethral catheter and IC is recommended to prevent and treat these, for this document, we avoid the term CAUTI and instead refer to UTI which includes bacteria in the urine (bacteriuria), as well as physical symptoms such as fever and/or urinary tract symptoms such as dysuria, urgency, frequency, hematuria, and flank pain.²⁴⁻²⁷

Along with symptoms, the bacterial count to diagnose a UTI varies based on the patient population, ranging from 102-108 colony-forming units (CFU)/mL of a bacterial species.^{14,15,28} The incidence of UTI as a consequence of IC is approximately 2.5 per person per year, with over 80% of patients experiencing at least one UTI over a five-year period.²⁹

RELATED INFECTIONS

Pyelonephritis with UTI is an uncommon complication, with an approximate risk of 5% suggested in the few published studies.³⁰

Epididymo-orchitis is more common in patients performing IC, with studies suggesting a broad incidence range from 3% to 12% in the short term to over 40% in the long-term (a seven-fold increase in risk).^{30,31} Standardized antibiotic therapy based upon local guidelines is recommended.

Urethritis historically occurred in 1-18% of patients undergoing IC. However, with newer catheter characteristics and catheterization techniques, this no longer applies, and contemporary data regarding incidence and risk of urethritis is lacking.

Prostatitis frequently occurs with an incidence of 18-31% and treatment as per local standardized protocols.³²⁻³⁵

Risk Factors for UTI

Low frequency of IC³⁶⁻⁴¹
Bladder overdistension⁴²
Female⁴⁰
Poor fluid intake⁴⁰
Non-hydrophilic coating^{40,43}
Poor technique⁴⁰
Poor education^{37,38,41}

Table 6 - Factors increasing the risk of infection in IC. Reproduced from the EAUN Guidelines 2013, with permission.²

Recommendations

A single use, pre-lubricated catheter should be recommended for patients, especially those with repeated, symptomatic UTIs. (2-A)⁴³

In a patient performing IC, only symptomatic UTI should be treated.^{25,44}

Epididymo-orchitis in a patient performing IC should be treated with antibiotic therapy, choice and duration based on local policy.

Prostatitis in a patient performing IC should be treated with antibiotic therapy; choice and duration based on local policy.^{34,35}

Table 7 – Recommendations for infection management. References from EAUN edited summary 2016 unless otherwise shown.

The European Urology Association (EAU) guidelines on neurogenic bladder dysfunction recommend an aseptic technique as a compromise between sterile and clean techniques, based on UTI incidence, practicality, and economic considerations.⁴⁵ In the EAU document, aseptic technique is defined as “catheters remain sterile, the genitals are disinfected, and disinfecting lubricant is used.”

Referring to Spaulding’s classification, as the bladder is ideally a sterile body cavity, anything introduced into it is considered critical and should be sterile.⁴⁶ Best practice is to use a sterile catheter and sterile lubricant each time, especially in hospital and residential settings.

Refer to Appendices vi and vii for the respective male and female clean procedures. Most catheters are manufactured for single use, while others may be manufactured for multiple use. The authors of this document were unable to find any urinary catheters available in Canada that are marketed for re-use. As previously stated, we cannot support the re-use of catheters for intermittent catheterization. We do however acknowledge that this does occur in Canada and therefore to mitigate risk, we make reference to the Cleaning Intermittent Urinary Catheters in Home and Supportive Living Provincial Continuing Care of Alberta Health Services.⁴⁷ Retrieved from <https://www.alberta-healthservices.ca/assets/healthinfo/ipc/hi-ipc-cchss-clean-intermittent-cath-cc.pdf>.

There are differing opinions on the need for sterile versus clean catheters, including in a now withdrawn Cochrane review and position statements from an Ontario Provincial Working Group of physicians, nurse practitioners, and other professionals, and Health Quality Ontario.^{28,48-53}

Despite some evidence that it may reduce the frequency of UTIs, prophylactic antibiotic use is not recommended, as it increases antimicrobial resistance of organisms and is contrary to provincial, territorial, national, and international antimicrobial stewardship initiatives.^{44,54-59} Multimodal strategies are recommended to reduce UTI risk.^{25,54,59}

INFECTION PREVENTION

UTI is the most common complication of intermittent catheterization and causes physical and social discomfort. Prevention of UTIs impacts patient quality of life, improving wellness and reducing missed workdays or social events.^{17,60}

3.1 HAND HYGIENE

Hand hygiene is the single most important practice for preventing the transmission of micro-organisms and thus infection.⁶¹

Healthcare professionals should strictly follow hand hygiene best practices including the Four Moments of Hand Hygiene: before contact with the patient and their environment, immediately before any aseptic procedure (e.g., intermittent catheterization and before putting on gloves), immediately after a risk of exposure to body fluids (e.g., after catheterization and after glove removal), and before leaving the room/bed space after touching the patient or environment.^{62,63} Patients who self-catheterize should thoroughly clean their hands with alcohol-based hand rub or with soap and water, especially if visibly soiled, before catheterization.⁶¹ Hand hygiene is required before accessing materials (e.g., catheter, lubricant, any containers, etc.), and immediately before and after the procedure.⁶¹

Recommendations

Follow hand hygiene protocols before gathering materials and immediately before and after catheterization.⁶¹

Educate patient/caregiver in techniques of hand hygiene before discharge from hospital.⁶¹

Table 8 – Recommendations for hand hygiene.

3.2 SKINCARE AND PREPARATION

Good genital hygiene, especially before catheter insertion, will reduce the risk of catheter contamination and subsequent infection.⁵⁴ Patients who practice IC are most at risk from the microflora of the urethral meatus being pushed up and into the bladder by catheter use, with E.coli being the main species responsible for UTIs in intermittent catheter users.⁶⁴

Recommendations

Maintain good genital/perineal hygiene, washing with soap and water from front to back at least daily and when necessary.¹⁰

Cleansing the area around the urethral meatus with tap or sterile water, soap and water, or antiseptics like chlorhexidine (based on institutional/local policy) will reduce the risk of catheter contamination.^{13,30,59,65}

Table 9 – Recommendations for skin care and preparation.

3.3 ENVIRONMENT AND EQUIPMENT

In any setting, the physical environment may contaminate equipment and increase the risk of infection. For IC, the procedure should be done in a clean environment, e.g., surfaces cleaned at minimum before the procedure. Use a hard, clean surface for setting up an aseptic field, e.g., table, non-fabric chair or seat. Avoid the floor or bed. It is recommended that animals be removed from the area where bladder catheterization is being performed. Animals can be a source and mode of transmission of infection. Equipment must be clean or sterile prior to use, and any equipment that is re-used, e.g., catheter, bowl, storage container/cover, etc., must be thoroughly cleaned and disinfected after use, and stored in a clean, dry area, away from the risk of splashes, sprays, or accidental touching.

As previously stated, a urinary catheter is a critical device as it enters a normally sterile body cavity, and therefore should be sterile.⁴⁶ Health Canada defines critical-contact single use devices as - “Devices that come into contact with blood or normally sterile body cavities by penetrating the skin or mucous membrane, such as cardiac catheters or urinary catheters.”⁶⁶ In addition, healthcare equipment that is labelled by the manufacturer as single use should not be reprocessed and re-used unless it meets the requirements of a new device.^{67,68}

Single use sterile lubricated catheters are recommended to minimize the risk

of infection. This may be problematic for some clients due to decreased manual dexterity, e.g., those with Parkinson’s disease, while others may be financially constrained. However, patients/clients with repeated UTIs should be strongly advised to use single use, pre-lubricated sterile catheters.⁴³

Recommendations

A single use, pre-lubricated sterile catheter should be recommended for patients, especially those with repeated, symptomatic urinary tract infections. (2–A)⁴³

Table 10 – Recommendations for environment and equipment.

3.4 FLUID INTAKE

Drinking adequate fluid helps to dilute the urine and create a downward drainage and flushing effect. The required amount of fluid varies depending on a patient’s weight (25-35 ml/kg/day), amount of fluid loss, food intake, and circulatory and renal status.⁴⁰ Inadequate fluid intake compounds problems related to inadequate frequency of bladder emptying. When urine volume is less than 1,200 ml per day, patients are less likely to empty their bladders at regular intervals, resulting in urinary stasis and bladder distension, conditions that increase the risk of infection.⁶⁹ Excessive fluid intake may result in bladder overdistension and overflow incontinence.^{69,70}

Recommendations

Encourage patients to drink sufficient fluid to maintain a urine output of at least 1,200 ml per day.^{69,70}

Patients should consume sufficient fluid based on their weight (25-35 ml/kg/day).

Table 11 – Recommendations for fluid intake. References from EAUN edited summary 2016 unless otherwise shown.⁷

3.5 URINALYSIS

As previously stated, patients performing IC routinely have an abnormal urinalysis, with chronic or recurring bacteria present in their urine within three weeks of IC.^{41,44,57}

Asymptomatic bacteriuria is the presence of bacteria in the urine without accompanying signs or symptoms of UTI. To be diagnosed with a UTI, the patients/clients should exhibit urinary symptoms such as dysuria, frequency, urgency, hematuria, flank pain, and fever.

Dipsticks alone have limited value to rule out infection and should not be used to diagnose UTI.⁷¹ A midstream or catheter specimen, using a sterile catheter, should be obtained to reduce contamination.

See Appendix ii for a sample procedure to collect a mid-stream urine specimen. Adapted with permission from Public Health Ontario.⁷²

Recommendations

Avoid the routine use of dipsticks to diagnose UTIs as they may provide misleading information.⁷¹

Take a midstream or catheter specimen of urine for culture only if a patient has symptoms suggesting a UTI.⁴⁴

Table 12 – Recommendations for urinalysis.

3.6 CRANBERRIES

There is currently insufficient evidence to recommend prophylactic administration of cranberry supplementation to reduce the incidence or risk of UTI as a result of IC.³¹

Recommendations

Do not routinely recommend cranberry supplements to prevent or treat UTI.^{31,54,73,74}

Table 13 – Recommendations for cranberries.



CHAPTER 04 – IMPACT OF INTERMITTENT CATHETERIZATION: PATIENT QUALITY OF LIFE

Intermittent catheterization can have both positive and negative impacts on a patient's quality of life. These can be physical, psychological, emotional, and social in nature.⁷⁵

POSITIVE IMPACT ON PATIENT QUALITY OF LIFE

- Improvement of urinary symptoms;⁷⁶
- Unbroken sleep;
- Independency;
- More self-confidence;
- Less urine incontinence;¹¹
- Normal sex life;
- Less local periurethral infection, febrile episodes, stones, and deterioration of renal failure.

NEGATIVE IMPACT ON PATIENT QUALITY OF LIFE

- Difficult to perform and to integrate with daily living, e.g., a lack of adequate public washroom facilities, work environment and holidays;⁷⁷
- Feelings of worry, shock, fear, or depression;
- Affected family and social life;
- Can be painful;
- Time-consuming, and having to watch the time (every 3-4 hours);
- Fatigue;
- May take time to adapt to daily life;
- Cost: financial limitations, lack of insurance, and public health policies.^{78,79}

Recommendations

Discuss cost and financial limitations as part of patient assessment and consider these when recommending the type of catheter for the patient. (5–C)⁷⁹

Professional support is highly recommended to increase compliance and QoL. (1–B)⁶⁰

Table 14 – Recommendations for quality of life.

FREQUENCY

Performing urethral catheterization four times a day seems to adversely affect QoL, especially for those patients that did not leak urine.⁸⁰ Those who catheterize twice daily are generally more able to develop a routine that does not require catheterization outside the home, thus avoiding many of the difficulties described under the negative impacts on QoL.

INTIMACY AND BODY IMAGE

Several studies have included statements on the impact of IC on intimacy or sexuality and body image. Some negative impacts have been described by some individuals.

One woman stated “I think the biggest issue that both of us have, is that we had a really good sex life before and that has been affected massively because obviously hygiene is paramount and if my back’s not good and with catheterizing, oh it’s just awful really. They [catheters] irritate my skin, so I get sore skin as well. So if you’re having intercourse and your skin’s broken, you’ve got all that worry as well as all that pain, so that’s difficult. It’s just like not one little thing; it’s a few things together”⁷⁵

Recommendations

Discuss sexuality and impact of IC as a part of the patient assessment; if necessary, refer to a psychologist/sexologist.

Table 15 – Recommendations for sexuality and body image. References from EAUN edited summary 2016 unless otherwise shown.⁷



CHAPTER 05 – CATHETER MATERIAL AND TYPES OF CATHETERS

CATHETER MATERIALS

There are a wide variety of intermittent catheters available in the Canadian market. Catheter selection depends on patient characteristics, patient finances, insurance coverage, availability, and the preference of the patient or caregiver.¹⁰ There is some evidence that patient satisfaction can be influenced by catheter type or material which may be essential for patient compliance with IC.

POLYVINYL CHLORIDE

Polyvinyl Chloride (PVC) is the most common thermoplastic polymer used in the construction of intermittent catheters.¹⁰ PVC catheters are usually clear, and they are inert, so do not react

when in contact with bodily fluids. PVC catheters are stiffer than silicone and red rubber catheters, which may contribute to urethral trauma. At the same time, this relative stiffness may be helpful to some patients who have difficulty advancing softer catheters like silicone.

PVC has environmental concerns. In the manufacturing of PVC catheters, plasticizers such as di-2-ethylhexyl phthalate (DEHP) are added to make the catheters more flexible.¹⁰ One environmental concern about PVC is that it emits toxic fumes (hydrogen chloride) when burned.⁸¹ PVC catheters are packaged singly in sterile packaging and are labelled as single use catheters.

SILICONE

Silicone is one of the most durable and biocompatible synthetic materials used to manufacture intermittent catheters. Although silicone catheters are more expensive, they have become more popular due to increased latex allergies.¹⁰ Silicone catheters made for intermittent catheterization are softer and more flexible than PVC catheters, and some patients may have trouble advancing the catheter.

POLYURETHANE

Polyurethane (PU) is a polymer containing urethane blocks and is soft and elastic. PU offers flexibility without the use of plasticizers, which provides the needed properties for intermittent catheters without having substances such as PVC and phthalates in them, which are undesirable in waste incineration.

THERMOPLASTIC OLEFIN

Thermoplastic polyolefin (TPO) is a generic name for a family of plastics, derived from either polyethylene or polypropylene. The term thermoplastic relates to the fact that the plastics have been modified so that they can be processed at high temperatures. TPO has several advantages:

- It does not contain any chlorine, therefore PVC free;
- It does not contain DEHP which is a phthalate used to soften plastic but is known to harm human health;
- It has a stiffness perceived sometimes to help introduction of the catheter;
- its processing results in a smoother surface than PVC, thus reducing the friction forces.⁸²

OTHER MATERIALS

Stainless steel catheters date back to the early 1900s. These catheters are rigid and multi-use for women only (ICS, Continence product). Stainless steel catheters require adequate cleaning and storage. Stainless steel catheters are not recommended for use, and it is unusual to see them used for IC today.

Red rubber catheters were also frequently used in the past. Red rubber catheters contain latex, so there is concern regarding allergies. Red rubber intermittent catheters are available in Canada, marketed as single use.⁸³

TYPES OF CATHETERS

Several types of catheters and catheter sets are available for IC in Canada. Figure 2 gives an overview of the types of existing ICs in Canada.

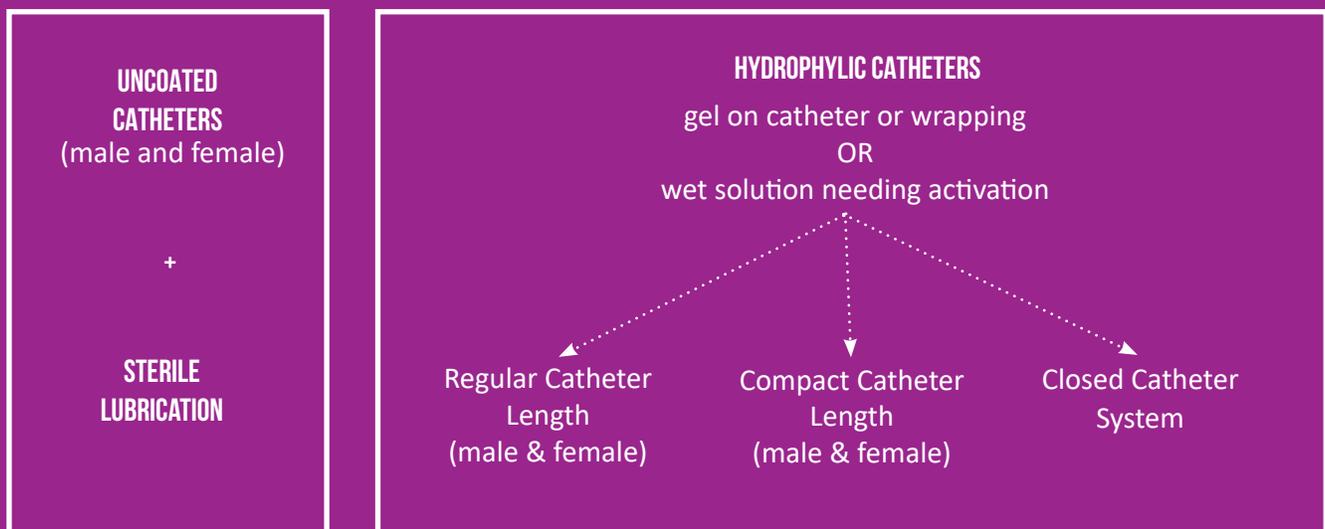


Figure 2: Type of intermittent catheters available in Canada in 2019.

UNCOATED INTERMITTENT CATHETERS

Uncoated intermittent catheters, also known as standard catheters, are usually made of polyvinyl chloride (PVC), silicone, or polyurethane and less commonly red rubber latex. Uncoated intermittent catheters, in combination with sterile lubrication, are widely used in Canada within hospitals and in the community. In hospitals, uncoated catheters are usually pre-packaged in an intermittent catheter-set and are single use due to infection risk.

Uncoated catheters should be used with sterile, single use water-soluble gel/lubricant.

The uncoated catheter may come packed with a gel/lubricant already in an intermittent catheterization kit, e.g., in a hospital setting. If the uncoated catheter is not in a kit, then a separate package of sterile water-soluble gel/lubricant should be used. In many parts of Canada within the community setting, uncoated catheters have been re-used for up to one week.⁵⁰ As described in Chapter 3, re-use of catheters is not recommended. Manufacturer guidelines state that the intermittent catheter is designed for single use and is to be discarded after use.¹⁰ Recognize the packaging symbols to help differentiate between those catheters designed for multiple use and single use.

Clinicians need to base decisions about which type of catheter to use on clinical judgement in conjunction with patients/caregivers, keeping in mind that the catheter is likely manufactured to be single use only.

SINGLE-USE HYDROPHILIC COATED CATHETERS

Hydrophilic coated (HC) intermittent catheters evolved to reduce friction, thereby reducing trauma during the catheterization process.¹⁰ HC catheters are coated with a polymer bound to the surface of the catheter. This polymer layer absorbs and binds water to the catheter making a smooth, slippery surface that makes inserting the catheter easier, especially as the layer remains intact, ensuring the entire urethra is lubricated during catheterization and again on withdrawal.^{10,50} See recommendations in tables 7 and 10 pertaining to the use of HC catheters for infection management and in consideration of the setting.

Some HC catheters are ready to use while others require the addition of water by breaking or bursting a water packet or salt solution to activate the hydrophilic coating.¹⁰ Some HC catheters have a plastic sleeve or plastic grip. This sleeve/grip allows the catheter to be inserted without being touched.

FEATURES OF INTERMITTENT CATHETERS

DIAMETER SIZE OF INTERMITTENT CATHETERS

The external diameter of intermittent catheters is measured in French (Fr) units, which is three times the diameter in millimetres. Sizes range from 14 to 22 for adults. The choice of catheter size should be large enough to allow the free flow of urine without damaging the urethra. The funnel end of the catheter is usually colour-coded allowing easier size identification (see Table 18).

Standard Catheter Connector Colour Chart							
Catheter Size	8	10	12	14	16	18	20
Colour							
Tube Size	2,7	3,3	4	4,7	5,3	6	6,7

Table 16 - Standard catheter connector colour chart



Figure 3: Colours of Catheter Grips representing diameter size, used with permission of ConvaTec Group PLC.

Recommendations

Choose a catheter size large enough to allow free drainage yet small enough to reduce the risk of trauma.

Table 17 – Recommendations on catheter diameter. References from EAUN edited summary 2016 unless otherwise shown.⁷

LENGTH OF INTERMITTENT CATHETERS

Many uncoated and hydrophilic catheters come in male and female lengths. The male catheter (approximately 40 cm) is longer than the female (approx. 7-22 cm), acknowledging the length of the male urethra. The shorter female length intermittent catheter facilitates drainage when a woman is seated on a toilet. Women find that shorter catheters do not shift and are easier to grab and insert.¹⁰

There is some evidence that among male users of intermittent catheters who use a wheelchair, a longer 40 cm length was preferred due to confidence of complete bladder emptying, more satisfactory length, and ease of drainage into a receptacle.⁸⁴



Figure 4: Male and Female Length Catheters in Different Diameter Sizes, use with permission of Coloplast A/S.

Recommendations

Choose a catheter length that the patient prefers to facilitate complete bladder emptying and ease drainage into a receptacle. (2–B)⁸⁴

Table 18 – Recommendations on the length of intermittent catheters.

CATHETER DRAINAGE OPENINGS

The intermittent catheter drainage openings (eyes or eyelets) are usually placed on one side or opposing sides of the catheter.¹⁰ Catheters with polished or ultrasonically-smoothed openings minimize urethral abrasion during insertion. Some patients have issues with sediment or mucous that can clog the drainage eye, so larger eyelets may be beneficial.

DISCRETE/COMPACT INTERMITTENT CATHETERS

Some manufacturers offer a compact intermittent catheter that is a smaller size and therefore more discreet and easily carried in a purse or pocket.¹⁰ The smaller catheter is convenient, and the products are sterile and for single use only. The compact intermittent catheters are available in male and female lengths and are usually available as both uncoated and hydrophilic intermittent catheters.

The female catheters are smaller than a writing pen and the male version is about half the size of a standard intermittent catheter. There is some evidence that among specific populations (e.g., spinal cord injury population), the compact catheter significantly improved patient quality-of-life related to intermittent self-catheterization.⁷⁷



Figure 5: Actreen Mini Female Catheter, used with permission of B Braun.



Figure 6: Magic3 Go female catheter, used with permission of BD Bard.



Figure 7: SpeediCath compact male catheter, used with permission of Coloplast.

TOUCH-LESS INTERMITTENT CATHETERS

A touch-less catheter is a single use intermittent catheter that has a protective sleeve that covers the catheter, which prevents direct hand contact with the catheter during preparation and catheterization.¹⁰ Some touch-less catheters not only have a protective sleeve but also have an introducer tip. It is thought that the first 1.5 cm of the urethra has larger numbers of micro-organisms, and this introducer tip protects the catheter from contamination as it passes through the distal urethra.

There are also touch-less catheters that have an insertion aid/gripper. These types of catheters can be helpful for those with a history of frequent catheter-associated UTI due to poor technique.¹⁰



Figure 8: Advance IC Gel Reservoir, used with permission of Hollister Limited.



Figure 9: VaPro, used with permission of Hollister Limited.

CLOSED INTERMITTENT CATHETER SYSTEMS

Closed catheter systems are most commonly available in Canada as hydrophilic catheters and are not available as uncoated catheters. A closed catheter system includes all the equipment, i.e., the catheter, the water-based lubricant and drainage bag, into a self-contained system.

These systems are ideal in confined spaces or restricted facilities such as airplanes, building sites, or rural settings where access to toilet facilities may be limited. They can be useful for those who catheterize from a seated or prone position. Since there is a difference in handling and use of these systems, users should refer to the manufacturer's instructions.



Figure 10: Closed Catheter System Actreen Mini Set, used with permission of B. Braun Medical of Canada.



Figure 11: Touchless Plus closed catheter system, used with permission of BD Bard.

The catheters illustrated in this document are examples only and not exhaustive.

CATHETER TIPS/ENDS

Standard Tip: The standard tipped catheter, also known as a Nelaton catheter, has a soft rounded tip that is flexible with a straight proximal end. They usually have two lateral eyes or openings. This is often the intermittent catheter that patients will begin to use when learning intermittent catheterization.¹⁰



Figure 12: Standard tip catheter, used with permission of ConvaTec.

Tiemann/Coudé Tip: The Tiemann/Coudé is firmer, curved at an angle, and can have up to three drainage holes. This type of tip is useful in individuals with a narrow urethral passage or prostatic obstruction. The combination of the angled and slightly more rigid tip can allow easier insertion through obstructed areas.¹⁰



Figure 13: Tiemann/Coudé Tip Hydrophilic Catheter, used with permission of Coloplast A/S.

Flexible Rounded Tip/Ergothen Tip: The soft bead at the end of the tip centres the catheter in the urethra for smooth insertion. The flexibility of the top section enables easy guidance through curves and bends for both normal and difficult male anatomies, including issues such as prostate hypertrophy and strictures. Figure 14 below also shows a touchless insertion gripper.⁸⁵

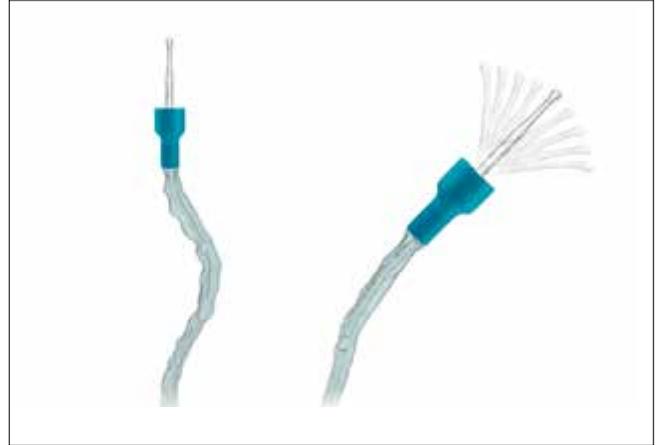


Figure 14: SpeediCath Flex, used with permission from Coloplast A/S.

Catheter choice is a personal decision with no one catheter the right option for every patient.^{86,87} Patients should be shown samples of the catheters that are appropriate for them to use.^{86,88,89} Patients reported the importance of trying different catheters before choosing one.⁹⁰ The choice of catheter should be made based on patient preferences and need.⁹¹ It is important to consider insurance constraints when choosing catheters.⁷⁹ Financial limitations to purchasing the required equipment can be a significant barrier to carrying out IC as taught.⁷⁸



CHAPTER 06 – MANAGEMENT OF INTERMITTENT CATHETERIZATION

Intermittent catheterization in Canada is governed by provincial regulations of the scope of practice for health professionals.⁹² Nurses perform IC as well as teach patients/caregivers the knowledge and skill to perform the procedure competently and confidently. The prerequisite environment for IC includes:

- Privacy;⁷⁹
- Requisite dexterity;⁹³
- Skilled health professional instruction and support to establish performance competency;⁸⁸
- Access to hand washing or hand sanitizer;⁷⁹
- Supplies for perineal/urethral meatus cleansing, intermittent catheter, lubricant for a non-lubricated catheter;
- Receptacle for urine and suitable place to dispose of supplies.

Recommendations

Observe local policy before starting catheterization.

Assess the individual and the circumstance for IC before choosing the type of catheter and aids.⁸⁸

Be aware that the individual's privacy is paramount. (4–C)⁷⁹

Perform IC after micturition in a patient who can void.

Table 19: Recommendation on the management of intermittent catheterization. References from EAUN Guideline 2013 unless otherwise shown.²

For practical guidelines on how to insert a male or a female urethral catheter, refer to your local policies and procedures manual/resource.

Recommendations

Use a record chart or voiding diary to track the fluid intake and output in the patient prior to and during IC.

Offer patients an individualized care plan based on the above criteria, bearing in mind the patient and caregiver's lifestyles and the impact this will have on the patient's QoL.^{60,88}

Assess the fluid intake of the patient if the urine output is >3L/day or there is a need to catheterize > 6 times/day.

If intermittent catheterization is used, perform it at regular intervals to prevent bladder over-distension.⁹⁴

Assess the fluid intake of the patient if urine output is > 500 ml per catheterization.

Assess the frequency if the urine output is > 500 ml per catheterization.

Re-assess status if catheterized volumes vary widely.*

Consider discontinuing IC if catheterized volume is <100 mL x3.*

Reassess status if urinary leakage occurs between catheterizations.*

IC before bedtime is recommended to help reduce nocturia.

*Table 22: Recommendation on the frequency of catheterization. References from EAUN Guideline 2013 unless otherwise shown.2 *Expert opinion of authors.*

6.3 URETHRAL MEATUS CLEANSING

Before catheter insertion, the urethral meatus should be cleansed. In the absence of statistically significant differences, tap or sterile water is an acceptable option for periurethral cleansing prior to insertion of a urinary catheter. Antiseptic solutions such as chlorhexidine or povidone may be used in formal health care settings, as determined by local policy. However, chlorhexidine may cause irritation of mucous membranes and in the community, clients should use clean water or soap and water for urethral meatus cleansing as it is convenient and cost-effective.^{95,96}

Recommendations

Tap or sterile water is an option for periurethral cleansing before insertion of a urinary catheter.⁶⁵

Antiseptics may be used in hospitals and long-term care homes but washing with soap and water is convenient and cost-effective in community settings.

Table 23: Recommendation for urethral meatus cleansing.

6.4 LUBRICATION

Non-coated catheters require the use of a sterile lubricant to aid catheter insertion. The multi-use lubricant in a tube has a great potential to become contaminated by bacteria, which will then be introduced through the insertion of the catheter. Two methods may achieve the application of the sterile lubricant on to the catheter tip and length. The first method is to cut both ends of the package and insert the catheter into one end; hold on to the package and push the catheter through the gel with the catheter exiting at the other end. The second method is to open the package and squeeze the gel contents on to the tip and along the shaft of the catheter. This can prove to be messy and make the catheter more difficult to handle. The purpose of both ways is to try and coat the catheter as much as possible with the lubricant. It is recognized that the majority of the lubricant will be caught at the urethral entrance rather than throughout the urethral passage.

In both male and female patients, the vulnerable urothelium can best be protected from trauma and pain by a continuous film of sterile lubricant along the length of the catheter being inserted. This is achieved with the use of a hydrophilic catheter, or if using a non-coated catheter, the sterile lubricant can also be instilled via a pre-loaded sterile syringe into the urethra.

For patients with preserved urethral sensation, a local anesthetic gel (lidocaine hydrochloride,

xylocaine) may be used. These come in pre-loaded syringes as well and require instillation into the urethra. It is imperative that the patient is asked if they have an allergy to any local topical anesthetics, and this is documented as such in their clinical alert record. Additionally, it cannot be used if the patient has damaged or bleeding urethral membranes due to an increased risk of systemic absorption. Lubricating gels that contain antiseptics or antimicrobials are not routinely recommended. Additionally, the patient who has a sensitivity to any of these agents must not receive these types of impregnated gels. There is no conclusive evidence that the routine use of these gels will decrease urinary tract infections.

Recommendations

Use a sterile, single use packet of lubricant jelly for catheter insertion.⁹⁴

Routine use of antiseptic lubricants is not necessary.⁹⁴

Instillation of lubricant into the urethra (10 mL for males/6 mL for females) provides a continuous film most effective in reducing urethral pain and trauma.

Avoid the use of local anesthetic gel in the presence of damaged or bleeding urethral membranes due to an increased risk of systemic absorption.

Check for lidocaine sensitivity if using a lubricant containing lidocaine.

Use of an anesthetic lubricant is indicated for individuals experiencing anticipated or actual discomfort with catheter insertion. *

Table 24: Recommendation for lubrication. References from EAUN edited summary 2016 unless otherwise shown.⁷

**Based on the expert opinion of the authors.*

6.5 INSERTION AIDS & DEVICES

Canadian medical supply retailers can access the following insertion aids and devices:

- **Leg spreader:** For women. This device will hold knees apart during IC. It may be collapsible for transport, available with the option for a mirror or light to be attached, and washable after use.
- **Mirror:** For women. This device attaches to the leg for improved visualization and may have the option to attach a light.
- **Pant holder:** Holds open pants down and away during IC.
- **Penis supporter:** Encircles the penis to stretch and position it for easier catheter insertion.
- **Extension tubing:** Attaches to the catheter if needed to facilitate urine drainage into the toilet.
- **Reacher tools for paraplegia:** Designed for individuals with reduced reach or grip ability, it may allow independence with catheter insertion.
- **Female catheter guide:** Assists with locating the urethral opening.

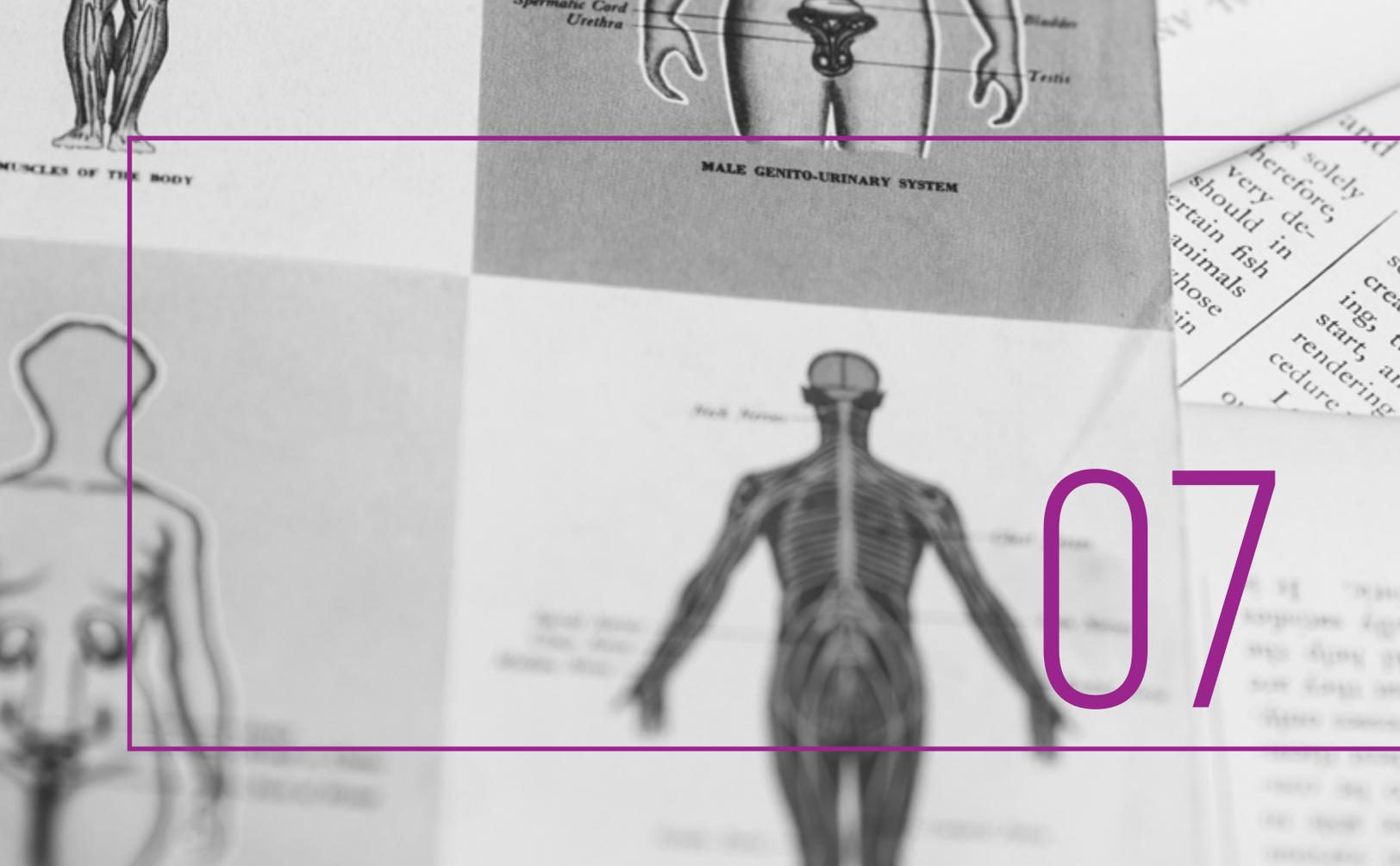
6.6 DOCUMENTATION

Provincial regulatory colleges for each health profession have approved standards required for all documentation; therefore, the expectation is that the health professional will comply with these standards. Employer's requirements and policies may vary; therefore, the health professional must ensure adherence to both their regulatory body's standards as well as their employer's policies.

The **following** are guidelines which may assist the health professional in their documentation:

1. The identification of the patient is verified with the record on which the data is being recorded.
2. Date and time of IC.
3. Reason for the intermittent catheterization.
4. If you reviewed the patient's record chart or voiding diary, record any information that contributed to proceeding with IC at this time.

5. Last IC done at ____ hr. with amount voided.
6. If the patient can void before to intermittent catheterization, record the amount and characteristics of the urine (colour, odour, transparency).
7. If an ultrasound has been done post voiding and prior to doing IC, record residual amount.
8. Pre-catheterization peri-care completed using_____
9. Urethral meatus cleansing completed using_____
10. Name, type of IC catheter, tip type, Fr#____, length__
11. If the tip is not coated, type and amount of lubricant used. If lubricant is instilled into urethra, state type, amount.
12. If local anesthetic instilled, state type, amount, and reason for the need for local anesthesia before insertion of the catheter.
13. Record the ease of insertion and removal of the catheter.
14. Record any adverse reactions to the insertion and the patient's tolerance to the IC.
15. Record the amount of residual urine obtained from doing the intermittent catheterization. Describe urine characteristics.
16. Place recording into the patient's voiding diary date, time, and amount.
17. Communicate any resources, recommendations, or changes related to IC that you have made to the patient or their care provider.



CHAPTER 07 – PATIENT EDUCATION

Intermittent catheterization can be carried out by the patient, a caregiver, or health care professional. In this chapter, we address the teaching of IC to the patient and their caregiver. The term patient is used throughout and is an all-encompassing term that includes residents, clients, family members, and caregivers. Self-confidence in carrying out the procedure has a significant impact on the quality of life and adherence, making IC education fundamental in the successful integration of IC into the patient's life.^{60,91}

PROVIDE EVERY PATIENT DEEMED APPROPRIATE FOR IC WITH AN OPPORTUNITY TO LEARN THE PROCEDURE.

IC is a simple procedure, and most do not find it difficult to learn. Over 80% of patients are able

to learn IC successfully, and the vast majority (84-92%) of patients can learn IC in one training session.^{80,91,93,97} Most patients report that it is not a burden to come for additional education sessions if necessary.

Several factors challenge successful learning of IC, including limited mobility, difficulty accessing the perineum (e.g., obesity, spinal stenosis), functional disabilities, cognitive disorders, and visual disturbances.⁹⁷

However, age is not a limiting factor as many elderly patients successfully learn IC.^{80,93,98}

Children with a learning disability have successfully learned self-catheterization, as have patients with a spinal cord injury below C5.^{99,100} ISC could be successfully carried out by

tetraplegic patients following upper limb reanimation.¹⁰¹ Those with multiple sclerosis (MS) report that a lack of dexterity makes carrying out IC challenging, yet IC can be successfully managed by those with MS.⁷⁶⁻⁷⁷ Men have a higher success rate than women.⁹⁷

The Pencil and Paper Test (PP Test) has been found to be a valid tool used to predict the success of learning intermittent self-catheterization (ISC) for patients with neurological disorders.⁹⁸ Challenges for patients with neurological disorders include such things as poor hand function (sensory, paralysis or coordination), spasticity interfering with catheterization, visibility issues resulting in difficulty locating the urethral meatus, physical or cognitive impairment, as well as, psychological components. The PP test evaluates the physical and cognitive abilities required to perform ISC but does not assess for psychological components. The PP test is administered in less than four minutes and is well received by patients.

For practitioners interested in using the PP Test as a tool in helping to determine the likelihood of success with ISC teaching for patients with neurogenic disorders, the instructions and test can be retrieved from <https://pp-test.jimdofree.com>.

The presence of one unfavourable factor does not predict failure, and the patient should be encouraged to try IC.⁹⁷ Severe disabilities do not always result in unsuccessful learning. Those with MS, spinal cord injury, cauda equine syndrome, spina bifida, stroke, and other conditions have all successfully been taught IC.⁹⁸

A NURSE SPECIALIZED IN CONTINENCE CARE, OR UROLOGY NURSING SHOULD PROVIDE IC EDUCATION.

In the studies reviewed, frequently the education was provided by a nurse specialized in continence care or urology nursing. Staff providing this education must, at minimum, be well-trained.^{80,91,93} Patients valued the knowledge, kindness, and patience of the nurse providing their education. Empathy and non-judgemental attitude were

also identified as positive attributes of nurses teaching IC.⁸⁸

EXTENDED APPOINTMENT TIMES ARE REQUIRED TO TEACH IC.

To adequately teach IC, extended appointment times are required.^{91,93} In the literature, education sessions ranged from one hour to 90 minutes. Patients report the importance of a private and relaxed environment with sufficient time.^{88,91,93}

PROVIDE IC EDUCATION IN THE CLINIC, HOSPITAL, OR HOME SETTING.

IC education can be provided in the clinic, hospital or home setting. If possible, patients should be offered the choice of venue for learning IC.⁸⁸

INCLUDE CAREGIVERS OR FAMILY MEMBERS IN IC EDUCATION.

Social support for adherence to IC is important.⁷⁸ Many patients chose to be accompanied to their education session by a relative or partner and reported that it was comforting to have them present.⁹¹

PROVIDE IC INFORMATION BEFORE THE INITIAL EDUCATION SESSION.

Patients have reported that receiving written information or audio-visual aids before the education session not only prepared them for the education session but also alleviated some of the fear they were experiencing.^{88,91,93} Refer to Appendix iii for a patient brochure that may be printed and distributed to patients.

IC education includes physiology and pathophysiology, indications and benefits of IC, catheters/equipment, IC procedure, incorporating IC into daily life, and potential complications. Teach intermittent catheterization using written, verbal, audio-visual resources, demonstration, and return demonstration.

Appendix iv provides a checklist that outlines the topics to be covered. This document can be used to ensure that all subjects are reviewed with the patient. Appendix v provides a procedure for nurses to reference when teaching IC.

Topics recommended to be covered in IC education include:

1. **Physiology and Pathophysiology.**^{80,88,91,93,98}
Explain the anatomy of the relevant gender urinary systems. These may the patient understand the need for IC.
2. **Indications and Benefits of IC.**^{97,99}
Refer to Chapter 2 for an overview of the indications of ISC and Chapter 4 for the impact of IC on quality of life.
3. **Catheters/Equipment.**^{89,93}
Catheter choice is a personal decision with no one catheter the right option for every patient.^{86,87} Patients should be shown samples of the catheters that are appropriate for them to use.^{86,88,89} Patients reported the importance of trying different catheters before choosing one.⁹⁰ The choice of catheter should be made based on patient preferences and need.⁹¹ It is important to consider insurance constraints when choosing catheters.⁷⁹ Financial limitations to purchasing the required equipment can be a significant barrier to carrying out IC as taught.⁷⁸
4. **Intermittent Catheterization Procedure.**^{91,98,99,102,103}
The procedure of IC is usually first explained verbally, written, or using audio-visual aids.^{80,91,98} Most use a combination of these methods. It is useful to provide written information as patients report referring to the written material after their education session.⁹¹ Appendices vi and vii are step-by-step procedures (male and female, respectively) for IC that can be printed for patients to reference at home.

The Clinical Advisory Board for Intermittent Catheterization (CABIC) guidelines for teaching patient's clean IC have been shown to improve knowledge and performance of IC.¹⁰³ Appendices vi and vii include all components of the CABIC teaching guide.

Following this explanation, the nurse supports the patient to carry out the procedure.^{88,93} The method needs to be individualized, and it takes practice to learn.⁷⁹ It is vital to work with the patient to determine the position (sitting, lying, or standing) that will work best for them.^{79,93} For women, positioning is one of the most commonly reported challenges with IC.^{77,99} The best location for performing catheterization should be discussed with the patient (e.g., bed, wheelchair, or toilet).⁹¹ Those who were allowed to practice the procedure in different positions with different catheters found the experience helpful, and those who did not have this experience felt that it would have been useful.

The use of simulators (partial or complete anatomical body parts) can be used to enhance training in IC further. Simulation training enables patients to increase their self-confidence when performing IC.¹⁰⁴

The use of aids and devices should be considered. Most women have difficulty learning to find the urethra and require the use of a mirror.^{79,89,99,105} There are also devices available to assist those with reduced dexterity and mobility, including spinal cord injury.^{93,100} Refer to Chapter 6 (section 6.6) for an overview of assistive devices available in Canada.

Most patients found that the preparation (hand washing, preparing the catheter, cleansing the genitals) and disposing of the catheter was more complicated than the procedure itself.⁹¹ This shows the importance of spending time on these aspects of the procedure.

5. **Frequency of catheterization**
In Chapter 6 (sections 6.1 and 6.2) the tracking of urine volume and frequency of catheterization are discussed. Patients can complete a voiding diary to assist with determining the appropriate frequency of catheterization.

6. Incorporating IC into daily life
Incorporation of intermittent catheterization into everyday life is not easy for patients.^{79,91} Even though the act of intermittent catheterization was described as not difficult, most prefer to catheterize at home as it can be challenging to carry out the procedure elsewhere.⁸⁷
7. Public washrooms are often inappropriate for carrying out IC – lack of space, lack of privacy, and space to lay out equipment are reported as common concerns.⁷⁷⁻⁷⁹ The lack of acceptable bathrooms can interfere with being able to go to work, travel, or be with friends and family. Training programs should include information on how to plan activities related to intermittent catheterization, such as tips and tricks for navigating public and private bathrooms.⁹¹ Sometimes using a specific catheter type (e.g., pre-lubricated catheter, compact catheter) can make it easier to carry out IC outside the home.⁸⁷
8. Potential complications.
Potential complications should be reviewed with those carrying out IC.^{93,99,102} Refer to Chapter 2 in this document for an overview of possible complications associated with ISC. In a qualitative study investigating urinary tract infections (UTI) with those carrying out IC, the investigators found that most participants were uncertain about signs and symptoms of UTI and when to seek help.¹⁰⁶ These findings emphasize the importance of reviewing UTI with those learning IC. Although not recommended, patient interviews show that catheter re-use continues, refer to Chapter 3.

PROVIDE ONGOING SUPPORT AND FOLLOW-UP.

After learning IC, follow-up and ongoing support from a health professional is essential.^{60,75-77,80,97,99,102,107} The recommended frequency of follow-up visits should be individualized and varies in the literature from one and six weeks to monthly for six months.^{80,93}

Most often, follow-up visits are done face-to-face. Telenursing interventions (e.g., telephone, email, or video conferencing) can complement patients' traditional health treatment.¹⁰⁸ Patient-nurse interactions provide direction/support for IC and web-based IC self-management interventions with follow-up phone calls with a nurse and a peer-led discussion forum has also been successful.⁹⁰

During follow-up, nurses can guide and support those new to IC to incorporate IC into daily activities, understanding of IC technique can be assessed, and voiding/IC schedule reviewed.^{76,79} Those unable to adhere to the IC procedure or frequency on an ongoing basis cited difficulties and changes in the insertion technique as contributing factors.⁷⁸

In addition to regular follow-up visits, providing the patient with a number to call to have questions answered and concerns addressed is helpful. Knowing where to address questions and having someone to call with any questions increases the confidence of patients.⁹¹ It was helpful to discuss things with someone who knew the practice and who gave tips and tricks.

A standard evaluation is recommended for a follow-up to address pressing issues such as satisfaction with IC, satisfaction with the catheter, frequency of catheterization, how to manage the need to vary the frequency, impact on intimacy, and impact on the quality of life. Follow-up care can be provided digitally (email or video conferencing), by telephone, or in-person.⁹¹

The Intermittent Catheterization Satisfaction Questionnaire (InCaSaQ) is a resource that can be used to evaluate patient satisfaction with IC.¹⁰⁹ Specifically, the InCaSaQ questionnaire consists of 8 questions, broken down into four categories; namely, packaging (level of discretion, hygiene/robust, ease with opening), lubrication (spontaneous/gel/water), catheter itself (holding, comfort, length

of catheter, ease of insertion, and progression through urethral meatus) and after catheterization (ease of disposal). The InCaSaQ was found to be a simple means for practitioners to evaluate patient satisfaction with a particular urinary catheter, to compare such things as comfort and effectiveness of various catheters, as well as to determine the need to change catheter type.

The questionnaire is to be used after IC teaching, to establish patient satisfaction with their choice of catheter, as well as following long-term IC use to possibly change catheter type after extended periods.¹⁰⁵

Recommendations

Provide every patient deemed appropriate for IC with an opportunity to learn the procedure. (3–B)

A nurse specialized in continence care or urology nursing should provide IC education. (3–B)

Extended appointment times are required to teach IC. (3–B)

Provide IC education in the clinic, hospital, or home setting. (5–C)

Include caregivers or family members in IC education. (3–B)

Provide IC information before the initial education session. (3–B)

IC instruction includes physiology and pathophysiology, indications and benefits of IC, catheters/equipment, IC procedure, incorporating IC into daily life, and potential complications. (3–B)

Teach intermittent catheterization using written, verbal, audio-visual resources, demonstration and return demonstration. (3–B)

Provide ongoing support and follow-up. (3–B)

Table 25: Recommendations on the education of patient.

GLOSSARY

BACTERIURIA: The presence of bacteria in the urine, the presence of more than 100,000 pathogenic bacteria per milliliter of urine is usually considered significant and diagnostic of urinary tract infection.

BLADDER CALCULUS: Bladder stone caused by a buildup of minerals if the bladder is not completely emptied after urination.

CLEAN INTERMITTENT CATHETER: A clean technique of passing a catheter into the urethra to drain the bladder of urine.

COUDÉ TIP CATHETER: A catheter with a small angled tip.

DETRUSOR MUSCLE: The smooth muscle found in the wall of the bladder, which relaxes to allow the bladder to store urine, and contracts during urination to release urine.

DILATATION: The action of stretching or further opening a passage such as the urethra when a stricture is present.

DYSURIA: painful, burning urination, often caused by a bacterial infection, inflammation, or obstruction of the urinary tract.

EPIDIDYMO-ORCHITIS: Inflammation of the epididymis and/or testicle (testis), usually due to infection, most commonly from a urine infection or a sexually transmitted infection.

INTRAVESICAL PRESSURE: the pressure exerted on the contents of the urinary bladder, being the sum of the intraabdominal pressure from outside the bladder and the detrusor pressure exerted by the bladder wall musculature itself (also called bladder pressure, vesical pressure).

MEATAL: pertaining to a meatus.

NEOBLADDER: a continent urinary reservoir made from a detubularized segment of the bowel or stomach with implantation of ureters and urethra, used to replace the bladder after cyctectomy.

PROSTATITIS: Inflammation of the prostate that results in pain in the groin, painful urination, difficulty urinating, and other symptoms.

PYELONEPHRITIS: Inflammation of the kidney, typically due to a bacterial infection. Symptoms most often include fever and flank tenderness.

STRICTURE: an abnormal temporary or permanent narrowing of the lumen of a hollow organ such as the esophagus, pylorus of the stomach, ureter, or urethra. It is caused by inflammation, external pressure or scarring. Treatment varies depending on the cause.

URETHROPLASTY: a surgical procedure for the repair of a urethra as in correction of hypospadias.

URETHRAL MEATUS: the external opening of the urethra.

URETHRITIS: Inflammation of the urethra.

URODYNAMICS: the study of hydrology and mechanics of urinary bladder filling, emptying, and voiding.

UROTHELIUM: a unique, highly specialized epithelium lining the lower urinary tract.

COMMON ABBREVIATIONS USED THROUGH THE DOCUMENT

CAUTI – catheter-associated urinary tract infection

CFU – colony forming units

CISC – clean intermittent self-catheterization

EAU – European Association of Urology

EAUN – European Association of Urology Nurses

HC – hydrophilic coated intermittent catheters

IC – intermittent catheterization

IUC – intermittent urethral catheterization

PP Test – pencil and paper test

QoL – quality of life

UTI – urinary tract infection

LIST OF FIGURES

CHAPTER 1

Figure 1: Oxford Centre for Evidence Based Medicine 2011 Levels of Evidence.

CHAPTER 5

Figure 2: Type of intermittent catheters available in Canada in 2019.

Figure 3: Colours of Catheter Grips representing diameter size, used with permission of ConvaTec Group PLC.

Figure 4: Male and Female Length Catheters in Different Diameter Sizes, use with permission of Coloplast A/S.

Figure 5: Actreen Mini Female Catheter, used with permission of B Braun.

Figure 6: Magic3 Go female catheter, used with permission of BD Bard.

Figure 7: SpeediCath compact male catheter, used with permission of Coloplast.

Figure 8: Advance IC Gel Reservoir, used with permission of Hollister Limited.

Figure 9: VaPro, used with permission of Hollister Limited.

Figure 10: Closed Catheter System Actreen Mini Set, used with permission of B. Braun Medical of Canada.

Figure 11: Touchless Plus closed catheter system, used with permission of BD Bard.

Figure 12: Standard tip catheter, used with permission of ConvaTec.

Figure 13: Tiemann/Coudé Tip Hydrophilic Catheter, used with permission of Coloplast A/S.

Figure 14: SpeediCath Flex, used with permission from Coloplast A/S.

Appendix i – Grading of the evidence reviewed

Appendix ii – Collecting a Mid-Stream Urine Specimen

Appendix iii – Patient Brochure

Appendix iv – Checklist for Patient Information

Appendix v – Teaching IC
(Procedure)

Appendix vi – Intermittent Catheterization
(Male Procedure) – Patient Handout

Appendix vii – Intermittent Catheterization
(Female Procedure) – Patient Handout

APPENDICES

APPENDIX I – GRADING OF THE EVIDENCE REVIEWED

Reference number	Author	Title	Year	Journal	LE	GR
	Adams J, Watts R, Yearwood M, Watts A, Hartshorn C, Simpson S, Allingham K, Denison S, Hardcastle B	Strategies to promote intermittent self-catheterisation in adults with neurogenic bladders: A comprehensive systematic review. Joanna Briggs 2011	2011	JBI Library of Systematic Reviews	1	A
102	Afsar SI, Yemisci OU, Cosar SN, Cetin N	Compliance with clean intermittent catheterization in spinal cord injury patients: a long-term follow-up study.	2013	Spinal Cord	4	C
98	Amarenco G, Guinet A, Jousse M, Verollet D, Ismael SS	Pencil and paper test: a new tool to predict the ability of neurological patients to practice clean intermittent self-catheterization.	2011	J Urol	3	B
101	Bernuz B, Guinet A, Rech C, Hugeron C, Even-Schneider A, Denys P, Barbot F, Chartier-Kastler E, Revol M, Laffont I	Self-catheterization acquisition after hand reanimation protocols in C5-C7 tetraplegic patients.	2011	Spinal Cord	3	B
105	Bickhaus JA, Drobnis EZ, Critchlow WA, Occhino JA, Foster RT Sr	The feasibility of clean intermittent self-catheterization teaching in an outpatient setting.	2015	Female Pelvic Med Reconstr Surg	4	C
77	Bolinger R, Engberg S	Barriers, complications, adherence, and self-reported quality of life for people using clean intermittent catheterization.	2013	J Wound Ostomy Continence Nurs	4	C
43	Cardenas DD, Moore KN, Dannels-McClure A, Scelza WM, Graves DE, Brooks M, Busch AK	Intermittent catheterization with a hydrophilic-coated catheter delays urinary tract infections in acute spinal cord injury: a prospective, randomized, multicenter trial.	2011	PM R	2	A
76	Castel-Lacanal E, Game X, De Boissezon, Guillotreau J	Impact of intermittent catheterization on the quality of life of multiple sclerosis patients.	2013	World J Urol	3	C
84	Chartier-Kastler E, Lauge I, Ruffion A, Goossens D, Charvier K, Biering-Sorensen F	Safety of a new compact catheter for men with neurogenic bladder dysfunction: a randomised, crossover and open-labelled study.	2011	Spinal Cord	2	B
86	Chartier-Kastler E, Amerenco G, Lindbo L, Soljanik I, Andersen HL, Bagi P	A prospective, randomized, crossover, multicenter study comparing quality of life using compact versus standard catheters for intermittent self-catheterization. (Spinal Cord Population 87% male)	2013	J Urol	2	A

Reference number	Author	Title	Year	Journal	LE	GR
	Clark JF, Mealing SJ, Scott DA, Vogel LC, Krassioukov A, Spinelli M, Bagi P, Wyndaele JJ	A cost-effectiveness analysis of long-term intermittent catheterisation with hydrophilic and uncoated catheters.	2016	Spinal Cord	4	C
89	Cobussen-Boekhorst H, Beekman J, Wijlick E, Schaafstra J, van Kuppevelt D, Heesakkers J	Which factors make clean intermittent (self) catheterisation successful?	2016	J Clin Nurs	3	B
91	Cobussen-Boekhorst H, Hermeling E, Heesakkers J, van Gaal B	Patients' experience with intermittent catheterisation in everyday life.	2016	J Clin Nurs	3	B
107	Cornejo-Davila V, Duran-Ortiz S, Pacheco-Gahbler C	Incidence of Urethral Stricture in Patients With Spinal Cord Injury Treated With Clean Intermittent Self-Catheterization.	2017	Urology	4	C
	Costa JA	Catheter length preference in wheelchair-using men who perform routine clean intermittent catheterization.	2013	Spinal Cord	2	B
108	de Souza-Junior V, Mendes IAC, Mazzo A, de Godoy S, Dos Santos CA	Telenursing Intervention for Clean Intermittent Urinary	2017	Comput Inform Nurs	5	C
	Domurath B, Kutzenberger J, Kurze I, Knoth HS	Clinical evaluation of a newly developed catheter (SpeediCath Compact Male) in men with spinal cord injury: residual urine and user evaluation.	2011	Spinal Cord	2	B
99	Faleiros F, Pelosi G, Warschausky S, Tate D, Käppler C, Thomas E	Factors Influencing the Use of Intermittent Bladder Catheterization by Individuals With Spina Bifida in Brazil and Germany.	2018	Rehabil Nurs	3	B
	Faleiros F, Toledo, C, Gomide MFS, Faleiros RG, Käppler C	Right to health care and materials required for intermittent catheterization: a comparison between Germany and Brazil.	2015	Quality in Primary Care	4	C
60	Fumincelli L, Mazzo A, Martins JCA, Henriques FMD	Quality of Life of Intermittent Urinary Catheterization Users and Their Caregivers: A Scoping Review.	2017	Worldviews Evid Based Nurs	1	B
	Girard, R Gaujard, S Pergay, V Pornon, P Martin Gaujard, G Vieux, C Bourguignon, L	Controlling urinary tract infections associated with intermittent bladder catheterization in geriatric hospitals.	2015	J Hosp Infect	3	B
80	Girotti ME, MacCornick S, Perissé H, Batezini NS, Almeida FG	Determining the variables associated to clean intermittent self catheterization adherence rate: One-year follow-up study.	2011	Int Braz J Urol	3	B

Reference number	Author	Title	Year	Journal	LE	GR
	Greenwell TJ, Castle C, Nicol DL	Clean intermittent self-catheterization does not appear to be effective in the prevention of urethral stricture recurrence.	2016	Scand J Urol	4	C
	Guinet-Lacoste A, Jousse M, Tan E, Caillebot M, Le Breton F, Amarenco G	Intermittent catheterization difficulty questionnaire (ICDQ): A new tool for the evaluation of patient difficulties with clean intermittent self-catheterization.	2016	Neurourol Urody	3	B
109	Guinet-Lacoste A, Jousse M, Verollet D, Ismael SS, Le Breton F, Tan E, Amarenco G	Validation of the InCaSaQ, a new tool for the evaluation of patient satisfaction with clean intermittent self-catheterization.	2014	Ann Phys Rehabil Med	3	B
97	Hentzen C, Haddad R, Ismael SS, Peyronnet B, Game X, Denys P, Robain G, Amarenco G	Intermittent Self-catheterization in Older Adults: Predictors of Success for Technique Learning.	2018	Int Neurourol J	3	B
	Johansson K, Greis G, Johansson B, Grundtmann A, Pahlby Y	Evaluation of a new PVC-free catheter material for intermittent catheterization: a prospective, randomized, crossover study.	2013	Scand J Urol	2	B
	Kannankeril AJ, Lam HT, Reyes EB, McCartney J	Urinary Tract Infection Rates Associated with Re-Use of Catheters In Clean Intermittent Catheterization of Male Veterans.	2011	Urologic Nurs	4	C
87	Kelly L, Spencer S, Barrett G	Using intermittent self-catheters: experiences of people with neurological damage to their spinal cord.	2014	Disabil Rehabil	5	C
4	Khan S, Khan RA, Ullah A, ul Haq F, ur Rahman A, Durrani SN, Khan MK	Role of clean intermittent self catheterisation (CISC) in the prevention of recurrent urethral strictures after internal optical urethrotomy.	2011	J Ayub Med Coll Abbottabad	2	B
6	Krebs J, Wöllner J, Pannek J	Urethral strictures in men with neurogenic lower urinary tract dysfunction using intermittent catheterization for bladder evacuation.	2015	Spinal Cord	4	C
100	Kriz J, Relichova Z	Intermittent self-catheterization in tetraplegic patients: a 6-year experience gained in the spinal cord unit in Prague.	2014	Spinal Cord	3	B
103	Le Danseur M, Stutzman SE, Wilson J, Sislak I, Olson DWM	Is the CABIC Clean Intermittent Catheterization Patient Education Effective?	2018	Rehabil Nurs	3	C
78	Lopes MAL, Lima EDR	Continuous use of intermittent bladder catheterization -- can social support contribute?	2014	Rev Latino-Am Enfermagem	5	C
5	Mazzo A, Pecci GL, Fumincelli L, Neves RC, Dos Santos RC	Intermittent urethral catheterisation: the reality of the lubricants and catheters in the clinical practice of a Brazilian service.	2016	J Clin Nurs	5	C

Reference number	Author	Title	Year	Journal	LE	GR
75	McClurg D, Walker K, Pickard R, Hilton P, Ainsworth H, Leonard K, Suresh S, Nilsson A, Gillespie N	Participant experiences of clean intermittent self-catheterisation, urinary tract infections and antibiotic use on the ANTIC trial – A qualitative study.	2018	Int J Nurs Stud	5	C
	Moore KC, Lester M, Robinson E, Bagulay N, Pearce I	Cleaning and re-using intermittent self catheters: a questionnaire to gauge patient's perceptions and prejudices.	2014	J Clin Urol	3	C
106	Okamoto I, Prieto J, Avery M, Moore K, Fader M, Sartain S, Clancy B	Intermittent catheter users' symptom identification, description and management of urinary tract infection: A qualitative study.	2017	BMJ Open	4	C
93	Parsons BA, Narshi A, Drake MJ	Success rates for learning intermittent self-catheterisation according to age and gender	2012	Int Urol Nephrol	4	C
56	Pickard R, Chadwick T, Oluboyede Y, Brennan C, Von Wilamowitz-Moellendorff A, McClurg D et al.	Continuous low-dose antibiotic prophylaxis to prevent urinary tract infection in adults who perform clean intermittent self-catheterisation: The AnTIC RCT.	2018	Health Technol Assess	1	A
	Prieto J, Murphy CL, Moore KN, Fader M.	Intermittent catheterisation for long-term bladder management.	2014	Cochrane Database of Systematic Reviews	1	A
88	Ramm D, Kane R	A qualitative study exploring the emotional responses of female patients learning to perform clean intermittent self-catheterisation.	2011	J Clin Nurs	5	C
	Rew M, Lake H	A survey of short- and long-term pre-lubricated intermittent catheters.	2013	Br J Nurs	3	B
	Sajid MA, Ahmad S, Saeed MA, Malik N	Role of clean intermittent self catheterization (CISC) in management of recurrent urethral strictures.	2010	Rawal Medical Journal	4	C
	Shamout S, Biardeau X, Corcos J, Campeau L	Outcome comparison of different approaches to self-intermittent catheterization in neurogenic patients: a systematic review.	2017	Spinal Cord	1	A
	Shaw C, Logan K	Psychological coping with intermittent self-catheterisation (ISC) in people with spinal injury: A qualitative study.	2013	Int J Nurs Studies	4	C
104	Silva DRA, Mazzo A, Jorge BM, Souza Junior VD, Fumincelli L, -Almeida RGS	Intermittent Urinary Catheterization: The Impact of Training on a Low-Fidelity Simulator on the Self-Confidence of Patients and Caregivers.	2017	Rehabil Nurs	2	B

Reference number	Author	Title	Year	Journal	LE	GR
	Watanabe T, Yamamoto S, Gotoh M, Saitoh T, Yokoyama O, Murata T, Takeda M	Cost-Effectiveness Analysis of Long-Term Intermittent Self-Catheterization with Hydrophilic-Coated and Uncoated Catheters in Patients with Spinal Cord Injury in Japan.	2017	Lower Urinary Tract Symptoms	4	C
	Welk B, Isaranuwachai W, Krassioukov A, Husted Torp L, Elterman D	Cost-effectiveness of hydrophilic-coated intermittent catheters compared with uncoated catheters in Canada: a public payer perspective.	2018	J Med Econ	4	C
79	Wilde MH, Brasch J, Zhang Y	A qualitative descriptive study of self-management issues in people with long-term intermittent urinary catheters.	2011	J Adv Nurs	5	C
90	Wilde MH, McMahon JM, Fairbanks E, Brasch J, Parshall R, Zhang F, Miner S, Thayer D, Schneiderman D, Harrington B	Feasibility of a Web-Based Self-management Intervention for Intermittent Urinary Catheter Users With Spinal Cord Injury.	2016	J Wound Ostomy Continence Nurs	4	C

APPENDIX II – COLLECTING A MID-STREAM URINE SPECIMEN

Sample procedures are available at:

<https://medlineplus.gov/ency/article/007487.htm> or

<https://www.publichealthontario.ca/-/media/documents/uti-midstream-urine-collection.pdf?la=en>

Public Health Ontario | Santé publique Ontario

Collecting Mid-Stream Urine Specimen



1 Use an **approved** empty sterile container.



2 **Label** the container with the following:

- Patient's full name
- Patient's date of birth
- Date and time of collection
- Patient's unit or ward and room number



3 **Complete** the requisition according to the laboratory protocol and insert the requisition in the outside pouch of a clear plastic transport bag.



4 **Perform hand hygiene** and put on gloves.



5 **Remove the lid** from the empty container and **carefully** set the lid **upside down**, making sure not to touch the inner surface of the lid.



6 **Instruct** the patient to pass a small amount of urine into the toilet (*this initial stream of urine may be contaminated with skin and urethral bacteria*). **Then, collect urine** from the stream into the container. Fill the container $\frac{1}{2}$ to $\frac{3}{4}$ full—**do not overfill**. This is a mid-stream urine specimen.



7 **Put the lid** on the container and **secure** it tightly.



8 **Place** the specimen container in the **sealable** pouch of the clear plastic transport bag.



9 **Remove gloves** and **perform hand hygiene**.

10 **Place immediately** in specimen refrigerator. Keep the urine sample **refrigerated** and submit it to the laboratory **within 24 hours** of collection.

This resource is part of Public Health Ontario's UTI Program.
For more information please visit www.publichealthontario.ca/UTI
or email UTI@oahop.ca



The above figure was adapted with the permission of Public Health Ontario. Public Health Ontario assumes no responsibility for the content of any publication resulting from translation/changes/adaptation of PHO documents by third parties.

APPENDIX III – PATIENT LEAFLET

See overleaf for patient leaflet.

CLEAN INTERMITTENT URETHRAL CATHETERIZATION IN ADULTS

P A T I E N T L E A F L E T

Intermittent self-catheterization helps maintain a healthy bladder. It is done when you cannot fully empty your bladder on your own. Your nurse can teach you. It takes practice.

WHAT IS INTERMITTENT SELF-CATHETERIZATION?

Self-catheterization means you put a small tube called a catheter into your bladder one or more times every day to drain your urine, often right into the toilet. The catheter passes through the urethra into the bladder until urine starts flowing out the catheter to drain the bladder. Once the urine stops coming, you take the catheter out.

Try to pass urine first. Then use a catheter to drain urine left in the bladder. Intermittent catheterization can stop problems with your bladder and kidneys and prevent leakage of urine. Intermittent self-catheterization means you do not have a catheter and drainage bag at all times.

FREQUENCY OF CATHETERIZATION

You should keep a diary to record:

- How much fluid you drink,
- What time you used the catheter,
- How much urine drained with the catheter.

This diary will help you and your nurse decide how many times you should self-catheterize in a day. This may range from needing to self-catheterize once per day to every 4-6 hours. A goal is to keep the urine drained with the catheter to less than 500 ml.

WHO REQUIRES INTERMITTENT SELF-CATHETERIZATION?

Self-catheterization is for people with impaired bladder emptying. This may be related to:

- Atonic (lazy) bladder;
- A neurologic disease, e.g., Multiple Sclerosis, Parkinson's disease or a spinal cord injury;
- A narrowing or obstruction

between the bladder and the opening of the urethra from urethral stricture disease, bladder neck contracture or Benign Prostatic Hypertrophy (BPH);

- Urinary retention after bladder Botox treatment, which is temporary lasting between 4 to 9 months.

TYPES OF INTERMITTENT CATHETERS

There are many different types of catheters available that you can use. Your nurse will help you pick the one that is best for you. Two special types of catheters are:

- **Hydrophilic Catheters** come already lubricated or wet. They are used once and then thrown away. Studies suggest they help reduce the risk of urethral damage from repeated catheterization. They also help reduce the risk of recurrent urinary tract infections.
- **Coude Tip Catheters** are for men. They have a special shape at the end to help pass through the prostate and into the bladder, avoiding urethral damage. Buy Coude catheters as either re-usable or hydrophilic catheters. Some men prefer Coude tip over a straight tip catheter.

Re-using catheters is not recommended. Catheter re-use is a contentious and evolving subject. If you keep getting a urinary tract infection, you should definitely use a new catheter each time and not re-use your catheters.

You can buy intermittent catheters at homecare supply stores. Some

provinces have a medical health coverage program. Check with your nurse.

Self-catheterization needs good hygiene. Always begin with washing your hands. Wash around your urethra opening and vagina or penis with warm water and a gentle, unscented, cleansing soap before using the catheter.

There are many benefits to intermittent self-catheterization. These include improved sleep, fewer washroom visits and a reduced risk of urinary tract infection.

WHEN TO VISIT YOUR HEALTHCARE PROVIDER?

There are some possible side effects that may happen with intermittent self-catheterization. Visit or call your healthcare provider if you develop signs of infection, have unusual bleeding, or have difficulty passing the catheter into the bladder.

WHAT ARE THE SIGNS OF A URINARY TRACT INFECTION (UTI)?

- Fever or chills with an increase in body temperature;
- Visible blood in the urine;
- A burning sensation while voiding;
- A higher frequency of voiding,
- or more urine leakages;
- Pelvic or back pain;
- Urine may also be cloudy or foul-smelling, but this on its own does not mean you have a UTI.

Drink water as this helps flush the bladder and works to help prevent these symptoms. If your urine looks dark yellow or cloudy, drink more water until it appears lighter in colour and clearer.

APPENDIX IV – CHECKLIST FOR PATIENTS

This checklist is intended to assist healthcare professionals to check whether all the information that patients need to know about IC has been provided.

PATIENTS NEED TO KNOW

- Why IC is necessary
- Basic anatomical knowledge about the urogenital tract
- How to perform the IC procedure
- The number of times to perform IC
- Which difficulties may occur during or after the catheterization procedure
- Name, size, and length of catheter
- How to store the catheters correctly
- To check the expiry date of the material before use
- How to prepare the catheter for use
- How to dispose of the catheters safely
- How to obtain supplies of the catheter
- That the technique of IC may vary in different settings (e.g., hospital, outpatient clinic, and home)
- Importance of fluid intake
- Importance of a healthy diet to avoid constipation
- Importance of good hygiene, especially hand hygiene
- How to avoid UTI
- How to recognise symptoms or the common signs of UTI
 - burning on urination
 - frequency or urgency
 - pain
 - feeling tired or shaky
 - fever or chills
 - hematuria
 - swelling/inflammation
- Availability of appropriate aids to help with catheterization such as mirrors, hand grips, leg abductors, integrated drainage bags, and travel kits
- What to do when travelling abroad
- When to contact a healthcare professional in case of
 - pain during or after catheterization becoming more difficult
 - hematuria
 - fever
 - problems in bowel movement
 - lower back pain
 - discoloured or malodorous urine if with the above symptoms.

APPENDIX V - TEACHING INTERMITTENT SELF-CATHETERIZATION

TEACHING POINTS

- Teach the patient their basic anatomy while reviewing the distinguishing features between female and male peritoneal orifices.
- Help the patient gain a better understanding as to the underlying etiology that led them to require intermittent self-catheterization.
- Teach the patient how to apply a step-by-step process to perform intermittent self-catheterization.
- Advise the patient as to the frequency of intermittent self-catheterization.
- Discuss catheter types and sizes with the patient.
- Teach the patient infection control measures, especially good hand hygiene for at least 15 seconds.
- Advise the patient on keeping a record of their fluid intake and fluid output.
- Review the signs and symptoms of a urinary tract infection and what to do about it.
- Review with the patient where to obtain and how to look after the supplies required for intermittent self-catheterization.

Teaching Intermittent Self-Catheterization Procedure

Step 1	If possible, have the patient void spontaneously and record the volume voided. Then have them wash their hands with soap and water, drying them with a clean towel.
Step 2	Gather supplies needed for intermittent self-catheterization and place on clean space on which to work. This will include catheter of choice (uncoated or hydrophilic), lubrication if required, and container to measure post-void residual volume.
Step 3	Remove catheter from packaging: squeeze some lubrication on to a clean towel placed on the working space and then roll the end of the catheter (the end that is to be inserted into the urethral meatus) through the lubricant, approximately two to three inches from the tip.
Step 4	Have male patients position themselves either sitting on a toilet or facing the toilet, whichever they prefer. Have female patients position themselves sitting on the toilet with their knees bent and legs spread apart or on a chair close to and facing the toilet. Some females may find using a mirror to be helpful, so placing one in between their legs, either on a chair or floor, may be useful.

Teaching Intermittent Self-Catheterization Procedure

- Step 5 Have **male** patients who are uncircumcised pull back their foreskin. Then wash the end of their penis with a clean cloth, soap and warm water, while teaching them to clean in a circular motion, starting at the urethral meatus and moving away from it.
-
- Have **female** patients spread their labia using their fingers (such as their index and middle fingers), while using their dominant hand to wipe the vagina clean from front to back with warm water and soap on a clean cloth.
- Note: A disposable wipe can also be used to clean the urethra and the surrounding area of the vagina. Then repeat cleaning the vagina a second time using either another clean wet towel or wipe, while ensuring the labia remains spread apart to prevent contamination of the area before catheterization.
-
- Step 6 After washing hands with soap and water, have **males** hold their penis straight up with one hand, reserving their dominant hand for use to gently insert the lubricated catheter into the urethra, through the urethral meatus at the tip of the penis. Encourage them to continue to slowly advance the catheter until they meet the sphincter muscle, which is when they will feel some resistance with advancing the catheter. Have the male patient wait and hold the catheter once resistance is met to allow relaxation of the sphincter muscle. After a few seconds, have the male patient take a deep breath and then exhale while proceeding to slowly advance the catheter through this part of the urethra and on into the bladder until urine is seen draining from the catheter end into a measuring container or toilet.
-
- For **females**, they will look for the urethra while their labia are still spread apart after cleaning, which they will note appears as a small opening falling below the clitoris but above the vagina. The female patient will pick up the catheter with her dominant hand, positioning the catheter in her hand like a dart, close to the lubricated end to maintain good control of the catheter. Encourage the patient to gently insert the lubricated catheter into the urethra until urine starts to flow. Let the female patient know that it is normal to feel a burning or pinch as the catheter passes through the urethra.
- Note for female patients: If the catheter has been inserted approximately three inches, but no urine flows, she has accidentally inserted the catheter into the vagina. The female patient can keep this catheter in the vagina and use this as a landmark to insert a second catheter above into the bladder through the urethra, until urine starts draining.
-
- Step 7 Allow time for urine to completely drain from the catheter into a measuring container or toilet. Continue to hold the catheter in place until the bladder is completely empty and urine stops draining.
-
- Step 8 Once urine has stopped draining from the catheter end, encourage the patient to remove the catheter, stopping briefly anytime more urine slowly begins to drain from the catheter end to drain the bladder fully.
-

Teaching Intermittent Self-Catheterization Procedure

Step 9	For uncircumcised male patients, once the catheter has been removed, it is essential in order to replace the foreskin over the head of the penis.
Step 10	At this point, the patient can clean themselves dry and put their clothes back on. Patients should be encouraged to measure and record the amount of urine drained with their catheter.
Step 11	After catheterization is complete, discard the catheter and its packaging into a garbage can or safe bin. Remind the patient to wash their hands at the end of this procedure, and before and after each time they perform intermittent catheterization.

HOW OFTEN SHOULD SELF-CATHETERIZATION BE DONE?

Intermittent self-catheterization may be temporary or more long-term. Encourage patients to keep track of their post-void residuals (the amount of urine they drain each time with the catheter) and keep a diary of this until a reliable routine has been established. Refer to Chapter 6 for a sample chart where post-void residual volumes can be recorded. Depending on the amount of urine drained with the catheter, this will determine how often patients should catheterize. This will range from once per day to every 4-6 hours throughout their day. A good goal is to keep post-void residual volumes to less than 500ml with each catheterization. If the patient is finding that they are draining <100ml (consecutively, e.g., three times in a row), then decreasing the number of times the patient catheterizes or stopping altogether may be appropriate. Where urethral stricture is concerned, this may require self-dilation daily or less frequently. Patients can speak with their healthcare professional to help with determining how often they should perform intermittent self-catheterization.

THINGS TO LOOK OUT FOR

Although there is always a risk of a urinary tract infection with intermittent self-catheterization, there is a reason this has been recommended for the patient. There is usually an equal if not greater risk associated with developing urinary tract infection and other medical problems if the patient has impaired bladder emptying or struggles with urethral strictures. Possible symptoms patients may present with and should report to their healthcare provider include:

- Fever (temperature of 38C/100.2F or higher) or chills;
- Blood in the urine (note: you may see mild bleeding your first week or two after catheterization, which may be normal and not necessarily a sign of a UTI);
- Burning sensation with voiding;
- Frequency of voiding that is more than normal for you;
- Flank or back pain.

APPENDIX VI – INTERMITTENT CATHETERIZATION (MALE PROCEDURE) – PATIENT HANDOUT

Intermittent Catheterization (Male Procedure)	
Step 1	If possible, void spontaneously into the toilet.
Step 2	Wash hands with soap and water and dry them with a clean towel.
Step 3	Gather supplies needed and place them on a clean workspace. *Supplies include catheter, lubrication, and container to measure what you drain with the catheter.
Step 4	Remove catheter from packaging. Squeeze some lubrication on to a clean towel and then roll the end of the catheter that is to be inserted into the urethral meatus (hole from where you pass urine at the tip of the penis) through the lubricant, approximately two to three inches from the tip.
Step 5	Position yourself either sitting on a toilet or facing the toilet, whichever they prefer.
Step 6	If you are uncircumcised, pull back your foreskin. Then wash the end of your penis with a clean cloth, soap, and warm water, cleaning in a circular motion, starting at the tip of the penis and moving away from it.
Step 7	After washing hands with soap and water, hold your penis straight up with one hand, keeping your dominant hand for use to gently insert the lubricated catheter into the urethra, through the urethral meatus. Continue to slowly advance the catheter until you meet the sphincter muscle, which is when you will feel some resistance. Hold the catheter and stop once resistance is met to allow relaxation of the sphincter muscle. After a few seconds, then take a deep breath and exhale while slowly advancing the catheter through this part of the urethra and into the bladder until urine is seen draining from the catheter end into your measuring container or toilet.
Step 8	Allow time for urine to completely drain from the catheter into a measuring container or toilet. Continue to hold the catheter in place until the bladder is completely empty and urine stops draining.
Step 9	Once urine has stopped draining from the catheter end, slowly remove the catheter, stopping briefly anytime more urine begins to drain from the catheter end in order to drain the bladder fully.
Step 10	If you are uncircumcised, it is essential to replace the foreskin over the head of the penis, once the catheter has been removed.
Step 11	Measure and record the amount of urine drained with the catheter.
Step 12	After catheterization is complete, discard the catheter and its packaging into a garbage can or safe bin. Clean yourself up and wash your hands.

Note: A good goal is to keep post-void residual volumes to less than 500 ml with each catheterization. If you are finding that you are draining less than 100 ml consecutively three times in a row, then decreasing the number of times you catheterize or stopping altogether may be appropriate. In this case, speak to your healthcare provider.

APPENDIX VII – INTERMITTENT CATHETERIZATION (FEMALE PROCEDURE) – PATIENT HANDOUT

Intermittent Catheterization (Female Procedure)	
Step 1	If possible, void spontaneously into the toilet.
Step 2	Wash hands with soap and water and dry them with a clean towel.
Step 3	Gather supplies needed and place them on a clean workspace. *Supplies include catheter, lubrication, and container to measure what you drain with the catheter.
Step 4	Remove catheter from packaging. Squeeze some lubrication on to a clean towel and then roll the end of the catheter that is to be inserted into the urethral meatus (opening from where you pass urine below the clitoris and above the vaginal opening) through the lubricant, approximately two to three inches from the tip.
Step 5	Position yourself sitting on the toilet with your knees bent and legs spread apart or on a chair close to and facing the toilet. You may find using a mirror to be helpful, so you can try placing one in between your legs, either on a chair or floor.
Step 6	Spread your labia using your fingers (index and middle fingers) and use your dominant hand to wipe the vagina clean (front to back) with warm water and soap on a clean cloth. Note: A disposable wipe can also be used to clean the urethral meatus and the surrounding area of the vagina. Repeat cleaning the vagina a second time using either another clean wet towel or wipe, while ensuring the labia remains spread apart to keep the area clean prior to catheterization.
Step 7	After washing hands with soap and water, using a mirror, look for the urethra while your labia is still spread apart after cleaning, and you will note this appears as a small opening falling below the clitoris and above the vaginal introitus (opening). Pick up the catheter using your dominant hand, positioning it like a dart, close to the lubricated end to maintain good control of the catheter. Gently insert the lubricated catheter into the urethra (opening below the clitoris and above the vagina) until urine starts to flow. It is normal to feel a burning or pinch as the catheter passes through the urethra. Note: If the catheter has been inserted three inches or so, but no urine flows, you have accidentally inserted the catheter into the vagina. Keep this catheter in the vagina and use this as a landmark to insert a second catheter above, into the bladder through the urethra, until urine starts draining.
Step 8	Allow time for urine to completely drain from the catheter into a measuring container or toilet. Continue to hold the catheter in place until the bladder is completely empty and urine stops draining.

Intermittent Catheterization (Female Procedure)

Step 9	Once urine has stopped draining from the catheter end, slowly remove the catheter, stopping briefly anytime more urine begins to drain from the catheter end in order to drain the bladder fully.
Step 10	Measure and record the amount of urine drained with the catheter.
Step 11	After catheterization is complete, discard the catheter and its packaging into a garbage can or safe bin. Clean yourself up and wash your hands.

Note: A good goal is to post-void residual volumes to less than 500 ml with each catheterization. If you are finding that you are draining less than 100 ml consecutively three times in a row, then decreasing the number of times you catheterize or stopping all together may be appropriate. In this case, speak to your healthcare provider.

REFERENCES

1. Brouwers MC1, Kho ME, Browman GP, Burgers JS, Cluzeau F, Feder G, Fervers B et al. AGREE Next Steps Consortium. AGREE II: advancing guideline development, reporting, and evaluation in health care. *Prev Med.* 2010;51(5):421-4. doi: 10.1016/j.ypmed.2010.08.005.
2. Vahr S, Cobussen-Boekhorst H, Eikenboom J, Geng V, Holroyd S, Lester M, Pearce I, Vandewinkel C; members of the European Association of Urology Nurses Guidelines Office. Catheterisation, Urethral intermittent in adults – Evidence-based Guidelines for Best Practice in Urological Health Care. Edition presented at the 14th International EAUN Meeting, Milan 2013. ISBN 978-90-79754-59-5. Retrieved from <https://nurses.uroweb.org/guideline/catheterisation-urethral-intermittent-in-adults/>
3. Underactive Bladders. Kevin Rademakers [Discussion] 2018 International Continence Society Retrieved from <https://www.ics.org/committees/standardisation/terminologydiscussions/underactivebladder>
4. Khan S, Khan RA, Ullah A, ul Haq F, ur Rahman A, Durrani SN, Khan MK. Role of clean intermittent self catheterisation (CISC) in the prevention of recurrent urethral strictures after internal optical urethrotomy. *J Ayub Med Coll Abbottabad.* 2011;23(2):22-25. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24800335>
5. Mazzo A, Pecci GL, Fumincelli L, Neves RC, Dos Santos RC. Intermittent urethral catheterisation: the reality of the lubricants and catheters in the clinical practice of a Brazilian service. *J Clin Nurs.* 2016;25(21-22):3382-3390. doi: 10.1111/jocn.13466. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27378618>
6. Krebs J, Wöllner J, Pannek J. Urethral strictures in men with neurogenic lower urinary tract dysfunction using intermittent catheterization for bladder evacuation. *Spinal Cord.* 2015;53(4):310-314. doi: 10.1038/sc.2015.15. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/25644391>
7. Vahr S, Cobussen-Boekhorst H, Eikenboom J, Geng V, Holroyd S, Lester M, Pearce I, Vandewinkel C; members of the European Association of Urology Nurses Guidelines Office. An edited summary of the European Association of Urology Nurses evidence-based guideline on Intermittent Urethral Catheterisation in Adults – Evidence-based Guidelines for Best Practice in Urological Health Care. Edition presented at the 18th International EAUN Meeting, London 2017. ISBN 978-90-79754-92-2. Retrieved from <https://nurses.uroweb.org/eaun-intermittent-catheterisation-in-adults-guidelines-edited-summary/>
8. Nicolle LE, Bradley S, Colgan R, Rice JC, Schaeffer A, Hooton TM. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clin Infect Dis.* 2005;40(5):643–654. doi: 10.1086/427507. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/15714408>
9. Gribble MJ, Puterman ML. Prophylaxis of urinary tract infection in persons with recent spinal cord injury: a prospective, randomized, double-blind, placebo-controlled study of trimethoprim-sulfamethoxazole. *Am J Med.* 1993;95(2):141-52. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/8356980>
10. Goetz LL, Droste L, Klausner AP, Newman DK. Catheters used for intermittent catheterization. In *Clinical Application of Urological Catheters, Devices, and Products.* Newman DK et al. Springer. 2018. doi: 10.1007/978-3-319-14821-2_2. Retrieved from https://link.springer.com/chapter/10.1007/978-3-319-14821-2_2
11. Svihra J, Krhut J, Zachoal R, Svihrova V, Luptak J. Impact of clean intermittent catheterization on quality adjusted life years (QALYs) in spinal cord injury patients with neurogenic urinary incontinence. *Neurourology Urology.* 2018;37(1):250-256. doi: 10.1002/nau.23283. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/28407301>
12. Grabe M, Bjerkklund-Johansen TE, Botto H, et al. Guidelines on Urological Infections. European Association of Urology 2011.:23. Retrieved from <https://uroweb.org/guideline/urological-infections/>
13. Nasiriani K, Kalani Z, Farnia F, et al. Comparison of the effect of water vs. povidone-iodine solution for periurethral cleaning in women requiring an indwelling catheter prior to gynecologic surgery. *Urol Nurs.* 2009;29(2):118-21,131. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19507410>
14. Nicolle LE. Catheter associated urinary tract infections. *Antimicrob Resist Infect Control.* 2014;3(1):23. doi: 10.1186/2047-2994-3-23. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4114799/> and <https://aricjournal.biomedcentral.com/articles/10.1186/2047-2994-3-23>
15. Nicolle LE, AMMI Canada Guidelines Committee. Complicated urinary tract infection in adults. *Can J Infect Dis Med Microbiol.* 2005;16(6):349–360. doi: 10.1155/2005/385768. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2094997/>

16. Niël-Weise BS, van den Broek PJ, da Silva EM. Urinary catheter policies for long-term bladder drainage. *Cochrane Database Syst Rev.* 2005;(1):CD004201. Online publication 2009. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004201.pub2/abstract>
17. Wagenlehner F, Wullt B, Ballarini S, Zingg D, Naber KG. Social and economic burden of recurrent urinary tract infections and quality of life: a patient web-based study (GESPRIT). *Expert Rev Pharmacoecon Outcomes Res.* 2018;18(1):107-117. doi: 10.1080/14737167.2017.1359543. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/28737469>
18. Wyndaele JJ. Intermittent catheterization: which is the optimal technique? *Spinal Cord* 2002;40(9):432-437. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12185603>
19. Habak PJ, Griggs RP. Stat pearls: Urinary tract infection in pregnancy. 2019 Dec 15. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK537047/>
20. Rowe TA, Juthani-Mehta M. Diagnosis and Management of Urinary Tract Infection in Older Adults. *Infect Dis Clin North Am.* 201428(1):75–89. doi: 10.1016/j.idc.2013.10.004. Public Health Ontario. Antimicrobial stewardship. (online) 2019 Oct 22. Retrieved from <https://www.publichealthontario.ca/en/health-topics/anti-microbial-stewardship>
21. Vigil HR, Hickling DR. Urinary tract infection in the neurogenic bladder. *Transl Androl Urol.* 2016;5(1):72–87. doi: 10.3978/j.issn.2223-4683.2016.01.06. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4739987/>
22. Center for Disease Control. Device-associated module UTI. 2019 Jan. Retrieved from <https://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf>
23. Center for Disease Control. Urinary tract infection (catheter-associated urinary tract infection [CAUTI] and non-catheter-associated urinary tract infection [UTI]) and other urinary system infection [USI] events. 2019 Jan. Retrieved from <https://www.cdc.gov/nhsn/pdfs/pscmanual/7pscCAUTIcurrent.pdf>
24. Association of Medical Microbiology and Infectious Disease Canada (AMMI). Symptom-free pee: Let it be: Asymptomatic bacteriuria in long-term care residents and elderly patients in acute care. *JAMA* (online). 2018. Retrieved from <https://www.ammi.ca/?ID=127>
25. Beahm NP, Nicolle LE, Bursey A, Smyth DJ, Tsuyuki RT. The assessment and management of urinary tract infections in adults: Guidelines for pharmacists. *Can Pharm J (Ott).* 2017;150(5):298–305. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5582677/>
26. Bruschi JL, Bavaro MF, Cunha BA, Tessier JM. How is urine culture used in the diagnosis of urinary tract infection (UTI)? *Medscape Infectious Diseases.* 2020. Retrieved from <https://www.medscape.com/answers/233101-3245/how-is-urine-culture-used-in-the-diagnosis-of-urinary-tract-infection-uti>
27. Hooton TM. Uncomplicated urinary tract infection. *N Engl J Med.* 2012;366(11):1028–37. doi: 10.1056/NEJMcp1104429. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22417256>
28. Health Quality Ontario. Intermittent catheters for chronic urinary retention: A health technology assessment. *Ont Health Technol Assess Ser.* 2019;19(1):1–153. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6395058/>
29. Biering-Sorensen F, Nielans HM, Dorflinger T, et al. Urological situation five years after spinal cord injury. *Scand J Urol Nephrol.* 1999;33(3):157–61. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/10452290>
30. Turi MH, Hanif S, Fasih Q, et al. Proportion of complications in patients practicing clean intermittent self catheterization (CISC) vs indwelling catheter. *J Pak Med Assoc* 2006;56(9):401–4. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/17091752>
31. Waites KB, Canupp KC, Armstrong S, et al. Effect of cranberry extract on bacteriuria and pyuria in persons with neurogenic bladder secondary to spinal cord injury. *J Spinal Cord Med* 2004;27(1):35–40. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/15156935>
32. Sharp VJ, Takacs EB, Powell CR. Prostatitis: Diagnosis and Treatment. *Am Fam Physician.* 2010;82(4):397–406. Retrieved from <https://www.aafp.org/afp/2010/0815/p397.html>
33. Webster J. Water or antiseptic for periurethral cleaning before urinary catheterization: a randomized controlled trial. *Am J Infect Control* 2001;29(6):389–94. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11743486>
34. Wyndaele JJ. Chronic prostatitis in spinal cord injury patients. *Paraplegia* 1985;23:164–169. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/4011291>
35. Wyndaele JJ, Maes D. Clean intermittent self-catheterization: a 12-year follow up. *J Urol.* 1990;143(5):906–8. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/2329604>

36. Bakke A, Digranes A, Høisaeter PA. Physical predictors of infection in patients treated with clean intermittent catheterization: a prospective 7-year study. *Br J Urol.* 1997;79(1):85–90. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9043503>
37. Günter M, Löchner-Ernst D, Kramer G, et al. Auswirkungen des aseptischenintermittierendenKatheterismus auf die männlicheHarnröhre. *Urologe (B)* 2001;41:359–361. [Translated using Google]. Retrieved from <http://link.springer.com/article/10.1007%2Fs001310170044>
38. Sauerwein D. Urinary tract infection in patients with neurogenic bladder dysfunction. *Int J Antimicrob Agents.* 2002;19(6):592–7. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12135853>
39. Stöhrer M, Kramer G, Löchner-Ernst D, et al. Diagnosis and treatment of bladder dysfunction in spinal cord injury patients. *Eur Urol.* 1994;3:170–5. Retrieved from https://uroweb.org/wp-content/uploads/20_Neurogenic-LUTD_LR.pdf
40. Woodbury MG, Hayes KC, Askes HK. Intermittent catheterization practices following spinal cord injury: A national survey. *Can J Urol.* 2008;15(3):4065–4071. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/18570710>
41. Wyndaele JJ. Complications of intermittent catheterization: their prevention and treatment. *Spinal Cord* 2002;40(10):536–41. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12235537>
42. De Ridder DJ, Everaert K, Fernández LG, Valero JV, Durán AB, Abriqueta ML, Ventura MG, Sotillo AR. Intermittent catheterisation with hydrophilic-coated catheters (SpeediCath®) reduces the risk of clinical urinary tract infection in spinal cord injured patients: a prospective randomised parallel comparative trial. *Eur Urol.* 2005;48(6):991–5. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/16137822>
43. Cardenas DD, Moore KN, Dannels-McClure A, Scelza WM, Graves DE, Brooks M, Busch AK. Intermittent catheterization with a hydrophilic-coated catheter delays urinary tract infections in acute spinal cord injury: A prospective, randomized, multicenter trial. *PM R.* 2011;3:408–417. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21570027>
44. Tenke P, Kovacs B, Bjerklund Johansen TE, Matsumoto T, Tambayah PA, Naber KG. European and Asian guidelines on management and prevention of catheter-associated urinary tract infections. *Int J Antimicrob Agents.* 2008;31(S1):S68–78. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/18006279>
45. Urological Infections Guideline 2020 Update. European Urology Association. Retrieved from <https://uroweb.org/guideline/urological-infections/>
46. Spaulding EH. Chemical disinfection and antisepsis in the hospital. *J Hosp Res.* 1972;9(1):5–31.
47. Cleaning Intermittent Urinary Catheters in Home and Supportive Living Provincial Continuing Care. Alberta Health Services. October 2018. Retrieved from <https://www.albertahealthservices.ca/assets/healthinfo/ipc/hi-ipc-cchss-clean-intermittent-cath-cc.pdf>.
48. Hooton TM, Bradley SF, Cardenas DD, Colgan R, Geerlings SE, Rice JC, Saint S, Schaeffer AJ, Tambayah PA, Tenke P, Nicolle LE; Infectious Diseases Society of America. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. *Clin Infect Dis.* 2010;50(5):625–63. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/20175247>
49. Kannankeril AJ, Lam HT, Reyes EB, McCartney J. Urinary tract infection rates associated with re-use of catheters in clean intermittent catheterization of male veterans. *Urol Nurs.* 2011;31(1):41–49. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/21542443>
50. Prieto J, Murphy CL, Moore KN, Fader M. Cochrane withdrawal: Intermittent catheterisation for long-term bladder management. *Cochrane Systematic Review - Intervention version published: 08 August 2017.* doi: 10.1002/14651858.CD006008.pub4. Retrieved from <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD006008.pub4/full>
51. Provincial Intermittent Catheter Working Group. Spinal Cord Injury Ontario. Intermittent catheters: Towards an inclusive access policy in Ontario. 2017 May. Retrieved from <https://sciontario.org/wp-content/uploads/2018/07/Intermittent-Catheters-Towards-an-Inclusive-Access-Policy-in-Ontario-4-....pdf>
52. Saadat SH, Shepherd S, Van Asseldonk B, Elterman DS. Clean intermittent catheterization: Single use vs. reuse. *Can Urol Assoc J.* 2018;13(2). Retrieved from <https://cuaj.ca/index.php/journal/article/view/5357>
53. Stöhrer M, D. Castro-Díaz, E. Chartier-Kastler, G. Del Popolo, G. Kramer, J. Pannek, P. Radziszewski, J.-J. Wyndaele. Guidelines on neurogenic lower urinary tract dysfunction. European Association of Urology. 2009. Retrieved from <https://uroweb.org/wp-content/uploads/EAU-Guidelines-Neurogenic-LUTS-2009.pdf>

54. Biering-Sørensen F, Bagi P, Høiby N. Urinary tract infections in patients with spinal cord lesions. Treatment and prevention. *Drugs*. 2001;61(9):1275–1287. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11511022>
55. Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA; Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for prevention of catheter-associated urinary tract infections 2009. *Infect Control Hosp Epidemiol*. 2010;31(4):319–326. Published online by Cambridge University Press: 02 January 2015. Retrieved from <https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/guideline-for-prevention-of-catheter-associated-urinary-tract-infections-2009/B823CD4AB-8B24925292E5B43758E3D41>
56. Pickard R, Chadwick T, Oluboyede Y, Brennand C, Von Wilamowitz-Moellendorff A, McClurg D, Wilkinson J et al. Continuous low-dose antibiotic prophylaxis to prevent urinary tract infection in adults who perform clean intermittent self-catheterisation: The AnTIC RCT. *Health Technol Assess*. 2018;22(24):1–102. doi: 10.3310/hta22240. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/29766842>
57. Ryu KH, Kim YB, Yang SO, et al. Results of urine culture and antimicrobial sensitivity tests according to the voiding method over 10 years in patients with spinal cord injury. *Korean J Urol*. 2011;52:345–349. doi: 10.4111/kju.2011.52.5.345. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21687395>
58. Sinai Health System and University Health Network Antimicrobial Stewardship Program. Toronto Central LHIN: Guidelines for empiric treatment of urinary tract infection in adults. (online) 2015 Jan. Retrieved from <https://www.antimicrobialstewardship.com/uti>
59. Ercole FF, Macieira TG, Wenceslau LC, Martins AR, Campos CC, Chianca TC. Integrative review: Evidences on the practice of intermittent/indwelling urinary catheterization. *Rev Latino-Am Enfermagem*. 2013;21(1):459–468. doi: 10.1590/s0104-11692013000100023. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23546332>
60. Fumincelli L, Mazzo A, Martins JCA, Henriques FMD. Quality of Life of Intermittent Urinary Catheterization Users and Their Caregivers: A Scoping Review. *Worldviews Evid Based Nurs*. 2017;14(4):324–334. doi: 10.1111/wvn.12231. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/28742287>
61. Public Health Agency of Canada. Hand hygiene practices in healthcare settings. 2012. Retrieved from http://publications.gc.ca/collections/collection_2012/aspc-phac/HP40-74-2012-eng.pdf
62. Canadian Patient Safety Institute. 4 Moments for Hand Hygiene. 2015. Retrieved from <http://www.patientsafetyinstitute.ca/en/About/Programs/HH/Documents/Education/Your%204%20Moments.ppt>
63. Canadian Patient Safety Institute. Hand Hygiene Toolkit. 2016. Retrieved from <https://www.patientsafetyinstitute.ca/en/toolsResources/Pages/Hand-Hygiene-Toolkit.aspx>
64. Cortese YJ, Wagner VE, Tierney M, Devine D., Fogarty A. Review of catheter-associated urinary tract infections and in vitro urinary tract models. *J Healthc Eng*. 2018;14. doi: 10.1155/2018/2986742. Retrieved from <https://new.hindawi.com/journals/jhe/2018/2986742/>
65. Clarke M, Wright M. Antisepsis for urinary catheter insertion: a review of clinical effectiveness and guidelines. Ottawa: CADTH; 2019 Jan. (CADTH rapid response report: summary with critical appraisal). Retrieved from <https://www.cadth.ca/sites/default/files/pdf/htis/2019/RC1051%20Antisepsis%20for%20Urinary%20Catheter%20Insertion%20Final.pdf>
66. Office of the Auditor General of Canada. 2004 March Report of the Auditor General of Canada. Chapter 2 - Health Canada - Regulation of Medical Devices. Retrieved from https://www.oag-bvg.gc.ca/internet/English/parl_oag_200403_02_e_14894.html
67. Cowling T, de Léséleuc L. Reprocessing of single-use medical devices: a 2015 update. [Environmental Scan; Issue 48]. Ottawa: Canadian Agency for Drugs and Technologies in Health; 2015. Retrieved from <https://www.cadth.ca/reprocessing-single-use-medical-devices-2015-update>
68. Health Canada: Update: Notice to stakeholders - Health Canada's regulatory approach to commercial reprocessing of medical devices originally labelled for single use. 2016 May 4. Retrieved from <https://www.canada.ca/en/health-canada/services/drugs-health-products/medical-devices/activities/announcements/update-notice-stakeholders-regulatory-approach-commercial-reprocessing-medical-devices-originally-labelled-single-use.html>
69. Heard L, Buhner R. How do we prevent UTI in people who perform intermittent catheterization? *Rehabil Nurs*. 2005;30(2):44–5. doi: 10.1002/j.2048-7940.2005.tb00358.x Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/15789695>

70. Ghafoor N, Stoffel F, Mader M. Clean intermittent catheterization (CIC) in spinal cord injury patients. [translated] *Journal für Urologie und Urogynäkologie* 2001;8(1):8–11. Retrieved from <http://www.kup.at/kup/pdf/654.pdf> [Article in German]
71. Little P, Turner S, Rumsby K, Warner G, Moore M, Lowes JA, Smith H et al. Dipsticks and diagnostic algorithms in urinary tract infection: Development and validation, randomised trial, economic analysis, observational cohort and qualitative study. *Health Technol Assess.* 2009;13(19):1–96. doi: 10.3310/hta13190 <https://www.ncbi.nlm.nih.gov/pubmed/19364448>
72. Public Health Ontario, Collecting Mid-Stream Urine. Retrieved from <https://www.publichealthontario.ca/-/media/documents/uti-midstream-urine-collection.pdf?la=en>
73. Jepson RG, Mihaljevic L, Craig JC. Cranberries for treating urinary tract infections. *Cochrane Database of Systematic Reviews.* 1998, Issue 4. Art. No.: CD001322. doi: 10.1002/14651858.CD001322. Retrieved from <https://dspace.stir.ac.uk/bitstream/1893/2469/1/Cochrane%20cranberry%20treatment.pdf>
74. Jepson RG, Williams G, Craig JC. Cranberries for preventing urinary tract infections. *Cochrane Database Syst Rev* 2012 Oct 17. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001321.pub5/abstract>
75. McClurg D, Walker K, Pickard R, Hilton P, Ainsworth H, Leonard K, Suresh S et al. Participant experiences of clean intermittent self-catheterisation, urinary tract infections and antibiotic use on the ANTIC trial - A qualitative study. *Int J Nurs Stud.* 2018;81:1–7. doi: 10.1016/j.ijnurstu.2018.01.012. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/29425912>
76. Castel-Lacanal E, Game X, De Boissezon X, Guillotreau J. Impact of intermittent catheterization on the quality of life of multiple sclerosis patients. *World J Urol.* 2013;31(6):1445–50. Retrieved from <https://link.springer.com/article/10.1007/s00345-012-1017-8>
77. Bolinger R, Engberg S. Barriers, complications, adherence, and self-reported quality of life for people using clean intermittent catheterization. *J Wound Ostomy Continence Nurs.* 2013;40(1):83–89. doi: 10.1097/WON.0b013e3182750117. Retrieved from <https://insights.ovid.com/article/00152192-201301000-00011>
78. Lopes MAL, Lima EDR. Continuous use of intermittent bladder catheterization - can social support contribute? *Rev Latino-Am Enfermagem.* 2014;22(3):461–466. Available here http://www.scielo.br/scielo.php?pid=S0104-11692014000300461&script=sci_arttext
79. Wilde MH, Brasch J, Zhang Y. A qualitative descriptive study of self-management issues in people with long-term intermittent urinary catheters. *J Adv Nurs.* 2011;67(6):1254–1264. Retrieved from <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2648.2010.05583.x>
80. Girotti ME, MacCornick S, Perisse H, Batezini NS, Almeida FG. Determining the variables associated to clean intermittent self-catheterization adherence rate: One-year follow-up study. *Int Braz J Urol.* 2011;37(6):766–772. doi: 10.1590/s1677-55382011000600013 Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22233982>
81. All About Polyvinyl Chloride (PVC) Plastic Retrieved from <https://3dinsider.com/polyvinyl-chloride/>
82. Information supplied by B. Braun Medical of Canada.
83. Information supplied by Medline Canada.
84. Chartier-Kastler E, Lauge I, Ruffion A, Goossens D, Charvier K, Biering-Sorensen F. Safety of a new compact catheter for men with neurogenic bladder dysfunction: a randomised, crossover and open-labelled study. *Spinal Cord.* 2011;49(7):844–50. doi: 10.1038/sc.2011.5. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/21339763>
85. Information supplied by Coloplast Canada
86. Chartier-Kastler E, Amarenco G, Lindbo L, Soljanik I, Andersen HL, Bagi P. A prospective, randomized, crossover, multicenter study comparing quality of life using compact versus standard catheters for intermittent self-catheterization. *J Urol.* 2013;190(3):942–7. doi: 10.1016/j.juro.2013.04.026. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23587630>
87. Kelly L, Spencer S, Barrett G. Using intermittent self-catheters: experiences of people with neurological damage to their spinal cord. *Disabil Rehabil.* 2014;36(3):220–6. doi: 10.3109/09638288.2013.785606. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23614376>
88. Ramm D, Kane R. A qualitative study exploring the emotional responses of female patients learning to perform clean intermittent self-catheterisation. *J Clin Nurs.* 2011;20(21-22):3152–62. doi: 10.1111/j.1365-2702.2011.03779.x Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/21831238>

89. Cobussen-Boekhorst H, Beekman J, Wijlick E, Schaafstra J, van Kuppevelt D, Heesakkers J. Which factors make clean intermittent (self) catheterisation successful? *J Clin Nurs*. 2016;25:1308–1319. doi: 10.1111/jocn.13187. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27001288>
90. Wilde M, McMahon J, Fairbanks E, Brasch J, Parshall R, Zhang F, et al. Feasibility of a Web-Based Self-management Intervention for Intermittent Urinary Catheter Users with Spinal Cord Injury. *J Wound Ostomy Continence Nurs*. 2016;43(5):529–539. doi: 10.1097/WON.000000000000256. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27488740>
91. Cobussen-Boekhorst H, Hermeling E, Heesakkers J, van Gaal B. Patients' experience with intermittent catheterisation in everyday life. *J Clin Nurs*. 2016;25:1253–1262. doi: 10.1111/jocn.13146. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/26991436>
92. RHPA: Scope of Practice, Controlled Acts Model. Legislation & regulation. College of Nurses of Ontario, 2020. Retrieved from <https://www.cno.org/en/learn-about-standards-guidelines/educational-tools/ask-practice/understanding-your-scope-of-practice/>
93. Parsons BA, Narshi A, Drake MJ. Success rates for learning intermittent self-catheterisation according to age and gender. *Int Urol Nephrol*. 2012;44(4):1127–1131. doi: 10.1007/s11255-012-0136-x. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22350836>
94. Gould CV, Umscheid CA, Rajender K, Agarwal K, Kuntz G, Pegues DA; Healthcare Infection Control Practices Advisory Committee (HICPAC) CAUTI: Guideline for Prevention of Catheter-Associated Urinary Tract Infections (2009). Last update June 6, 2019. P12 Retrieved from <https://www.cdc.gov/infectioncontrol/pdf/guidelines/cauti-guidelines-H.pdf>
95. CADTH Rapid Response Report Pre-Operative Skin Antiseptics for Mucous Membrane Preparation in Patients with Contradictions to Povidone Iodine: Clinical Effectiveness and Guidelines 2015. Retrieved from <https://www.cadth.ca/sites/default/files/pdf/htis/may-2015/RA0756%20Antiseptics%20in%20Iodine%20Allergy%20Final.pdf>
96. Stokowski LA. Chlorhexidine in Healthcare: Your Questions Answered. Medscape. 2010. Retrieved from https://www.medscape.com/viewarticle/726075#vp_1
97. Hentzen C, Haddad R, Ismael SS, Peyronnet B, Game X, Denys P, Robain G, Amerenco G. Intermittent Self-catheterization in Older Adults: Predictors of Success for Technique Learning. *Int Neurourol J*. 2018;22(1):65–71. doi: 10.5213/inj.1835008.504. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/29609423>
98. Amarenco G, Guinet A, Jousse M, Verollet D, Ismael SS. Pencil and paper test: a new tool to predict the ability of neurological patients to practice clean intermittent self-catheterization. *J Urol*. 2011;185(2):578–82. doi: 10.1016/j.juro.2010.09.106. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/21168886>
99. Faleiros F, Pelosi G, Warschusky S, Tate D, K  ppler C, Thomas E. Factors Influencing the Use of Intermittent Bladder Catheterization by Individuals With Spina Bifida in Brazil and Germany. *Rehabil Nurs*. 2018;43(1):46–51. doi: 10.1002/rnj.302. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27775158>
100. Kriz J, Relichova Z. Intermittent self-catheterization in tetraplegic patients: a 6-year experience gained in the spinal cord unit in Prague. *Spinal Cord*. 2014;52(2):163–6. doi: 10.1038/sc.2013.154. 3–B Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24343054>
101. Bernuz B, Guinet A, Rech C, Hugeron C, Even-Schneider A, Denys P, et al. Self-catheterization acquisition after hand reanimation protocols in C5-C7 tetraplegic patients. *Spinal Cord*. 2011;49(2):313–318. doi: 10.1038/sc.2010.120. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20877333>
102. Afsar SI, Yemisci OU, Cosar SN, Cetin N. Compliance with clean intermittent catheterization in spinal cord injury patients: a long-term follow-up study. *Spinal Cord*. 2013;51(8):645–650. doi: 10.1038/sc.2013.46. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23752262>
103. Le Danseur M, Stutzman SE, Wilson J, Sislak I, Olson DWM. Is the CABIC Clean Intermittent Catheterization Patient Education Effective? *Rehabil Nurs*. 2018;43(1):40–45. doi: 10.1002/rnj.306. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27775184>
104. Silva DRA, Mazzo A, Jorge BM, Souza Junior VD, Fumincelli L, Almeida RGS. Intermittent Urinary Catheterization: The Impact of Training on a Low-Fidelity Simulator on the Self-Confidence of Patients and Caregivers. *Rehabil Nurs*. 2017;42(2):97–103. doi: 10.1002/rnj.226. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/26399198>

105. Bickhaus JA, Drobnis EZ, Critchlow WA, Occhino EA, Foster RT Sr. The feasibility of clean intermittent self-catheterization teaching in an outpatient setting. *Female Pelvic Med Reconstr Surg.* 2015;21(4):220–224. doi: 10.1097/SPV.000000000000155. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/25679356>
106. Okamoto I, Prieto J, Avery M, Moore K, Fader M, Sartain S, Clancy B. Intermittent catheter users' symptom identification, description and management of urinary tract infection: A qualitative study. *BMJ Open.* 2017;7(9). doi: 10.1136/bmjopen-2017-016453. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/28871020>
107. Cornejo-Davila V, Duran-Ortiz S, Pacheco-Gahbler C. Incidence of Urethral Stricture in Patients With Spinal Cord Injury Treated With Clean Intermittent Self-Catheterization. *Urology.* 2017;99:260-264. doi: 10.1016/j.urology.2016.08.024. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27566143>
108. de Souza-Junior V, Mendes IAC, Mazzo A, de Godoy S, Dos Santos CA. Telenursing Intervention for Clean Intermittent Urinary Catheterization Patients: A Pilot Study. *Comput Inform Nurs.* 2017;35(12):653–661. doi: 10.1097/CIN.0000000000000370. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/28692432>
109. Guinet-Lacoste A, Jousse M, Verollet D, Ismael SS, Le Breton F, Tan E, Amarenco G. Validation of the InCaSaQ, a new tool for the evaluation of patient satisfaction with clean intermittent self-catheterization. *Ann Phys Rehabil Med.* 2014;57(3):159–168. doi: 10.1016/j.rehab.2014.02.007. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24680634>



Nurses Specialized in Wound, Ostomy
and Continence Canada (NSWOC) <http://nswoc.ca>
Canadian Nurse Continence Advisors (CNCA) <http://www.cnca.ca>
Urology Nurses of Canada (UNC) <https://www.unc.org>
& Infection Prevention and Control Canada
(IPAC Canada) <https://ipac-canada.org>.

This position statement is made possible by educational grants.
Gold – Coloplast
Bronze – BD Bard, ConvaTec & Hollister, plus support from 3M.

All trademarks acknowledged.
Images courtesy of B. Braun, BD Bard, Coloplast, ConvaTec & Hollister.
Edited and produced by John Gregory IIWCC, Opacity Inc.