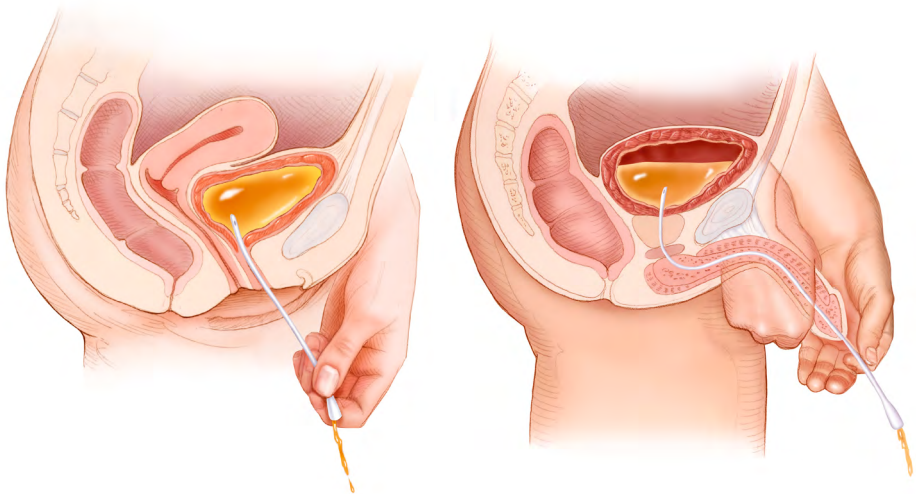


Evidence-based Guidelines for  
Best Practice in Urological Health Care

# Urethral intermittent catheterisation in adults

Including urethral intermittent dilatation

**2024**



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# What's new in this update

For this 2024 update of the guidelines 'Catheterisation - Urethral Intermittent in Adults' (2013), we did broad and comprehensive literature searches covering the whole subject. All records identified from the searches were screened according to the predefined eligibility criteria. We identified new and relevant evidence which we appraised through a structured assessment. We included 112 new references in the text. Following the new evidence, we have assessed all recommendations and rephrased when unclear and reduced the number of recommendations from 78 to 57 to aid in their implementation. Likewise, the whole document has been carefully reviewed and ambiguous text has been revised.

Specific changes include:

- 6.0 - Complications. The section has been updated with clear definitions.
- 7.0 - Updated the catheter material, included new catheter designs and removed help devices that were not available anymore.
- 14.0 - Patient perspective/experience with intermittent catheterisation. The section is new and covers the patient perspective and which barriers and facilitators patients experience when integrating intermittent catheterisation in their everyday life.

# Introduction

The European Association of Urology Nurses (EAUN) was created in April 2000 to represent European urology nurses. The EAUN's underlying goal is to foster the highest standards of urological nursing care throughout Europe. With administrative, financial, and advisory support from the European Association of Urology (EAU), the EAUN also encourages research and continued nursing education (through European Urology – Accredited Continuing Nursing Education; EU-ACNE) and aspires to develop European standards for education of urology nurses.

We believe that excellent health care goes beyond geographical boundaries. Improving current standards of urological nursing care has been top of our agenda, with the aim of directly helping our members develop or update their expertise. To fulfil this essential goal, we are publishing an update of one of our Evidence-based Guidelines for Best Practice in Urological Health Care booklets; a comprehensive compilation of theoretical knowledge and practical guidelines on intermittent catheterisation (IC). IC is defined as the best evidence-based practice for bladder management in individuals with difficulty in voiding due to neurogenic or non-neurogenic lower urinary tract dysfunction. [1] Advances in care have significantly increased survival in patients with, for example, spinal cord injury/disease (SCI/D), and proper bladder management is an important element in SCI rehabilitation. Problems with bladder regulation are one of the most important health issues, and urinary tract infections are reported as the leading cause of re-hospitalisation after SCI/D. SCDs now account for 50% of the patients with spinal cord dysfunction; for example, due to spinal cord infarction, metastasis and infection.

The goal is to maintain continence, prevent urological complications, preserve upper and lower urinary tract function, and make bladder management compatible with the person's lifestyle and environment to maintain physical health and quality of life (QoL). [2, 3]

The evidence presented in these guidelines are based on studies with different patient populations. The inclusion criteria were adults with bladder dysfunction who needed to perform IC regardless of whether bladder dysfunction was caused by: urinary incontinence (leaking urine or inability to control micturition); urinary retention; surgery on the prostate or genitalia; or the need to catheterise once or long-term.

The EAUN Guidelines Working Group (further referred to as "Working Group" in this document) believes there is a need to provide guidelines with recommendations that clearly state the level of evidence of each procedure, with the aim of improving

current practices and delivering a standard and reliable protocol. In this booklet, we include clear illustrations, extensive references, and annotated procedures to help nurses identify potential problem areas and carry out effective patient care. The Working Group decided to include topics such as indications and contraindications, equipment, nursing principles, and interventions in catheter-related care, as well as education for patients and caregivers, and urethral dilatation. We also highlight the psychological and social aspects unique to the experience of patients performing IC that have a profound influence on QoL.

With our emphasis on delivering these guidelines based on evidence and expert opinion, we intend to support nurses and practitioners who are already assessed as competent in IC procedures. Although these guidelines aim to be comprehensive, effective practice can only be achieved if the nurse or practitioner has a clear and thorough knowledge of the anatomy and physiology under discussion, and the necessary understanding of basic nursing principles.

This publication focuses on urethral IC and intermittent urethral dilatation. These guidelines are intended to complement, or provide support to, established clinical practice and should be used within the context of local policies and existing protocols and with recognition of the individual situation of the patient.

This text is made available to all individual EAUN members. The full text can be accessed on the EAUN website ([www.eaun.org](http://www.eaun.org)).

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# 1. Abbreviations

- CAUTI Catheter-associated urinary tract infection
- CFU Colony-forming unit
- CIC Clean intermittent catheterisation
- CISC Clean intermittent self-catheterisation
- DEHP Di-2-ethylhexyl phthalate (plasticizer)
- EAUN European Association of Urology Nurses
- IC Intermittent catheterisation
- ISC Intermittent self-catheterisation
- ISD Intermittent self-dilatation
- ISCC International Sustainability & Carbon Certification
- MS Multiple sclerosis
- NaCl Sodium chloride
- PA Polyamide
- PE Polyethylene
- PET Polyethylene terephthalate
- POBE Polyolefin-based elastomer
- PP Polypropylene
- PU Polyurethane
- PVC Polyvinyl chloride
- PVP Polyvinyl pyrrolidone
- QoL Quality of life
- REACH Registration, Evaluation, Authorisation and Restriction of Chemicals
- SCI Spinal cord injury
- SIC Sterile intermittent catheterisation
- SISC Sterile intermittent self-catheterisation
- SUI Stress urinary incontinence
- TOT Transobturator tape
- TVT Tension free vaginal tape
- UTI Urinary tract infection
- UUI Urgency urinary incontinence

## 2. Role of nurses in different countries

The European Association of Urology Nurses is a professional organisation of nurses in Europe who specialise in urological care. In Europe, there is variation in the education and competency of nurses in urology, with activities and roles differing among countries. However, the Working Group has tried to ensure that every nurse and healthcare professional may gain some benefit from using these guidelines.

In different countries, and even in different areas within the same country, job titles differ within the specialty. Countries differ in their regulations on guidelines, catheter products and their application, as well the legal aspects of what a caregiver may do. It is therefore difficult for any guideline to fulfil all requirements.

For the purpose of this document, we refer to all nurses who work with people performing intermittent catheterisation as nurse specialists.

## 3. Methodology

The Working Group has prepared this guidelines document to help nurses assess the evidence-based management and incorporate the recommendations into their clinical practice. These guidelines are not meant to be prescriptive, nor will adherence to them guarantee a successful outcome in all cases. Ultimately, decisions regarding care must be made on a case-by-case basis by healthcare professionals after consultation with their patients, using their clinical judgement, evidence-based knowledge, and expertise. The expert Working Group consists of a multidisciplinary team of nurse specialists, including Susanne Vahr Lauridsen (Chair), Veronika Geng (Vice Chair), Sajida Chagani, Anne Daniels, Therese Kelly, Marcin Popiński, Bente Thoft Jensen, Giulia Villa, Sally Wildeman, as well as urologist Ian Pearce. (see [‘About the authors’, Chapter 18](#)).

### 3.1 Literature search

Informed by the main question *“Is there any evidence for intermittent catheterisation and urethral dilatation for nursing interventions in different care situations such as preparation, insertion or care of intermittent catheters as well as catheter materials or complications?”*, a structured search strategy was developed and the search was carried out by Yuhong Yuan, Department of Medicine, Hamilton Health Science Center, McMaster University, Hamilton, ON, Canada, commissioned by the European Association of Urology Nurses (EAUN).

The initial search was performed from inception until 5 November 2021 and an update search until 31 July 2023. Conference abstracts, study protocols, editorials, letters, comments, and case reports were excluded. In all databases, output was limited to human studies and English language publications.

Databases:

- EBM Reviews
- Cochrane Central Register of Controlled Trials
- Embase
- OVID Medline Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R)
- CINAHL

If a topic was not covered by the results of the search, references from the first edition were used.

Additional searches were not limited to any level of evidence. For chapter 12 on patient perspective, only qualitative studies were used. Occasionally, book chapters were also used.

The search was based on the main keywords “intermittent catheterisation”, “urethral dilatation”, “urethral stricture”, and “urinary retention”. For the detailed search strategy, please contact the EAUN at [eaun@uroweb.org](mailto:eaun@uroweb.org).

All publications identified from the searches were uploaded to Covidence systematic review software for removal of the duplicates. Then, all titles and abstracts were screened according to the predetermined eligibility criteria.

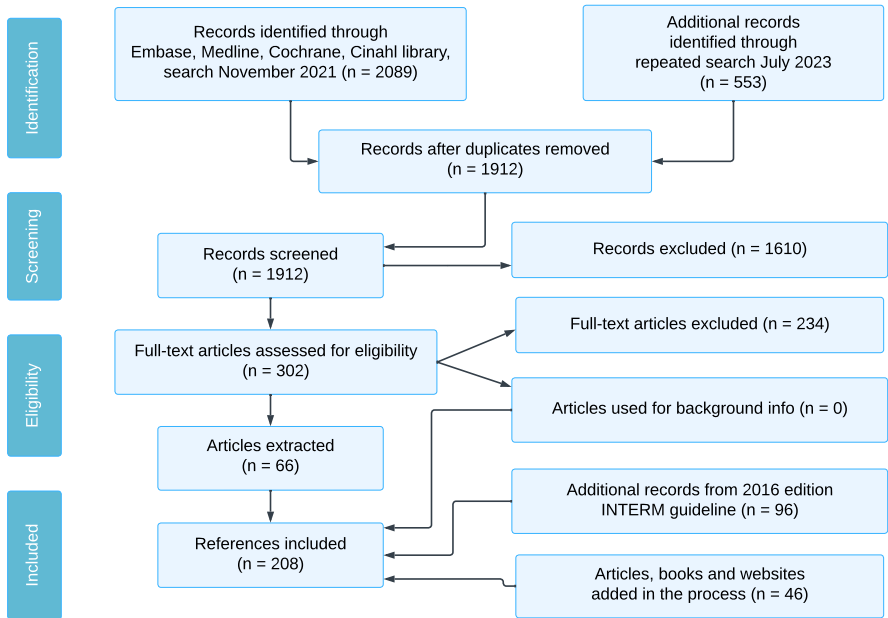
The title and abstract screening were performed independently by two panel members and any potentially relevant studies were forwarded for full-text screening. Assessments of full-text studies were conducted independently by all members of the guideline group and new references were included if they were relevant to the topic described in the guidelines.

### **3.1.1 Search results**

The initial search in November 2021 resulted in 1433 abstracts from scientific publications (after removal of duplicates, abstracts and irrelevant results). After reading the abstracts, 273 were retained and full-text articles were made available to the Working Group. Of these, 49 articles were used in the guidelines. The update search in July 2023 resulted in 553 articles. From this search, 30 abstracts were selected for full-text assessment and 17 were included in the guidelines. The results are shown in the PRISMA Flow diagram below. [4]

In the process of working with the articles, 45 new references were found and added to the reference list, if they were relevant for the topic and cited in the text. Ninety-six references from the previous version of these guidelines (2013 edition) were retained and additionally, 1 article mentioned by a reviewer and considered useful by the Working Group, was included.

**Diagram 1. PRISMA Flow diagram of the search**



### 3.2 Limitations of the document

The EAUN acknowledge and accept the limitations of this document. It should be emphasised that the current guidelines provide information about the treatment of an individual patient according to a standardised approach. The information should be considered as providing recommendations without legal implications. The intended readership is pan-European practising urology nurses and nurses working in a related field.

Cost-effectiveness considerations are best addressed locally and therefore fall outside the remit of these guidelines. Other stakeholders, including patient representatives, have not been involved in producing this document.

The list of catheter companies mentioned in the guidelines is not intended to be exhaustive. The catheters highlighted are illustrative only, and nurses may use similar products from other companies not listed in the guidelines.

### 3.3 Rating system

The recommendations provided in these documents are based on a rating system modified from that produced by the Oxford Centre for Evidence-based Medicine: Levels of Evidence (March 2009). [5] All group members participated in the critical assessment of the scientific papers identified. Disagreements were solved by the Chair and Vice Chair.

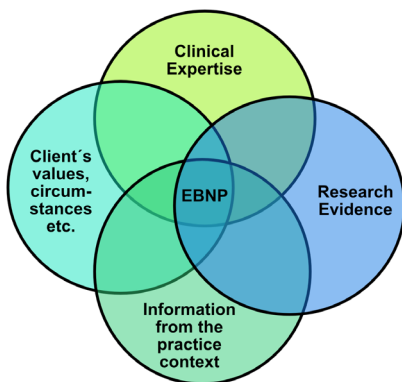
Whenever possible, the Working Group has graded treatment recommendations using a three-grade recommendation system (A–C) and inserted levels of evidence to help readers assess the validity of the statements made. The aim of this practice is to ensure a clear transparency between the underlying evidence and a recommendation given. This system is further described in Tables 1 and 2.

Some of the literature was not easy to grade. However, if the Working Group thought that the information would be useful in practice, it was ranked as level of evidence 4 and grade of recommendation C. Low-level evidence indicates that no higher level evidence was found in the literature when writing the guidelines, but cannot be regarded as an indication of the importance of the topic or recommendation for daily practice.

The literature used in these guidelines included qualitative research, but because there was no systematic ranking for these types of studies, the qualitative studies were all graded level 4.

The Working Group aims to develop guidelines for evidence-based nursing, as defined by Behrens (2004): “Integration of the latest, highest level scientific research into the daily nursing practice, with regard to theoretical knowledge, nursing experience, the ideas of the patient and available resources”. [6] The group based the text on evidence whenever possible, but if evidence was missing, it was based on best practice. Most of the text in the appendices is based on expert opinion.

Four components that influence nursing decisions can be distinguished: personal clinical experience of the nurse; existing resources; patient wishes and ideas; and results of research. [7] This statement implies that although literature is important, the experiences of nurses and patients are also necessary for decision-making. Subsequently, it is not only the written guidelines that are relevant for nursing practice.



*Fig. 1 The four components that should be included in evidence-based nursing practice*

*Adapted from Tammy Hoffmann, Sally Bennett, Chris Del Mar Introduction to evidence based practice Chapter one – Nurse Key <https://nursekey.com/introduction-to-evidence-based-practice/>*

**Table 1. Level of evidence (LE)**

LE	Type of evidence
1a	Evidence obtained from meta-analysis of randomised trials
1b	Evidence obtained from at least one randomised trial
2a	Evidence obtained from one well-designed controlled study without randomisation
2b	Evidence obtained from at least one other type of well-designed quasi-experimental study
3	Evidence obtained from well-designed non-experimental studies, such as comparative studies, correlation studies, and case reports
4	Evidence obtained from expert committee reports or opinions or clinical experience of respected authorities*

**Table 2. Grade of recommendation (GR)**

Grade	Type of evidence – Nature of recommendations
A	Based on clinical studies of good quality and consistency addressing the specific recommendations and including at least one randomised trial
B	Based on well-conducted clinical studies, but without randomised clinical trials
C	Made despite the absence of directly applicable clinical studies of good quality



### **3.4 Review process**

A blinded review was carried out by specialised nurses, urologists in various countries, and a patient organisation representative. The Working Group revised the document based on the comments received and included relevant references received (also from after the search period). A final version was approved by the EAUN Board and the EAU Executive responsible for EAUN activities.

### **3.5 Disclosures**

The Working Group members have provided disclosure statements of all relationships that might be a potential source of conflict of interest. The information has been stored in the EAU database. This guidelines document was developed with an unrestricted grant from Coloplast and Wellspect.

The EAUN is a non-profit organisation and funding is limited to administrative assistance and travel and meeting expenses. No honoraria or other reimbursements have been provided.

## 4. Terminology (definitions)

### 4.1 Urethral intermittent catheterisation

Intermittent (in/out) catheterisation (IC) is defined as drainage or aspiration of the bladder or a urinary reservoir with subsequent removal of the catheter. [8]

For sterile, aseptic, non-touch and clean techniques, the Working Group decided to use the definitions below, because the definitions in the literature were not coherent.

### 4.2 Catheterisation techniques

There are various IC techniques, but unfortunately, it is not always clear what is exactly meant by a particular technique that is mentioned in the literature. Also, practice differs even though the same name may be used. The techniques mentioned in these guidelines are defined outlined below.

#### **Sterile technique**

Complete sterile technique is only used in operating theatres, diagnostic situations, and immunocompromised patients. Sterile technique implies that all the material is sterile and catheterisation is performed with sterile gown, gloves, etc. – that is, full operating theatre conditions.

It is now widely accepted that sterile intermittent catheterisation (SIC) has been used incorrectly for aseptic technique.

The focus in these guidelines is on aseptic technique, which is the most commonly used technique in different settings.

**Aseptic technique** (When aseptic technique is mentioned in these guidelines, it refers to this definition)

- Use of a sterile catheter
- Cleansing of the genitals (water and soap)
- Use of sterile gloves
- Use of sterile lubricant (if the catheter is not pre-lubricated)
- Use of sterile tweezers (optional)

#### **Non-touch technique**

A non-touch technique is an aseptic technique that is usually performed with a sterile ready-to-use catheter.

An insertion grip/sleeve or special packages can be used to touch the catheter. [9] Additionally, limiting touch to only the conus side of the catheter is also considered a non-touch technique.

- Cleansing of the hands
- Non-sterile gloves
- Cleansing of the genitals (water and soap)
- Use of a sterile or ready-to-use catheter

## Clean technique


Clean technique is only used by patients or caretakers in the home setting.

- Use of a sterile catheter
- Cleansing of the hands
- Cleansing of the genitals (water and soap)
- Use of non-sterile or sterile lubricant (if the catheter is not pre-lubricated)

## Hygienic technique

The term hygienic technique is sometimes used for aseptic and sometimes for clean technique. The Working Group decided not to use this term.

**Diagram 2. Details of different IC techniques**

			Aseptic* non-touch technique (EAUN definition)	Clean
	Sterile	Aseptic* (EAU definition)		
Environment	Sterile	Non-sterile	Non-sterile	Non-sterile
Catheter	Sterile	Sterile	Sterile single use	Sterile   Reusable
Lubricant	Sterile	Sterile/ Antiseptic*	Sterile	Sterile, antiseptic, clean or no lubricant
Gloves	Sterile	Sterile	Sterile or unsterile if the catheter has a sleeve	No gloves
Care of the catheter				Rinse with water, store in dry place
Hand hygiene	Sterile gloves	Sterile gloves	Sterile gloves or unsterile if the catheter has a sleeve	Water and soap
Genital hygiene	Disinfectant	Disinfectant	Disinfectant or water and soap	Water or water and soap
Touch catheter and genitals	Touch with gloves	Touch with gloves	Touch with gloves or gloves and tweezers or sleeve catheter	Touch catheter without gloves, but never touch the catheter part that is inserted

\*Asepsis is the state of being free from disease-causing contaminants. Antiseptics are antimicrobial substances that are applied to living tissue/skin to reduce the possibility of infection.

### 4.3 Further definitions

#### **Urethral stricture/stenosis**

Urethral stricture is the preferred term for any abnormal narrowing of the anterior urethra, [10] which can lead to various urinary symptoms and complications. Urethral strictures are either a single or multiple narrowings along the length of the urethra and are more common in men than in women. [11-13] In men, urethral stricture refers to a narrowed segment of the anterior urethra due to fibrosis and cicatrisation of the urethral mucosa and surrounding spongiosus tissue ("spongiofibrosis"). [14, 15] In the male posterior urethra, there is no spongiosus tissue and at this location, the term stenosis is preferred. [14, 15].

There is no universal definition for what constitutes a female urethral stricture (FUS). It is defined by most authors as a fixed anatomical narrowing causing reduced urethral calibre, [11, 16] variously defined as between < 10 Fr to < 20 Fr [17, 18] with the majority defining < 14 Fr as diagnostic, compared with a normal urethral calibre of 18-30 Fr. In transgender patients, the term stricture is also used to define a narrowing of the reconstructed urethra despite the absence of surrounding spongiosus tissue.

#### **Urethral meatal stenosis**

Narrowing of the distal opening of the urethra that may be congenital or occur secondary to infection, inflammation, or as a result of surgical (open or endoscopic) intervention. [19]

#### **Bladder neck stenosis**

Abnormal narrowing of the bladder neck, mostly related to previous surgery.

#### **Dilatation**

Dilatation refers to the condition of an anatomical structure being dilated beyond its current dimensions.

Urethral dilatation refers to stretching the stenotic part of the urethra with semi-rigid, rigid dilators or balloon distention to treat abnormal narrowing and temporarily improve voiding.

*For the purpose of this document IC is deemed to include both urethral IC and urethral intermittent dilatation.*

## **Healthcare-associated infections (HCAIs)**

Healthcare-associated infections occur while receiving health care, or develop in a hospital or other healthcare facility, that first appear  $\geq 48$  h after hospital admission, or within 30 days after receiving health care. [20]

## **Haematuria**

There are two kinds of haematuria. Microscopic haematuria as three or more red blood cells per high-power field (RBC/HPF) on urine microscopy. [21] and macrohaematuria (also called gross or frank haematuria) which is visible with the naked eye from a concentration as low as 1 ml blood per litre of urine. [22]

## **Urinary retention**

Urinary retention is when the bladder does not empty completely or at all. Acute urinary retention is defined as a painful, palpable or percussable bladder, when the patient is unable to pass urine. [8]

Chronic urinary retention is defined as a non-painful bladder that remains palpable or percussable after the patient has passed urine. Such patients may be incontinent. [8]

## **Post-void residual (PVR)**

Post-void residual is defined as the volume of urine left in the bladder at the end of micturition. [8]

## **Bacteriuria**

Bacteriuria is the presence of bacteria in the urine and it can be classified as asymptomatic or symptomatic bacteriuria. For a urine specimen collected by in and out catheter, a count of  $> 100$  colony-forming units (CFU)/ml is consistent with bacteriuria. [23]

Symptomatic bacteriuria is defined as a significant number of bacteria in the urine that occurs together with urinary tract symptoms such as dysuria and fever.

Asymptomatic bacteriuria is defined as a positive urine culture but with absence of symptoms. [24]

## **Urinary tract infection (UTI)**

A urinary tract infection (UTI) is an infection involving any part of the urinary system, including urethra, bladder, ureters, and kidney.

UTI is defined as bacteriuria or funguria together with urinary tract symptoms such as dysuria and fever with a count of  $> 10^3$  CFU/ml.

The definition of CAUTI belongs to indwelling catheters and is not applicable for IC. [25]

**Table 3. Classification of UTI**

Classification of UTI	
Uncomplicated UTIs	Acute, sporadic or recurrent lower (uncomplicated cystitis) and/or upper (uncomplicated pyelonephritis) UTI, limited to non-pregnant women with no known relevant anatomical and functional abnormalities within the urinary tract or comorbidities.
Complicated UTIs	All UTIs which are not defined as uncomplicated. Meaning in a narrower sense UTIs in a patient with an increased chance of a complicated course: i.e. all men, pregnant women, patients with relevant anatomical or functional abnormalities of the urinary tract, indwelling urinary catheters, renal diseases, and/or with other concomitant immunocompromising diseases for example, diabetes.
Recurrent UTIs	Recurrences of uncomplicated and/or complicated UTIs, with a frequency of at least three UTIs/year or two UTIs in the last six months.
Urosepsis	Urosepsis is defined as life threatening organ dysfunction caused by a dysregulated host response to infection originating from the urinary tract and/or male genital organs.

[23]

However, different organisations use different definitions as shown in Table 4 (differences in red font).

**Table 4. Differences in definition of UTI**

Source	Signs/ symptoms		Lab parameters	Differences
Blok <i>et al.</i> EAU Guidelines on Neuro-Urology. Arnhem: European Association of Urology; 2022	Fever Incontinence Spasticity Lethargy Cloudy urine	Malodorous urine Kidney/bladder pain Dysuria Autonomic dysreflexia	10 <sup>2</sup> CFU/ml	Laboratory parameters
Hooton <i>et al.</i> 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	Fever Rigors Altered mental status Lethargy	Flank pain Acute haematuria Dysuria Urgent urination	10 <sup>3</sup> CFU/ml	No other identified source of infection, altered mental status, haematuria, urgency
Goetz <i>et al.</i> International Spinal Cord Injury Urinary Tract Infection Basic Data Set. Spinal Cord. 2013	Fever Incontinence Spasticity Lethargy Cloudy/ malodorous urine	Pyuria/leukocyturia Kidney/bladder pain Dysuria Autonomic dysreflexia	10 <sup>3</sup> CFU/ml	New onset of symptoms, pyuria

From: UTI-assessment tool presentation by Dr. A. Krassioukov, Canada [26-28]

# 5. Indications, contraindications and alternatives for intermittent catheterisation

## 5.1 Indications

**Table 5. Indications for intermittent catheterisation**

Acute or chronic urinary retention due to non-neurogenic or neurogenic conditions
Overflow incontinence, e.g., benign prostatic hyperplasia (BPH), urethral strictures
Incomplete emptying, e.g., neurogenic or hypotonic bladder, or after interventions such as bladder augmentation, intravesical onabotulinum toxin A injection, mid-urethral tape insertion
Continent urinary diversions, e.g., Mitrofanoff pouch, Studer neobladder
Intravesical instillation, e.g. BCG, mitomycin C for superficial bladder cancer
Investigations, e.g., urodynamics
Bladder washouts, e.g., with normal saline to remove mucus
To avoid any potential complications during insertion of radioactive therapeutics, e.g., caesium into the cervix

[29-31]

It is important to acknowledge that if performed for a large residual volume, IC should only be performed in the presence of symptoms or complications (Table 6), arising from this residual volume of urine rather than being based on a post-micturition residual volume only.

**Table 6. Complications of a large post-void residual volume of urine**

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

There are generally four categories of lower urinary tract dysfunction requiring IC, according to the underlying reason for incomplete bladder emptying.



### **5.1.1 Detrusor dysfunction**

Detrusor underactivity, or underactive bladder (UAB), is defined as a contraction of reduced strength and/or duration resulting in prolonged bladder emptying and/or a failure to achieve complete bladder emptying within a normal time span. [32] The patient is therefore left with a post-micturition residual volume of urine. The most common causes are neurological or idiopathic disorders, but may also be due to drug therapy, such as anti-muscarinic and  $\alpha$ 3 agonists.

### **5.1.2 Bladder outlet obstruction**

With obstruction or blockage of the bladder outlet, complete bladder emptying is prevented by physical obstruction despite an adequately functioning detrusor muscle. The most common causes of this are prostatic enlargement, high bladder neck, or urethral stenosis in women. Urethral stricture in men may also cause bladder outflow obstruction and is most often a consequence of infection or after instrumentation. For example, it can be caused by transurethral resection of the prostate (TURP), or bladder neck stenosis following radical prostatectomy (RP).

Detrusor sphincter dys-synergia is the most common cause of bladder outflow obstruction in patients with neurogenic bladder dysfunction, and occurs in the absence of co-ordinated sphincter relaxation and detrusor contraction. The sphincter therefore contracts and generates a functional obstruction at the bladder outlet. [33]

### **5.1.3 Postoperative**

Operations for restoring continence all carry a risk of impairing bladder emptying and a need for IC if any residual volume results in symptoms or complications. Acute urinary retention is also seen postoperatively, especially when epidural anaesthetic is used.

#### **a. Procedures for stress urinary incontinence (SUI)**

Curative procedures for stress urinary incontinence (SUI) (Table 7) all work on the principle that SUI can be reduced, or hopefully resolved, by causing some bladder outlet obstruction. As a consequence, bladder emptying may be impaired, leading to a clinically significant residual volume of urine in some patients. The risk of residual volume increases with the use of transobturator tape (TOT) or tension-free vaginal tape (TVT), colposuspension, or fascial slings.

**Table 7. Procedures with curative intent for stress urinary incontinence (SUI)**

Transobturator tape (TOT) insertion
Tension-free vaginal tape (TVT) insertion
Colposuspension
Fascial slings
Bulking agents

**b. Procedures for urgency urinary incontinence (UUI)**

Procedures for resolving urgency urinary incontinence (UUI) (Table 8) all work on the principle that episodes of UUI will be reduced or resolved by reducing intravesical pressure and increasing functional bladder capacity. Consequently, the ability of the bladder to empty efficiently and completely is impaired, leading to a residual volume of urine that may result in symptoms and complications that require IC.

**Table 8. Procedures with curative intent for urgency urinary incontinence**

Transurethral instillation of anticholinergic medications
Intradetrusor onabotulinum toxin A (formerly called botulinum toxin type A) injection
Detrusor myectomy
Clam ileocystoplasty
Sacral neuromodulation

**c. Other procedures (e.g., Mitrofanoff)**

Some reconstructive procedures involve the creation of a purpose-built channel, typically formed using non-terminal ileum, via which, IC is performed to drain the bladder, augmented bladder, or reconstructed neobladder. The Mitrofanoff principle involves the use of the appendix, refashioned non-terminal ileum (Monti procedure), or rarely, Meckel's diverticulum to create a channel leading from the urinary bladder to the anterior abdominal wall. Typically, the bladder outlet is closed and the channel is tunnelled into the bladder such that there is a natural valve-type effect on bladder filling, which causes the channel lumen to occlude to prevent unwanted urinary leakage. An intermittent catheter is then inserted to drain the bladder when required. Such procedures may be performed for a variety of conditions, including bladder exstrophy and neuropathic bladder, and after cystoprostate-urethrectomy.

For a description of the Mitrofanoff procedure, please refer to the European Association of Urology Nurses Guidelines 2010 “Continent Urinary Diversion”, Section 3.6. [34]

#### **5.1.4 Postpartum urinary retention**

Postpartum urinary retention requiring IC may occur in up to 15% of deliveries and is variably defined as the absence of voiding 6 h postpartum with a residual volume of > 150 ml. When diagnosed promptly, most patients require only temporary IC, with < 5% still needing IC after 3 years. [35] The risk of postpartum urinary retention is increased in the presence of an epidural anaesthesia, episiotomy, prolonged second stage of labour, or instrument-assisted delivery.

The implementation of IC to manage postpartum urinary retention offers a faster return to normal bladder function compared with the use of an indwelling catheter. [36]

### **5.2 Contraindications**

There are few contraindications to IC.

#### **Absolute contraindication**

- High intravesical pressure that would require continuous free drainage to avoid renal damage.

#### **Relative contraindications**

- Poor manual dexterity in the absence of an appropriately trained caregiver/ attendant
- Urethral trauma
- Urethritis
- Prostatitis/urinary tract infection
- Significant visible haematuria

### **5.3 Alternatives for intermittent catheterisation**

In case of residual volume and symptoms or complications, alternatives to IC are suprapubic catheterisation and indwelling urethral catheterisation. When catheterisation is only needed for a few days, both suprapubic drainage and intermittent urethral catheterisation have advantages over indwelling urethral catheterisation due to causing less discomfort. [37] Regarding symptomatic urinary tract infection, a suprapubic or intermittent catheter is preferable to an indwelling urethral catheter. [38, 39] Male external catheter drainage system catheters can be considered in patients with voiding problems without symptoms or complications and without residual volume. [26, 38]

**Table 9. Alternative bladder emptying methods**

Suprapubic catheterisation
Indwelling urethral catheterisation
Use of a male external catheter, eventually with sphincterotomy
Use of a female external catheter [40, 41]
Neurostimulation <ul style="list-style-type: none"><li>• sacral neuromodulation</li><li>• tibial nerve stimulation</li><li>• pudendal nerve stimulation [42]</li></ul>
Use of a Brindley stimulator
Urinary diversion

## 6. Complications

### 6.1 Infection

#### 6.1.1 Nosocomial infection

Nosocomial infections also referred to as healthcare-associated infections (HAI), are infection(s) acquired during the process of receiving health care that was not present during the time of admission. [43] Intermittent catheters pose no risk of biofilm formation due to their short time in the body. Therefore, they have a lower risk of catheter-associated urinary tract infection (CAUTI), which is the most common complication of intermittent catheterisation (IC), especially among IC users with a neurogenic disorder. [44-46] Although the true incidence, prevalence and relative risk are difficult to determine because studies vary significantly in their definition of UTI, the time frame over which the UTIs were assessed and their means of reporting. [47] In addition, most studies have been confined to specific patient cohorts, for example, spina bifida and spinal cord injury.

The incidence of CAUTI as a consequence of IC is in the region of 2.6 and 2.7 per person per year, the 1-year incidence of UTI varied from 62% to 77% among IC users with a neurogenic disorder and 38% to 42% among IC users with a non-neurogenic disorder. [46, 48, 49]

Lamin and colleagues reported that asymptomatic bacteriuria was found in 50% of IC users and symptomatic CAUTI occurred in 10–15%. Welk and colleges reported that IC users with a neurogenic disorder compared with IC users with a non-neurogenic disorder were more likely to have a CAUTI (54.9% vs. 38.9%), be hospitalised for CAUTI (11.3% vs. 4.0%), or have  $\geq 3$  CAUTIs (17% vs. 9.6%) within the first year of starting IC. This suggests that neurogenic disease is an independent risk factor for CAUTI among IC users. [46] Symptomatic CAUTIs are most prevalent in patients who have higher residual urine volumes at the time of catheterisation. [46, 50]

The bladder volume should preferably not exceed 400–500 ml in IC users. [27, 48]. Incomplete bladder emptying increases the risk of UTIs. [51]

In IC users, only symptomatic UTI should be treated because of the risk of antibiotic resistance and adverse effects. [52, 53]

The use of hydrophilic or pre-lubricated catheters is associated with a reduced risk of CAUTI among patients using IC [23, 54, 55] In addition, Ye *et al.* found evidence indicating significant reduction of symptomatic CAUTI when using the non-touch

technique in combination with ready-to-use catheters (a preactivated hydrophilic or gel-lubricated catheter). [56, 57]

It is unclear if the lower incidence of CAUTI found when using a hydrophilic catheter is due to high patient satisfaction, as the hydrophilic coating can reduce pain and decreases the risk of microtrauma. This makes the process easier, increases quality of life (QoL) and results in adherence to clean IC. The lower incidence of CAUTI may also be because the hydrophilic-coated catheters do not require additional external lubrication; thus, there is no additional need to touch the catheter before insertion. [45, 58]

Håkansson and colleagues reported that the incidence of pyelonephritis was < 1% per patient per year in patients with neurogenic or non-neurogenic bladder. [59]

### **6.1.2 Epididymo-orchitis**

Epididymitis can be acute, chronic or recurrent and is often caused by an infection. When the testicles are also affected, it is called epididymo-orchitis. Acute epididymitis is common in patients performing IC and is clinically characterised by pain, swelling and increased temperature of the epididymis, which may involve the testis and scrotal skin. [23] In a retrospective study over 17 years (n=140) Ku et al. found that in people with spinal cord injury 27.9% are diagnosed with an epididymo-orchitis. The epididymo-orchitis was significant more often for patients using CIC than for patients using indwelling urethral catheterisation. [60]

### **6.1.3 Urethritis**

Urethritis can be of either infectious or non-infectious origin. Inflammation of the urethra presents usually with LUTS. [23] Singh et al. and Wyndaele reported that urethritis had an incidence of 1–20% in spinal cord injury patients using IC. [61, 62]

### **6.1.4 Prostatitis**

Bacterial prostatitis is a clinical condition caused by bacterial pathogens and it can be both acute or chronic. Acute bacterial prostatitis usually presents abruptly with voiding symptoms and distressing but poorly localised pain. It is often associated with malaise and fever. [23]

Prostatitis can be a cause of recurrent UTI. [61, 63]

**Table 10. Factors increasing the risk of infection in IC**

Risk factor	LE
Low frequency of IC [48, 61, 63-67]	2b
Bladder overdistension [68]	1b
Female [48, 69]	1b
Poor fluid intake [48]	3
Non-coated catheters [54, 56]	1a
Poor technique [70]	3
Poor education [61, 64, 67, 69, 71]	2b

Recommendations	LE	GR
In all IC users, only treat symptomatic UTI. [52, 53]	1b	A
In all IC users, explore if the bladder volume exceeds 400–500 ml [27, 48]	3	C

## 6.2 Urethral trauma/haematuria

Urethral trauma, especially in men, due to IC can cause false passage and meatal stenosis; however, the incidence is rare. [72] Trauma to the urethral mucosa can lead to long-term complications, such as urethral stricture or infection of the urethral mucosa. [33, 56]

Urethral bleeding or haematuria is an acute form of urethral trauma that manifests as blood in the urine. Urethral bleeding is a complication of IC and is more frequently seen in patients starting IC. Håkansson and colleagues reported a 2.2% frequency of bleeding per year. [59]

Addition of a hydrophilic coating or use of a pre-lubricated catheter significantly reduces the risk of microscopic haematuria. [54, 56, 73, 74] However, there is still no evidence supporting the use of hydrophilic catheters to reduce gross haematuria. [56, 57, 75] Similarly, the use of lubrication, either incorporated into the catheter device or externally applied reduces the risk of trauma. [74, 76]

Recommendation	LE	GR
Hydrophilic-coated or pre-lubricated catheters should be used for IC [54, 56, 73, 74]	1a	A

### 6.2.1 False passage

A false passage is when an object, such as a catheter or surgical device, passes through the wall of the urethra. Urethral trauma resulting in a false passage is almost certainly under-reported but may result in the patient being unable to continue with IC as a consequence of the catheter entering the false passage in preference to the bladder. [77]. A scoping review by Engberg et al. reported an incidence of 2.2–9% annually; however, limited research is available on prevalence and intervention. [47, 59, 62]

### 6.2.2 Urethral stricture

A urethral stricture is a narrowing of the urethra, which can lead to various urinary symptoms and complications. Urethral stricture is more common in men than women and is caused by repeated trauma from IC. Urethral stricture in women is rare and estimated at about 0.1–1% [78], compared with 4.2–25% in men. The occurrence of urethral strictures in men increases with time. [79, 80]

A review conducted by Liao et al. supported the use of hydrophilic catheters to reduce the incidence of urethral strictures. They found that the incidence of urethral stricture was 3.1% in patients using hydrophilic catheters and 11.5% in those using non-hydrophilic catheters. [74]

*For more information on dilatation for strictures, see Chapter 15.*

Recommendations	LE	GR
Hydrophilic-coated catheters to prevent urethral strictures should be used [74]	1a	A
In the event of inability to catheterise, seek advice of a urologist	4	A

### 6.2.3 Meatal stenosis

Meatal stenosis is an abnormal narrowing of the urethral opening (meatus). If the narrowing becomes significant, voiding will be impaired and may cause incomplete bladder emptying. Meatal stenosis is a rare complication with only a few reported case series in the '90s. [81, 82]



### **6.2.4 Bladder perforation**

Bladder perforation is a rare complication with only sporadic reports, which occurs in augmented bladders along the anastomotic site. [83, 84]

## **6.3 Miscellaneous**

### **6.3.1 Catheter knotting**

Catheter knotting happens when the catheter coils around itself and then the catheter end loops through these coils. It is an extremely rare complication and more commonly reported in children. [85] This complication may be prevented by careful selection of the catheters and ensuring understanding of urethral anatomy and safe insertion lengths of catheters. [86]

### **6.3.2 Formation of bladder and prostate stones (calculi)**

The risk of developing bladder stones is increased by recurrent UTI with urease-producing organisms, incomplete bladder emptying, and use of permanent catheters, immobilisation and hypercalciuria.

Bartel et al. found a 2% incidence of bladder stone formation in spinal cord injury patients using IC, compared with 11% for suprapubic catheters and 6.6% for indwelling catheters), with a mean period of stone development of ~10 years. The time to recurrence was 26 months. [87]

Long-term IC is associated with an increased risk of bladder calculus formation in children and adults [88, 89], with a higher risk in patients performing IC via a Mitrofanoff procedure. [89] The pathogenesis can be related to the introduction of pubic hair that acts as a nidus for stone formation. [90, 91]

A recent study by Ecer et al. found an association between the incidence of prostate calculi in patients with a neurogenic bladder using IC compared to those not using IC. CAUTI and prostatitis are the most important factors causing an increase in the frequency of prostate calculi. [92]

### **6.3.3 Pain/discomfort**

Pain may be experienced during or after catheter insertion or removal, and as a consequence of bladder spasm or UTI. Painful insertion and removal can be caused by incomplete relaxation of the pelvic floor muscles, mucosal atrophy in post-menopausal women, or lack of lubrication. There is a lack of evidence on the topic of pain and discomfort during IC. [47]

Fear of pain can hinder relaxation and learning during the instruction period. [58] When removing the catheter, vacuum suction can occur, probably because the catheter adheres to the bladder wall.

Johansson *et al.* reported that patients using a hydrophilic PVC catheter reported significantly more burning sensation and pain compared to patients using a PVC-free catheter. [93]

Severe pain when inserting the catheter has a significant impact on QoL. [94]

Pain can be reduced by appropriate training of the person carrying out the catheterisation.

Recommendation	LE	GR
PVC-free catheters should be used for IC to reduce pain and burning [93]	1b	A

## 7. Catheter material, types of catheters and equipment

### 7.1 Catheter material

Single-use medical devices have been under close scrutiny for several years; especially the choice of material. Many different requirements such as medical safety, treatment functionality and efficiency, patient comfort, and environmental performance must be considered. There is an increasing demand from the community for polyvinyl chloride (PVC)-free materials and their phthalate components in medical devices. [95] According to REACH (EU chemical regulation), phthalates are harmful and hazardous to the human body. Products containing classified phthalates must be labelled according to the Medical Devices Directive (93/42/ECC) as of March 2010. Finding good alternatives to phthalates is a technical challenge, but for some products phthalate-free alternatives are available.

#### Polyvinyl chloride

PVC is a thermoplastic polymer that is cheap, durable and flexible. PVC catheters are clear plastic and usually single use. PVC catheters exist in harder or softer versions, giving the catheter the correct rigidity, stability and buckling resistance for individual application. [95] To make the PVC catheter soft and flexible, plasticisers are used and they are not chemically bound in the polymer molecules. [96] As a result, these may cause problems (e.g., skin reaction).

#### Silicone

Silicone (group of synthetic polymers) is one of the most biocompatible synthetic materials available, thus offering reduced toxicity and tissue inflammation, and resistance to UV light. Silicone catheters are durable but highly flexible. Silicone devices can be manufactured with a thin wall, thus creating a large drainage lumen in relation to the external diameter. [96, 97]

#### Ethylene vinyl acetate

Ethylene vinyl acetate (EVA) also known as poly ethylene vinyl acetate (PEVA) is a polymer of ethylene and vinyl acetate that is similar to elastomeric materials in terms of softness and flexibility, yet can be processed like other thermoplastics.

### 7.2 Catheter lubrication/coating

The purpose of using lubrication is to reduce friction and thus protect the sensitive urethral mucosa during catheter insertion and removal. [98] Currently, most catheters have a hydrophilic coating that reduces friction between the urethral mucosa and the

catheter. Apart from the hydrophilic coatings, there are plain PVC or silicone catheters that come packed with a separate gel/lubricant, or as pre-lubricated catheters with a gel coating applied.



*Fig. 2 Example of a catheter packed with gel or water*

*(Courtesy of Manfred Sauer GmbH)*

Different types of lubricants can be distinguished:

- Lubricants with/without out anaesthetic lignocaine/lidocaine and/or chlorhexidine
- Lubricants with chlorhexidine (antiseptic)
- Lubricants with water and glycerine

Sterile lubricants are always for single use. An open package should not be used again.

### **Hydrophilic and gel coatings**

Hydrophilic-coated catheters are characterised by a layer of polymer coating that absorbs and binds water to the catheter up to 10 times its own weight. This results in a thick, smooth and slippery surface reducing friction between the catheter surface and the urethral mucosa during insertion. The coating layer remains intact upon introduction into the urethra and ensures lubrication of the urethra throughout its length. [99]

Several companies produce a variety of products with a hydrophilic coating.

- Some products require the addition of water for 30 s to activate the catheter coating (e.g., EasiCath®, FloCath®, Hi-slip®, IQ-Cath®, Magic3®, and VaQua™ Catheter)
- Others are presented pre-packaged with water or saline (e.g., LoFric®, SpeediCath®, IQ-Cath® and VaPro™)
- Or with an inert transparent water-soluble gel that self-lubricates the catheter as it is advanced from the packaging (e.g., InstantCath Protect®, UroCath gel®, Actreen®, and IQ-Cath® gel).

## 7.3 Catheter tips

### 7.3.1 Nelaton

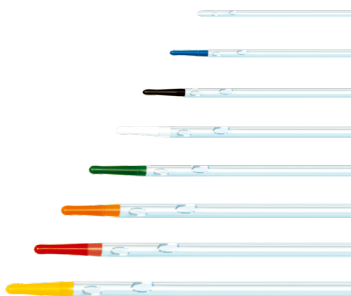
The Nelaton catheter is the standard catheter and has a soft rounded tip that is flexible with a straight proximal end. It has two lateral eyes for drainage that are often polished for comfort.

### 7.3.2 Tiemann/Coudé

The Tiemann (also known as Coudé) catheter has a slightly curved and tapered tip with up to three drainage holes. This type of catheter is particularly useful in individuals with a narrow urethral passage or prostatic obstruction. The angled tip gives directional stability, and the tip is slightly more rigid than a standard type to allow easier insertion through obstructed areas.

### 7.3.3 Flexible rounded tip

The flexible rounded catheter tip permits passage into almost any orifice and the urethra, irrespective of configuration, tortuosity, or degree of obstruction. Its flexibility can cause a lack of control for some patients.



*Fig. 3 Flexible tips with various Charrières*

*Ergothen tips  
(Courtesy of Teleflex)*

### 7.3.4 Pointed tip

The pointed tip is squeezable and has a bendy end. This tip can be useful in case of obstruction and dilatation because the Charrière increases in size along the first centimeter of the catheter. The tip ends in a ball to prevent the catheter becoming trapped in the urethra.



*Fig. 4 Pointed tip*

*IQ-Cath®*

*(Courtesy of Manfred Sauer GmbH)*

### 7.3.5 Introducer/protective tip

It is assumed that many urinary tract infections are caused during intermittent catheterisation (IC) when the catheter tip passes through the colonised portion of the urethra, pushing the bacteria further into the urinary tract. A sterile introducer/protective tip catheter system seems to allow the catheter to bypass the colonised portion of the urethra. [100]

The Working Group did not find any studies to underpin the advantages of the introducer/protective tip.



*Fig. 5 Example of an introducer/protective tip*

*(Courtesy of V. Geng)*

### 7.3.6 Micro-hole zone catheter

The micro-hole zone technology catheter has more than 80 micro-holes instead of 2 or 3 eyes for emptying, which empties the bladder completely in one free flow without the need to reposition the catheter. The micro holes may prevent suction in the urethra, and subsequently reduce the risk of microtraumas and residual urine. [101]



*Fig. 6 Micro-hole zone catheter*

*Luja™*

*(Courtesy of Coloplast)*

## 7.4 Catheter diameter, length and connectors

### 7.4.1 Size

The external diameter of intermittent catheters is measured in millimetres and is known as the Charrière scale (Ch or CH) or French scale (F, Fr or FG) which measures the circumference. Sizes range from 6 to 24. Female adult sizes are commonly 10–14 and male adult 12–14, although larger sizes are used for treating strictures. [102] The catheter chosen should be large enough to allow free flow of urine without causing damage to the urethra. Irrespective of the choice of catheter, the connection is universally colour coded to denote the size of the catheter. The colour coding of the sizes and connectors is the same ([see 7.4.3. Catheter connectors](#)).

### 7.4.2 Length

Intermittent catheters are available in both male and female lengths (~40 cm and 7–22 cm, respectively).

### 7.4.3 Catheter connectors

Catheter connectors generally have standardised colours, relating to size, for ease of recognition (see Table 11). The colours are international, but not every manufacturer uses the colour coding, so it is necessary to check the packaging and connector for size confirmation. (Connectors are generally attached during the manufacturing process and are already in place.)

**Table 11. Standard catheter connector colour chart**

Catheter size (Fr)	8	10	12	14	16	18	20	22
Colour								
Tube diameter (mm)	2.7	3.3	4	4.7	5.3	6	6.7	7.3

**Luer lock connector**

A Luer lock connector is connected to a catheter when irrigating (or instilling) the bladder. This can be attached to the pre-installed connector. It is also possible to use a catheter with a standard connection and use a special connector with a Luer lock on one side and tip on the other side to insert the connector.



*Fig. 7 Example of catheter with Luer lock connector*

*B. Braun*

*(Courtesy of V. Geng)*



*Fig. 8 Example of Luer lock adapter*

*B. Braun*

*(Courtesy of V. Geng)*

**7.5 Catheter packaging and disposal**

Packaging for catheters and catheter sets can vary with regard to opening. Packaging should be considered when choosing catheters for patients with reduced dexterity. If a urine bag is attached to the catheter, it can be easily drained by pulling a tap or cutting the bag with scissors. Once urine is discarded the used catheter can be discarded with the packaging.

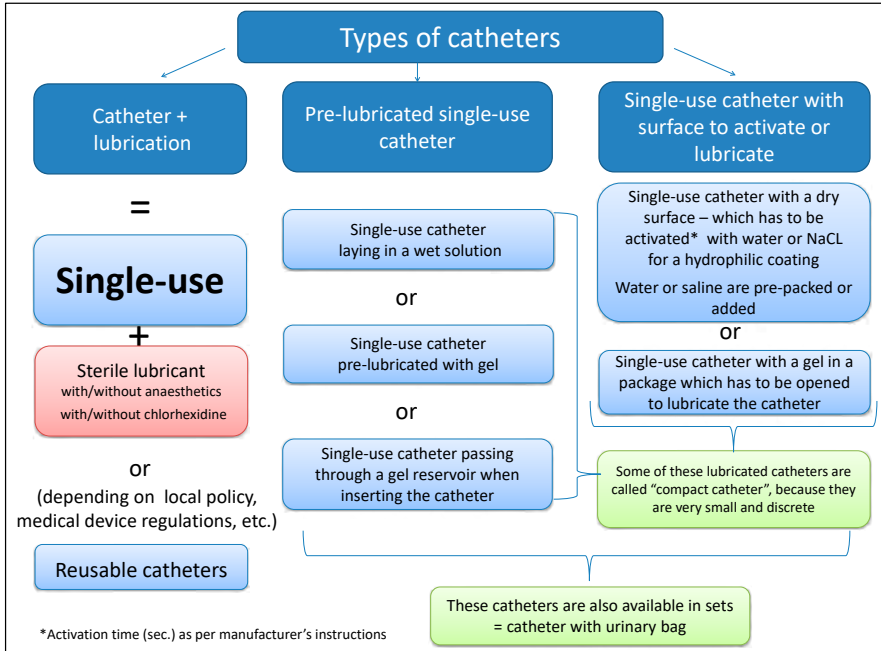
In the community, packaging waste can be reduced by dispensing with outer packaging only or ordering bulk containers.



## 7.6 Types of catheters

Several types of catheters and sets are available for IC. Diagram 3 gives an overview of the existing types. The catheters illustrated in this document are examples only, and not exhaustive.

**Diagram 3. Types of catheters**



### Standard catheter

Standard types of catheters have no bag attached, are easy to store when travelling, discreet, and easy to dispose. Standard catheters enable the patient to pass urine via the catheter directly into the toilet.

### Complete catheter set

Complete catheter sets contain a catheter connected to a urine bag that enables the patient to measure residual volume with ease, is convenient when the patient needs to catheterise in a non-hygienic area or lying on a bed. Clinical practice shows that patients with reduced dexterity sometimes find sets easier to use because urine is contained. Sets can be used for aseptic or non-touch techniques.

### 7.6.1 Single-use catheter

All the catheters are available in male and female versions.

#### 7.6.1.1 Single-use catheter without coating

Single-use sterile catheters without any equipment and no coating can be used with lubricants.

Single-use catheters in hospitals are often used in combination with standard catheter sets.

Non-coated catheters are widely considered in the literature to cause an increase in urethral irritation, poor patient satisfaction, increased bacteriuria, and long-term urethral complications, although there is a lack of hard evidence to support this. [24]



Fig. 9 Single use catheter

EasiCath®

(Courtesy of Coloplast)

#### 7.6.1.2 Single-use catheter with coating or gel

Single-use sterile catheters with hydrophilic coatings are a ready-to-use solution, with gel on the surface of the catheter or in the wrapping. As the name suggests, these catheters are designed for single use and are precoated to allow ease of insertion and removal, thereby reducing the risk of urethral mucosal irritation that can be more prevalent with an uncoated product. [103]

#### 7.6.1.3 Catheters with sleeves or non-touch catheters

In catheters with a plastic sleeve or plastic grip, the sleeve/grip around the catheter is used as guide to introduce the catheter without touching it. There are two types:

- 1) catheter with a plastic sleeve/grip around it (sleeve/grip does not cover the catheter completely)



*Fig. 10 Male catheter for non-touch use*

*LoFric® Origo™ Insertion Grip*

*(Courtesy of Wellspect)*



*Fig. 11 Female catheter partly covered by a sleeve/grip for non-touch use*

*Liquick® Base (Teleflex)*

*(Courtesy of V. Geng)*

- 2) catheter with a plastic sleeve completely covering the catheter, so that the catheter can be inserted safely without sterile gloves and without touching the catheter, available for men and women.



*Fig. 12 Sleeve catheter for men*

*(Courtesy of Manfred Sauer)*

#### 7.6.1.4 Meatal dilator /meatal dilatation catheter

Meatal dilators are used for dilatation of the penile urethral meatus. There are different sizes and tips, and ideally they are hydrophilic-coated.



*Fig. 13 Hydrophilic meatal dilators*

WyCath Meatal Dilators

(Courtesy of Flexicare)



*Fig. 14 Meatus dilatation catheter*

LoFric® Dila-Cath™

(Courtesy of Wellspect)

#### 7.6.2 Catheter systems/complete sets

Most of the above-described catheters are also available as catheter set or complete set; the lubrication is the same as in single-use catheters. The catheters are pre-connected with a urinary bag. However, there is a difference in handling and how to use them with a non-touch technique. For details, refer to the manufacturer's insertion instructions.

Complete sets usually contain a catheter suitable for IC, a drainage/reservoir bag to collect the urine, and a lubricant or activator such as water if the catheter is hydrophilic. These sets are ideal for use in confined spaces or restricted facilities such as aeroplanes, building sites, or extremely rural settings where access to toilet

facilities may be limited. They are particularly useful for wheelchair users and those patients who catheterise from a seated or prone position.

#### 7.6.2.1 Discrete/compact catheters

Some manufacturers offer a compact intermittent catheter that is small and therefore more discreet. The small packaging is more convenient, and the products are sterile and for single use. Compact intermittent catheters for women are available from different companies. Only one company also offers male compact catheters ([see table in section 7.7.2](#)).

The female catheters are designed specifically for the short urethra and are smaller than a standard writing pen, whereas the male version is less than half the size of a standard intermittent catheter.

The compact products have the same coating/lubrication as the standard-length products. Both are easy to use and dispose, offer a simpler storage solution, and can be used with a non-touch technique. Manufacturers that offer a compact style intermittent catheter also offer additional products specifically for these catheters, such as drainage bags.



*Fig. 15 Various female compact catheters. The top catheter is partly covered by a sleeve/grip*

*Pictured from top to bottom are: Liquick® Base (Teleflex), SpeediCath® Compact Female (Coloplast), LoFric® Sense™ (Wellspect), Actreen® Lite Mini (B. Braun)  
(Courtesy of V. Geng)*



*Fig. 16 Telescope catheter*



*SpeediCath® Compact Male catheter (Coloplast)  
(Courtesy of Coloplast)*





## 7.7 Examples of catheters with type of material and coating







This subchapter shows examples of different types of catheter/catheter set from various countries, selected by the international working group. The information in the table was provided by the manufacturers on request. This list does not pretend to be exhaustive.

### 7.7.1 Catheters and catheter sets







(in alphabetical order company name)







Catheter	Description and material	Used for	Photo courtesy of
<b>Actreen® Mini Cath</b> 	<p><b>Catheter:</b> 9 cm ready-to-use catheter with Nelaton tip. Available from CH8 to CH16</p> <p><b>Catheter material:</b> Actreen® Mini Cath is made of TermoPlastic polyolefin (TPO).</p> <p><b>Eyes:</b> There are 2 eyes per Actreen® catheter</p> <p><b>Coating:</b> Actreen® Mini Cath pre-lubricated with glycerin and water-based formula</p> <p><b>Catheter package material:</b> Polyethylene (PE film)</p> <p>Additionally, Actreen® Mini Cath is not made with PVC, DEHP-(phthalate) and latex</p>		B. Braun





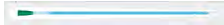





Catheter	Description and material	Used for	Photo courtesy of
<b>Actreen® Mini Set</b> 	<p><b>Catheter:</b> 9 cm ready-to-use catheter connected to a bag. Available from CH10 to CH14</p> <p><b>Catheter material:</b> Actreen® Mini Set is made of TermoPlastic polyolefin (TPO)</p> <p><b>Eyes:</b> There are 2 eyes per Actreen® catheter</p> <p><b>Coating:</b> Actreen® Mini Set pre-lubricated with glycerin and water-based formula</p> <p><b>Bag particularities:</b></p> <ul style="list-style-type: none"> <li>• Volume capacity: 700 ml</li> <li>• There is an anti-reflux valve integrated into the bag allowing to limit the risk of leakages</li> </ul> <p><b>Catheter package and Urine bag material:</b> polyethylene. Additionally, Actreen® Mini Set is not made with PVC, DEHP-(phtalate) and latex</p>		B. Braun
<b>Actreen® Hi-Lite Cath</b> 	<p><b>Catheter:</b> Ready-to-use catheters available as following:</p> <ul style="list-style-type: none"> <li>- 20 cm available with Nelaton tip: CH6 to 16</li> <li>- 41 cm available with 2 tips: <ul style="list-style-type: none"> <li>• Nelaton: CH8 to 18</li> <li>• Tiemann: CH8 to 18</li> </ul> </li> </ul> <p><b>Catheter material:</b> Actreen® Hi-Lite Cath is pre-lubricated with Glycerin and water-based formula. Eyes: There are 2 eyes per Actreen® catheter</p> <p><b>Coating:</b> Actreen® Hi-Lite Cath pre-lubricated with Glycerin and water-based formula</p> <p><b>No-touch:</b> Actreen® catheters rely on the no-touch technique to avoid catheter contamination. Catheter package material: Polyethylene/ polypropylene</p> <p>Additionally, Actreen® Hi-Lite Cath is not made with PVC, DEHP-(phtalate) and latex</p>		B. Braun













Catheter	Description and material	Used for	Photo courtesy of
<b>Actreen® Hi-Lite Set</b> 	<p><b>Catheter:</b> 37 cm ready-to-use catheter connected to a bag 2 tips available:</p> <ul style="list-style-type: none"> <li>• Nelaton: CH10 to 18</li> <li>• Tiemann: CH10 to 18</li> </ul> <p><b>Catheter material:</b> Actreen® Hi-Lite Set is pre-lubricated with glycerin and water-based formula.</p> <p><b>Eyes:</b> There are 2 eyes per Actreen® catheter</p> <p><b>Coating:</b> Actreen® Hi-Lite Set pre-lubricated with glycerin and water-based formula</p> <p><b>No-touch:</b> Actreen® catheters rely on the no-touch technique to avoid catheter contamination</p> <p><b>Bag particularities:</b></p> <ul style="list-style-type: none"> <li>• Volume capacity: 1000 ml</li> <li>• There is an anti-reflux valve integrated into the bag to limit the risk of leakages</li> </ul> <p><b>Catheter package and Urine bag material:</b> Polyethylene/polypropylene. Additionally, Actreen® Hi-Lite Set is not made with PVC, DEHP-(phthalate) and latex</p>		B. Braun
<b>EasiCath®</b> 	<p><b>Catheter:</b> Single-use, sterile catheter available with Nelaton and Tiemann tip</p> <p><b>Catheter material:</b> phthalate-free</p> <p><b>Coating:</b> Hydrophilic coating</p> <p><b>Catheter package:</b> Individually packaged in an easy to open sleeve</p>		Coloplast
<b>EasiCath® Set</b> 	<p><b>Catheter:</b> Single-use, sterile catheter with an integrated bag available with Nelaton and Tiemann tip</p> <p><b>Catheter material:</b> phthalate-free</p> <p><b>Urinary bag:</b> 700 - 1,200 ml</p> <p><b>Coating:</b> Hydrophilic coating</p> <p><b>Catheter package:</b> Individually packaged in an easy to open sleeve</p>		Coloplast
















Catheter	Description and material	Used for	Photo courtesy of
<b>Luja™</b>  	<p><b>Catheter:</b> Innovative dry-sleeve ready-to-use catheter with a flexible tip with 80+ micro-holes (Micro-hole Zone Technology) for complete bladder emptying in one free flow</p> <p><b>Catheter material:</b> PU, therefore PVC- and phthalate-free</p> <p><b>Coating:</b> Hydrophilic prelubricated coating with the Triple Action Coating Technology</p> <p><b>Catheter package:</b> Pocket size and standard size packaging as well as drip-free re-closure for discrete disposal</p>		Coloplast
<b>SpeediCath®</b> 	<p><b>Catheter:</b> Ready-to-use catheter available with Nelaton and Tieman tip</p> <p><b>Catheter material:</b> PU, therefore PVC- and phthalate-free</p> <p><b>Coating:</b> Hydrophilic prelubricated coating with the Triple Action Coating Technology</p> <p><b>Catheter package:</b> Easy opening with ring-pull feature</p>		Coloplast
<b>SpeediCath® Flex</b> 	<p><b>Catheter:</b> Dry-sleeve catheter with a flexible tip instantly ready-to-use</p> <p><b>Catheter material:</b> PU, therefore PVC- and phthalate-free</p> <p><b>Coating:</b> Hydrophilic prelubricated coating with the Triple Action Coating Technology</p> <p><b>Catheter package:</b> Pocket size and standard size packaging as well as drip-free re-closure for discrete disposal</p>		Coloplast
<b>SpeediCath® Flex Set</b> 	<p><b>Catheter:</b> Dry-sleeve all-in-one catheter with a flexible tip and an integrated, dry-to-touch bag instantly ready-to-use</p> <p><b>Catheter material:</b> PU, therefore PVC- and phthalate-free</p> <p><b>Urinary bag:</b> 1000 ml, with handle, tearline and pull ring for easy emptying</p> <p><b>Coating:</b> Hydrophilic prelubricated coating with the Triple Action Coating Technology</p> <p><b>Catheter package:</b> Drip-free re-closure for discrete disposal</p>		Coloplast





Catheter	Description and material	Used for	Photo courtesy of
<b>Advance™ Intermittent Catheter</b> 	<b>Catheter:</b> Flexible catheter with a sleeve protective tip <b>Catheter material:</b> Phthalates-free, PVC, not made with natural rubber latex <b>Urinary bag material:</b> User-regulated gel reservoir		Hollister Incorporated
<b>Advance Plus™ Intermittent Catheter</b> 	<b>Catheter:</b> Flexible catheter with a sleeve, protective tip, and integrated 1500 ml collection bag <b>Catheter material:</b> Phthalates-free, PVC, not made with natural rubber latex <b>Urinary bag material:</b> User-regulated gel reservoir		Hollister Incorporated
<b>VaPro™ No Touch F-Style Intermittent Catheter*</b>  <small>* Improved catheter design with new HydraBalance™ lubricating technology. Availability and timing varies by country (starting 2024).</small>	<b>Catheter:</b> 100% No Touch Protection catheter with cap, protective tip and sleeve. Offers more firmness in the catheter tube <b>Catheter material:</b> Phthalates-free, PVC free material, not made with natural rubber latex. <b>Coating:</b> Ready to use, hydrophilic, pre-lubricated <b>Catheter package:</b> Designed with two finger holes to be easy to open		Hollister Incorporated
<b>VaPro™ No Touch Intermittent Catheter*</b>  <small>* Improved catheter design with new HydraBalance™ lubricating technology. Availability and timing varies by country (starting 2024).</small>	<b>Catheter:</b> 100% No Touch Protection catheter with cap, protective tip and sleeve <b>Catheter material:</b> Phthalates-free, PVC free material, not made with natural rubber latex <b>Coating:</b> Ready to use, hydrophilic, pre-lubricated <b>Catheter package:</b> Designed with two finger holes to be easy to open		Hollister Incorporated
<b>VaPro Plus™ Intermittent Catheter*</b>  <small>* Improved catheter design with new HydraBalance™ lubricating technology. Availability and timing varies by country (starting 2024).</small>	<b>Catheter:</b> 100% No Touch Protection catheter with cap, protective tip and sleeve, with an integrated collection bag <b>Catheter material:</b> Phthalates-free, PVC free material, not made with natural rubber latex <b>Coating:</b> Ready to use, hydrophilic, pre-lubricated <b>Catheter package:</b> Designed with two finger holes to be easy to open		Hollister Incorporated





Catheter	Description and material	Used for	Photo courtesy of
<b>VaPro Pocket™ Intermittent Catheter*</b>  <p>* Improved catheter design with new HydraBalance™ lubricating technology. Availability and timing varies by country (starting 2023).</p>	<b>Catheter:</b> 100% No Touch Protection catheter with cap, protective tip and sleeve in pocket-sized packaging <b>Catheter material:</b> Phthalates-free, PVC free material, not made with natural rubber latex <b>Coating:</b> Ready to use, hydrophilic, pre-lubricated <b>Catheter package:</b> Designed with finger hole to be easy to open		Hollister Incorporated
<b>VaPro Plus Pocket™ Intermittent Catheter*</b>  <p>* Improved catheter design with new HydraBalance™ lubricating technology. Availability and timing varies by country (starting 2024).</p>	<b>Catheter:</b> 100% No Touch Protection catheter with cap, protective tip and sleeve with integrated collection bag in pocket-sized packaging <b>Catheter material:</b> Phthalates-free, PVC free material, not made with natural rubber latex <b>Coating:</b> Ready to use, hydrophilic, pre-lubricated <b>Catheter package:</b> Designed with finger hole to be easy to open		Hollister Incorporated
<b>IQ2004</b> 	<b>Catheter:</b> Hydrophilic single use catheter IQ-Cath, not ready for use, length 40 cm <b>Coating:</b> Hydrophilic to activate <b>Catheter package:</b> 30 pcs.		Manfred Sauer GmbH
<b>IQ2104</b> 	<b>Catheter:</b> Hydrophilic single use catheter IQ-Cath, ready for use, length 40 cm, integrated saline 0.9% <b>Coating:</b> Hydrophilic to activate <b>Catheter package:</b> 30 pcs.		Manfred Sauer GmbH
<b>IQ2604</b> 	<b>Catheter:</b> Hydrophilic single use catheter IQ-Cath, ready for use, length 40 cm, urine collection bag 1 litre, integrated saline 0.9% <b>Coating:</b> Hydrophilic to activate <b>Urinary bag:</b> PE <b>Catheter package:</b> 30 pcs.		Manfred Sauer GmbH

Catheter	Description and material	Used for	Photo courtesy of
<b>IQ4304</b> 	<b>Catheter:</b> Hydrophilic single use catheter IQ-Cath, ready for immediate use, "Peel" packaging, Sleeve, length 40 cm (IQ4303) or 30 cm (IQ4303) <b>Coating:</b> Hydrophilic - pre activated <b>Catheter package:</b> 30 pcs.		Manfred Sauer GmbH
<b>IQ2302</b> 	<b>Catheter:</b> Hydrophilic single use catheter IQ-Cath - Women, ready for immediate use, "Peel" packaging, length 12 cm <b>Coating:</b> Hydrophilic - pre activated <b>Catheter package:</b> 30 pcs.		Manfred Sauer GmbH
<b>IQ3204</b> 	<b>Catheter:</b> Gel single use catheter IQ-Cath, ready for immediate use and already immersed in gel, length 40 cm <b>Coating:</b> Gel - pre activated <b>Catheter package:</b> 30 pcs.		Manfred Sauer GmbH
<b>Liquick Base</b> 	<b>Catheter:</b> Intermittent catheter with blue protective inner sleeve, Ergothan tip, Nelaton tip and Tiemann tip – sachet with saline solution for activation included <b>Catheter material:</b> PVC, DEHP-free <b>Coating:</b> Hydrophilic to activate <b>Catheter package:</b> Tyvek with self-adhesive patch		Teleflex
<b>Liquick Pure</b> 	<b>Catheter:</b> Intermittent catheter for women with blue protective inner sleeve, Ergothan tip and Nelaton tip – sachet with saline solution for activation included <b>Catheter material:</b> PVC, DEHP-free <b>Coating:</b> Hydrophilic to activate <b>Catheter package:</b> Aluminium with sealing flap		Teleflex
<b>Liquick X-treme</b> 	<b>Catheter:</b> Intermittent catheter with protective inner sleeve, Ergothan tip and Tieman tip – ready-to-use <b>Catheter material:</b> PVC, DEHP-free <b>Coating:</b> pre-activated hydrophilic <b>Catheter package:</b> Aluminium with sealing flap		Teleflex

Catheter	Description and material	Used for	Photo courtesy of
<b>Liquick X-treme Plus</b> 	<p><b>Catheter:</b> Intermittent catheter with protective inner sleeve preconnected urine bag, Ergothan tip and Tiemann tip – ready-to-use</p> <p><b>Catheter material:</b> PVC, DEHP-free</p> <p><b>Urinary bag:</b> LDPE with non-reflux valve</p> <p><b>Coating:</b> pre-activated hydrophilic</p> <p><b>Catheter package:</b> Aluminium with sealing flap</p>		Teleflex
<b>SafetyCat Active</b> 	<p><b>Catheter:</b> Intermittent catheter with protective inner sleeve, Ergothan tip, Nelaton tip, Tiemann tip – ready-to-use</p> <p><b>Catheter material:</b> PVC, DEHP-free</p> <p><b>Coating:</b> pre-coated with lubricating gel</p> <p><b>Catheter package:</b> Aluminium with sealing flap</p>		Teleflex
<b>LoFric®</b> 	<p><b>Catheter:</b> Hydrophilic intermittent catheter Available with Nelaton and Tiemann tip. 15, 20, 30, 40 cm length</p> <p><b>Catheter material:</b> Polyolefin-based elastomer (POBE) without PVC, phthalates and latex</p> <p><b>Coating:</b> Hydrophilic, Polyvinyl pyrrolidone (PVP) and NaCl. All LoFric catheters are coated with the unique Urotonic™ Surface Technology. This ensures the catheter remains smooth and safe, both during insertion and withdrawal</p> <p><b>Item packaging:</b> Lacquered paper, laminated film of PP/PA/PE</p>		Wellspect

Catheter	Description and material	Used for	Photo courtesy of
<b>LoFric® Origo™</b>   <b>LoFric® Origo™/Flexible</b>   <b>LoFric® Origo™ Sleeve</b> 	<p><b>Catheter:</b> Instantly activated hydrophilic intermittent catheter with sachet included for activation.</p> <p>LoFric Origo is eco labelled with the Nordic Swan.*</p> <p><b>Catheter material:</b> Polyolefin-based elastomer (POBE). Not manufactured with PVC, phthalates or latex</p> <p><b>Coating:</b> LoFric catheters are coated with the unique Urotonic™ Surface Technology. This ensures the catheter remains smooth and safe, both during insertion and withdrawal</p> <p><b>Catheter package:</b> Discreetly packaged and foldable to pocket size. The different grip solutions gives control without having to touch the catheter tube during insertion.</p> <p>LoFric Origo is available in:</p> <p><b>Nelaton tip:</b> CH08-CH12, length 30 cm Nelaton and Tiemann tip: CH10-CH18, length 40 cm</p> <p><b>Flexible tip:</b> CH12-CH16, length 40cm Different grip solutions, Insertion Grip and Protective sleeve</p>		Wellspect
<b>LoFric® Sense™</b>  	<p><b>Catheter:</b> Instantly activated hydrophilic intermittent catheter with sachet included for activation. The ergonomic grip allows for a better grip and non-touch technique. It's easy and discreet to carry and use anywhere.</p> <p>CH 8-14, length 15 cm.</p> <p>LoFric Sense is eco labelled with the Nordic Swan.*</p> <p><b>Catheter material:</b> Polyolefin-based elastomer, POBE. Not manufactured with PVC, phthalates or latex.</p> <p><b>Coating:</b> All LoFric catheters are coated with the unique Urotonic™ Surface Technology. This ensures the catheter remains smooth and safe, both during insertion and withdrawal</p> <p><b>Item packaging:</b> Laminate foil of PET and PE</p>		Wellspect

Catheter	Description and material	Used for	Photo courtesy of
<b>LoFric Primo</b> 	<p><b>Catheter:</b> Instantly activated hydrophilic intermittent catheter with sterile solution pocket included for activation, integrated insertion aid and easy to open loops. Available with Nelaton and Tieman tip, LoFric Primo is eco labelled with the Nordic Swan.*</p> <p><b>Catheter material:</b> Polyolefin-based elastomer (POBE) without PVC, phthalates and latex</p> <p><b>Coating:</b> Hydrophilic, Polyvinyl pyrrolidone (PVP) All LoFric catheters are coated with the unique Urotonic™ Surface Technology. This ensures the catheter remains smooth and safe, both during insertion and withdrawal</p> <p><b>Sterile solution pocket:</b> Laminate foil of polyethylene terephthalate (PET), polyethylene (PE) and aluminium. Sterile water with sodium chloride (NaCl)</p> <p><b>Item packaging:</b> PE</p> <p><b>LoFric Primo is available in:</b>          Nelaton tip: CH06-CH18, length 20 cm          Nelaton tip: CH08-CH14, Length 15 cm          Nelaton tip: CH08-CH18, length 40 cm          Tiemann tip: CH10-CH18, length 40 cm</p>		Wellspect
<b>LoFric® Hydro-Kit™</b> 	<p><b>Catheter:</b> Instantly activated hydrophilic intermittent catheter with sachet included for activation.</p> <p><b>Catheter material:</b> Polyolefin-based elastomer (POBE). Not manufactured with PVC, phthalates or latex</p> <p>LoFric Hydro-Kit is eco labelled with the Nordic Swan.*</p> <p><b>Urinary bag:</b> Collection bag with printed scale, 1000 ml</p> <p><b>Coating:</b> LoFric catheters are coated with the unique Urotonic™ Surface Technology. This ensures the catheter remains smooth and safe, both during insertion and withdrawal</p> <p><b>Catheter package:</b> The-all-in-one solution. Loops for easy opening, textured Insertion Grip gives good grip and control, allowing non-touch technique. Possibility to separate catheter from the bag.</p> <p><b>LoFric Hydro-Kit is available in:</b>          Nelaton tip, CH08-CH18, length 20 cm          Nelaton tip: CH08-CH18, length 40 cm          Tiemann tip: CH10-CH18, length 40 cm</p>		Wellspect



Catheter	Description and material	Used for	Photo courtesy of
<b>LoFric® Dila-Cath™</b> 	<b>Catheter:</b> Single use, hydrophilic dilatation catheter. The catheter does not have drainage eyes and, therefore, cannot be used for bladder emptying. CH16, 18. Length 40cm <b>Catheter material:</b> POBE without PVC, phthalates and latex <b>Coating:</b> hydrophilic, PVP and NaCl for activation. Urotonic™ Surface Technology <b>Item packaging:</b> Lacquered paper, laminated film of PP/PA/PE		Wellspect
<b>LoFric® Insti-Cath™</b> 	<b>Catheter:</b> Single use, hydrophilic urinary catheter for intermittent bladder instillation solutions with Luer lock adapter <b>Catheter material:</b> POBE without PVC, phthalates and latex <b>Coating:</b> hydrophilic, PVP and NaCl Urotonic™ Surface Technology <b>Item packaging:</b> Lacquered paper, laminated film of PP/PA/PE <b>LoFric Insti-Cath is available in:</b> Nelaton tip, CH08-CH14, length 20 cm Nelaton tip: CH08-CH14, length 40 cm Tiemann tip: CH12, length 40 cm		Wellspect

\* The Nordic Swan Ecolabel is an environmental labelling scheme certifying that a product or service complies with the requirements for the label. The Nordic Swan Ecolabel offers:



- A recipe on how to reduce the environmental impact from production and consumption of goods.
- A credible, third party certified guidance for their consumers and professional buyers to choose goods and services that are among the environmentally best.

## 7.7.2 Compact male catheters

(in alphabetical order company name)





Catheter	Description and material	Used for	Photo courtesy of
<b>SpeediCath® Compact</b> 	<b>Catheter:</b> Compact catheter with Nelaton tip instantly ready-to-use (telescope design for male) <b>Catheter material:</b> Polyurethane (PU), therefore PVC- and phthalate-free <b>Coating:</b> Hydrophilic prelubricated coating with the Triple Action Coating Technology <b>Catheter case:</b> Drip-free re-closable after use for discreet and hygienic disposal		Coloplast







Catheter	Description and material	Used for	Photo courtesy of
<b>SpeediCath® Compact Set</b>  	<p><b>Catheter:</b> Compact all-in-one catheter with a Nelaton tip and an integrated, sterile bag (telescope design for male)</p> <p><b>Catheter material:</b> PU, therefore PVC- and phthalate-free</p> <p><b>Urinary bag:</b> 750 ml, sterile</p> <p><b>Coating:</b> Hydrophilic prelubricated coating with the Triple Action Coating Technology</p> <p><b>Catheter case:</b> Drip-free re-closable after use for discreet and hygienic disposal</p>		Coloplast

### 7.7.3 Compact female catheters

(in alphabetical order company name)

Catheter	Description and material	Used for	Photo courtesy of
<b>SpeediCath® Compact and Compact Plus</b>  	<p><b>Catheter:</b> Compact catheter with a Nelaton tip instantly ready-to-use. The Compact Plus has extra length</p> <p><b>Catheter material:</b> PU, therefore PVC- and phthalate-free</p> <p><b>Coating:</b> Hydrophilic prelubricated coating with the Triple Action Coating Technology</p> <p><b>Catheter case:</b> Drip-free re-closable after use for discreet and hygienic disposal</p>		Coloplast
<b>SpeediCath® Compact Eve</b>  	<p><b>Catheter:</b> Compact catheter with Nelaton tip instantly ready-to-use (telescope design for male)</p> <p><b>Catheter material:</b> Polyurethane (PU), therefore PVC- and phthalate-free</p> <p><b>Coating:</b> Hydrophilic prelubricated coating with the Triple Action Coating Technology</p> <p><b>Catheter case:</b> Drip-free re-closable after use for discreet and hygienic disposal</p>		Coloplast

Catheter	Description and material	Used for	Photo courtesy of
<b>Infyna Chic™ Intermittent Catheter</b> 	<p><b>Catheter:</b> Designed for discretion</p> <p><b>Catheter material:</b> Phthalates-free, PVC free material, not made with natural rubber latex</p> <p><b>Coating:</b> Ready to use, hydrophilic, pre-lubricated</p> <p><b>Catheter case:</b> Fully recyclable polypropylene case. Now contains 11% less plastic (when compared to previous version)</p>		Hollister Incorporated
<b>LoFric® Elle™</b> 	<p><b>Catheter:</b> A compact ready-to-use catheter, with a unique ergonomic design that allows the container to become an angulated handle when connected to the catheter. Using the handle is always optional. LoFric Elle is slim, discrete, and convenient to carry, reseat and dispose of. CH 10-14, length 15 cm.</p> <p>LoFric Elle is eco labelled with the Nordic Swan.</p> <p><b>Catheter material:</b> Polyolefin-based elastomer (POBE). Not manufactured with PVC, phthalates or latex.</p> <p><b>Coating:</b> Hydrophilic prelubricated, water based wetting fluid with glycerol Urotonic-surface Technology. This ensures the catheter remains smooth and safe, both during insertion and withdrawal.</p> <p><b>Catheter case:</b> Fully recyclable case, now with bio-based raw material that cuts the carbon footprint with 55% compared to original product.</p> <p><b>Item packaging:</b> Polypropylene</p>		Wellspect

## 7.8 Reusable catheters

Several studies have investigated the advantages and disadvantages of various cleaning methods for reusable catheters in the home setting where catheterisation is performed by the patient or caregiver. There are some concerns about the efficacy and compliance with the cleansing techniques. [104-106] Reuse of catheters intended for multiple use occurs in several countries with poor availability of single-use catheters, but off-label reuse of catheters is not legally supported. [107] However, evidence about how often and for how long they can be reused and how to cleanse effectively is missing. The gold standard in hospital and residential settings remains to use a new sterile catheter, because of the risk of cross-infection. [26, 108]

Available data on IC do not provide convincing evidence that single or multiple use is superior for all clinical settings. This reflects the lack of reliable evidence rather than evidence of the absence of a difference. An ongoing study is investigating reusable catheters for chronic urinary retention. [109]

Currently, clinicians need to base decisions about which technique and type of catheter to use on clinical judgement, local context and in conjunction with patients, because of uncertainty about the best technique and type of catheter. [110] Differential costs of catheters/techniques may also influence decision-making. [24]

## **7.9 Insertion aids and help devices**

There are a variety of accessories available to enable easier catheter insertion, vision or handling. These products can be used when IC is performed by patients or caregivers using a clean or non-touch technique.

*Various types of help devices are pictured in: [Appendix H: Help devices/aids](#)*

# 8. Principles of management of nursing intervention

**Before starting with intermittent catheterisation (IC), some general aspects should be considered:**

The decision to start IC is prescribed by a medical doctor or nurse specialist in accordance with local policy. Optimal conditions need to be available, including a well-educated nurse, suitable material, comfortable place, and hygienic toilet with appropriate space. The procedure should be performed either with an aseptic, non-touch or clean technique depending on the setting (hospital, rehabilitation centre, or home) and patient. The patient’s privacy is paramount in all locations. [111, 112]

Recommendations	LE	GR
Observe local policy before starting catheterisation	4	C
Assess the patients and their individual circumstances for IC before choosing type of catheter, tip and aids	4	C
Be aware that the patient’s privacy is paramount in all locations [111, 112]	4	C

GR, grade of recommendation; LE, level of evidence.

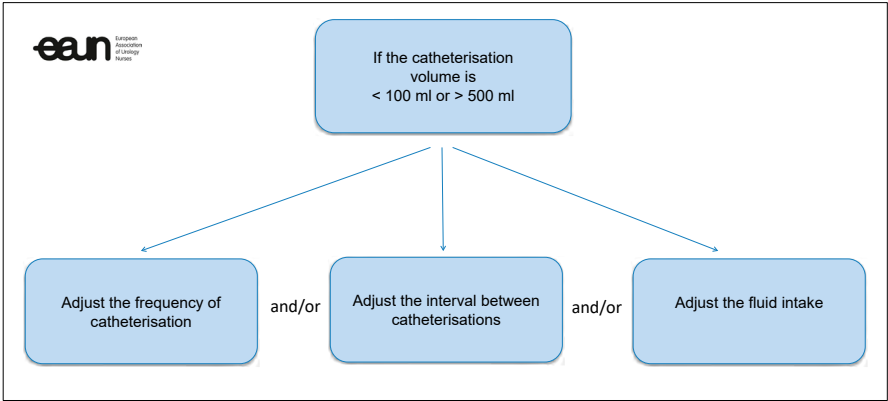
## 8.1 Frequency of catheterisation

Individualised care plans help identify appropriate catheterisation frequency, based on discussion of voiding dysfunction and impact on quality of life (QoL), voiding diary, functional bladder capacity, and ultrasound bladder scans for residual urine. The number of catheterisations per day varies. In adults, a general rule is catheterising frequently enough to avoid a bladder volume > 500 ml, but guidance is also provided by urodynamic findings such as bladder volume, detrusor pressures on filling, presence of reflux, and renal function [24] (see Diagram 4). A prospective cohort study (n=100) found that patients adherent to the prescribed frequency of catheterisation had less risk of infection than those who were not. [51] Increase the IC frequency if the patient still has the urge to urinate, or has motor restlessness or spasticity.

If the patient is unable to pass urine independently, they will usually require IC 4–6 times daily to ensure the bladder volume remains below 500 ml. Excessive fluid intake increases the risk of over-distension of the bladder and overflow incontinence. [113] Possible leg oedema is eliminated in lying position and the bladder will fill within the

first few hours of lying down. Thus, patients should be advised to perform IC shortly before sleep to prevent sleep disturbance and bladder over-distention.

**Diagram 4. Options when adaptation of the catheterisation pattern is needed**



Recommendations	LE	GR
Assess the frequency of catheterisation if the urine output is > 500 ml or < 100 ml per catheterisation	4	A
Review the patient's medication list influencing bladder function (such as anticholinergic medication and $\beta 3$ agonists)	4	A
Perform IC shortly before sleep to prevent sleep disturbance and bladder over-distention	4	C

**8.2 Residual urine volume**

In the early days of establishing IC, observation and management of bladder emptying and residual volume (including retention) are important to measure the urine volume drained to determine the frequency of IC. [63] Completing a voiding diary (Appendix I) can be helpful to keep a record of the fluid intake, how much urine is voided independently (if any), frequency of catheterisation, and residual volume. The diary can then be used by the health professional, in consultation with the patient and caregiver, to decide whether amendment to the frequency of IC is necessary.

*A voiding diary can be found in:*

*[Appendix I: Voiding diary for intermittent catheterisation patients](#)*

### 8.3 Patient and caregiver assessment

While IC is considered the gold standard for assisted bladder drainage [27, 114], it should only be considered and undertaken once the patient has been assessed and is deemed eligible. Patients should be able to perform the procedure correctly and consistently, or designate someone to perform the procedure on their behalf. It is important to manage the patient's expectations from the beginning. [115] The greater the support of the healthcare team for the multidimensional aspects of patients' lives, the better treatment adherence will be. [116]

Patients and/or caregivers need to be assessed regarding their:

- ability to understand the information
- knowledge of diagnosis and understanding the need for catheterisation
- knowledge about the urinary tract [117]
- general health status
- ability to perform the skill
- adherence
- need for psychological support
- motivation/emotional readiness
- availability to perform the procedure [111, 118]

#### **Ability to understand the information**

For some patients the procedure is complex, especially at the start of the learning process. They have difficulty memorising the procedure or lack organisational skills (e.g., correct sequence of the procedure, organising catheter materials). [119]

Two small studies on adherence to short- and long-term IC found that general determinants for initial mastery and short-term adherence relate to knowledge, complexity of the procedure, misconceptions, and timing of the educational session. These determinants illustrate how IC is not as simple as is often assumed. Obtaining the knowledge required and mastering the necessary skills are a real challenge to patients.

The expert opinion of the Working Group is that, for patients with low cognitive function, it is important that a caregiver or healthcare provider accompanies the patient during a training session. By asking the patient to repeat the training skills, one can check whether the explanation has been understood. [120] Sometimes more than one training session is needed and shorter follow-up can be helpful. Also, contacting a community nurse who can take care of these patients at home can be a solution. Occasionally, an alarm watch (or mobile phone) can be helpful when patients have difficulty in remembering to perform IC.

In a study of multiple sclerosis (MS) patients with different cognitive levels and bladder emptying problems, 87% were able to learn clean intermittent self-catheterisation (CISC) in spite of cognitive function. The number of training sessions required was 2–6 for men and 2–11 for women. Patients did not use written materials or other devices in this study and there was no description of which catheters were used. [119]

Determining the self-confidence of the individual regarding IC application and supporting it when necessary is a prerequisite for successful implementation. [121]

A variety of educational media should be used in suitable patients to facilitate patient/carer learning. [122] Online content allows repeated and remote access to suit patients' needs. [121]

### **General health status**

Before starting information and instruction for IC it is necessary to assess the general health status to determine if there are any barriers to performing IC.

### **Knowledge about the urinary tract**

Patients need to have a basic knowledge of the urinary tract. One study showed that, in older women, mastery of IC is complicated by limited knowledge of their own bodies. [58]

In caregivers, long-term adherence to catheterisation can be influenced by fear of damaging the urinary tract. [123] Therefore, teaching strategies for clean intermittent catheterisation (CIC) should ensure that caregivers are familiar with the basic anatomy and function of the lower urinary tract. [117]

### **Ability to perform the skill**

The outcome of IC training depends on several patient skills (motor, cognitive, psychological and behavioural) and environmental factors. Lack of motor skills (how to sit or stand in patients with neurological problems, such as tetraplegia), fine motor skills (dexterity, limited hand function), and sensory skills, as well as poor vision, can cause difficulties when learning or performing CISC. [116, 124] Impaired manual dexterity (e.g., tetraplegia) or catheter type used for IC does not seem to affect the stricture occurrence rate. [80]

In particular, women can experience difficulties in finding the urethra and need to use a mirror prior to inserting the catheter. [58, 125] Special devices have been developed, and when the patient is motivated, it is usually possible to succeed. [126]

*Examples of special devices can be found in: Appendix H: Help (supporting) devices*

If the patient does not have the ability to perform ISC appropriately, an educated and adapted person (such as their spouse, caregiver or guardian) should be identified and trained to undertake the procedure. [116]

Convenience and speed of use are important because many people have to fit IC into their busy lives. [127] For patients to continue to use IC successfully as part of their daily routine, the procedure must be made as easy as possible. Some patients find learning the technique difficult and may discontinue because they find the task too burdensome.

A group of 160 females undergoing pelvic reconstructive surgery that needed postoperative ISC were instructed to perform the procedure at home, which included a demonstration video about ISC. In addition, study personnel contacted participants within 72 h of surgery to assess their ease and ability to perform ISC after surgery. After two weeks they answered a questionnaire and 85% of participants felt that the ISC instructions were “very easy to understand”; 10.6% felt they were somewhat easy to understand; and the remaining 4.2% found that the instructions were somewhat or very confusing. Likewise, 82.0% felt that performing ISC at home met or exceeded their expectations. [128]

### **Adherence (compliance)**

IC adherence is key to maintenance of health and renal function and to manage lower urinary tract symptoms (LUTS). Adherence can be demanding for an individual [115, 129] and educational, emotional and psychological support and regular reviews are essential. [130, 131] A small study found that the median time required to self-catheterise with the necessary material ready (specific duration) was 2.23 min (range 47 s to 11.5 min). The time spent on catheterisation did not influence adherence. [132]

There are many factors that influence adherence, such as:

- knowledge of the procedure and the body
- complexity of the procedure
- physical impairments
- psychological factors
  - misconceptions
  - fears of negative effects of IC
  - fear of lack of self-efficacy
  - embarrassment
  - resistance to the sickness role
- availability of materials
- timing of the educational session

[58, 111]



Any of these factors can result in avoiding activities or non-adherence to prescribed IC. Healthcare professionals' communication skills and attitudes are instrumental in promoting confidence and can help patients to overcome their (initial) resistance [111, 120] and increase adherence. [133]

*More information on how to help patients adapt to the new lifestyle can be found in Sections 8.4 Patient and caregiver information and 8.5 Ongoing support and follow-up.*

### **Motivation/emotional readiness**

Lack of patient motivation is the most common reason for failure. [134] Nurses need to be aware that patients can experience shock and embarrassment, and investigating the needs and desires of the patients is of great importance. [135] Recognising and responding to the patients' emotional reaction to learning to self-catheterise can improve the patients' motivation, compliance, self-esteem and psychological wellbeing. Investigating the motivation of the patient is also important for successful assessment. [58]

The desire to maintain independence is a motivating factor in patients' acceptance and adherence to performing CIC. [136]

Fear of negative effects of IC and lack of self-efficacy persist over time and can have a negative impact on long-term adherence. Patients perceive the combination of IC and having an active social life as difficult and seem to refrain from activities or become non-adherent to prescribed IC frequency. Some older patients tend to avoid situations that compromise adherence, and some younger patients struggle with the difficult combination of IC and their self-image, independence, the routines they wish to maintain, and their intimate relationships. Young patients often have resistance to a sickness role. [58]

### **Need for psychological support**

The psychological implications for people who need to learn and perform IC often pose the biggest challenge to this treatment. Therefore, for nurses to provide an effective service and to train and support patients, it is important to explore and address patients' psychological, emotional and practical needs, including correct communication, information giving, and attitudes. [111] If patients experience ongoing problems, they should be referred to a sexologist or psychologist.

**Performing IC outside the patient’s own home**

Some patients, especially older people, find it difficult to perform IC outside their own house, because they are afraid of poor hygienic sanitary conditions, and the risk of urinary tract infection (UTI) because of this. [58]

Many external barriers to performing IC are specific to the design of public restrooms, poor access for people in a wheelchair and poor hygiene. [137] This makes it difficult to perform IC using the correct technique and maintain hygiene. Patients should be educated in how to manage these barriers to maintain social activities outside their own home.

Patients and caregivers should be encouraged to express any psychological issues about IC because of the intimacy of performing such a procedure. [135, 138, 139] Patients and caregivers should be aware of contingency plans of who will perform IC if caregivers are unable due to illness or holidays, for example.

Even though IC is the gold standard in bladder management, it might be preferable to use an indwelling catheter for a short period, for instance, during a flight where there is a minimum of sanitary circumstances. [140]

A medical travel document could be helpful for people who practise IC and are travelling abroad. The travel document offers information on the products the patients carry, for example, for bladder management, and contains contact details of the healthcare provider should a customs employee have any queries.

*An example of a medical travel document for patients can be found in:  
Appendix K Medical travel document for patients*

Recommendations	LE	GR
Ensure patients and caregivers have access to appropriate educational resources and materials [121, 127, 137]	4	C
Assess the caregiver’s general health, dexterity, motivation, understanding, and availability to undertake IC [118]	4	C
Ensure that the patient/caregiver understands the basic anatomy and function of the urinary system [141]	4	C
Ensure that the patient and/or caregiver has a clear understanding of the patient’s relevant urological condition and why they require IC [70]	4	C

Ascertain the motivation of the patient [58]	4	C
Investigate the need for special supportive devices [58]	4	B
Offer support to patients and/or caregivers to help them overcome any initial resistance to IC [111]	4	B
Counsel the patient and caregiver to express any psychological issues about the caregiver performing such an intimate procedure [135, 138, 139]	4	C
Advise patients to take a medical travel document in case they are travelling abroad	4	C

## 8.4 Patient and caregiver education – why, who, when, where, how and what

There is a lack of agreed standards for patient and caregiver education on IC, and only properly trained nurses should provide teaching. A recent consensus meeting on this issue recommended that all healthcare facilities should have an evidence-based guideline for members of the healthcare team as they proceed with teaching patients and their families about the steps in IC. [142] The following sections describe the recommendations from the European Association of Urology Nurses panel members.

### Why

The purpose of education is to empower patients and caregivers to enable them to have more control and to ease problem-solving. Education needs to be directed towards patients and caregivers.

### Who

When it is not possible for patients to carry out IC, the procedure can be taught to an appropriately trained caregiver. Health professionals need to counsel patients and caregivers regarding:

- potential benefits and difficulties with this method of bladder management
- knowledge and skills required to perform the procedure
- commitment required to carry out IC on a regular basis
- potential lifestyle adjustment

Often patients feel more at ease during a learning session when supported by their partner or carer. This can be valuable when patients' private circumstances form an obstacle to accepting and feeling comfortable with IC, and the patients have feelings of inferiority or are worried about their sex life.

## **When**

Patients must be physically and emotionally ready to learn because all types of learning require energy. Patient motivation and previous learning experiences are relevant. Nurses need to be sensitive to the patients' wishes and needs and be prepared to use a variety of educational strategies. O'Connor (2005) [143] has described the importance of self-care in teaching stoma management skills. This can also be applied to IC education. Sometimes an intermediate step must be taken, in which a caregiver or healthcare professional performs the IC for a short time.

## **Where**

Teaching IC may be carried out in the patient's home or in hospital. The patient's privacy is paramount in either location. [111, 112]

## **How**

Educators should demonstrate calmness and provide praise and encouragement. It is important to give the patients and caregivers feedback and provide reassurance. [111]

Encourage the patients and caregivers to handle the equipment first and talk through the procedure before demonstrating the technique because this aids the learning process.

Consistent teaching methods and modelling of desired behaviour increase patients' and caregivers' technical skills and satisfaction, so patients and caregivers are ready to carry out IC successfully outside the hospital. [144]

More than one appointment with the patients and caregivers may be necessary to allow time for them to assimilate the information given before they can give full informed consent to the arrangement. [140] The wishes of patients and caregivers need to be considered. [145] It is important that neither the patients nor the caregivers feel coerced into performing a procedure with which they feel uncomfortable. [145] Respect for the cultural and religious beliefs of patients and caregivers also needs to be considered. [146]

## **What**

There are many things that patients and caregivers need to know before they can perform the IC procedure confidently and safely. For this purpose, a checklist is provided. This is intended to assist healthcare professionals to check whether all the information about IC that needs to be given to the patients has been provided.

*The checklist for patient information can be found in: Appendix A: Checklist for patient information*

Patients need:

- verbal explanation of IC
- practical instruction in the procedure
- written information
- instructional video, if available.



*Fig. 17 Verbal explanation of IC*

*(Courtesy of Manchester Royal Infirmary, UK)*

### **Written information**

Pretreatment information should be supplemented by booklets (preferably non-commercial), where all topics are explained textually and clarified with relevant anatomical pictures and other patients' experiences. Digital information can be found on websites of suppliers, hospitals, and patient organisations. Preferably, the information should be written in plain language. [135, 137]

All verbal information should be reinforced with written information that the patients and caregivers can keep and consult.

### **Choice of technique and material**

It is important that healthcare professionals enable patients to make an informed choice when choosing the best method and product for their individual needs. [114, 140] For more information about the choice of technique and material, refer to Sections 9.1 and 9.2.

## Supply and reimbursement of catheter equipment

Reimbursement differs in European countries because each has its own healthcare system and insurance. Some patients are not reimbursed for their products and cost must be taken into account when recommending appropriate products. Nurses should be aware of their national rules for reimbursement. Some products are not available locally. Storage and reuse of catheters might in some countries be a deciding factor in patient choice. Increased risk of complications and cost of treatment may offset the advantages of catheter reuse. [140]

## Changes in urine colour and smell

Patients need to be aware of possible changes in the colour and smell of urine, due to what they have eaten, drunk, breathed or been exposed to.

*An overview of changes in urine can be found in: Appendix J Changes in urine due to food and medication*

Recommendations	LE	GR
Ensure that healthcare professionals are proficient in the skills and teaching of IC	4	C
IC should be taught by an appropriately experienced nurse	4	C
Individualise teaching for the patients and their caregivers [125]	4	C
Use consistent teaching methods and modelling of desired behaviour to increase patients' and caregivers' practical skills and satisfaction	4	C
Develop a relationship and environment that encourages and supports patients towards self-management of long-term bladder conditions [111]	4	B
Empower patients and caregivers to take an active role in catheter management [135]	4	C
Provide verbal explanation of IC and sufficient time for practical instruction of the procedure to the patients and caregivers	4	C
Ensure that all verbal information is reinforced with written information to help the patients and caregivers learn the procedure	4	C

## 8.5 Ongoing support and follow-up

Integration of IC into everyday life can be difficult. The patients and caregivers require close ongoing support and follow-up. [140, 145, 147] However, only half the patients receive these. [135] It is important to give the patients contact details to access professional help should they require it. It may also be helpful for them to be given the contact details of any available support networks for patients and caregivers.

Following tuition in IC, patients should be offered an early review by a healthcare professional to ensure that they are successfully performing the procedure, and to offer help with any difficulties that they may have experienced. [58, 118, 121, 146, 148] A record of catheterisation practice is essential to assess adherence and compliance. [45] Follow-up review can be by telephone or during consultation at a clinic. [135] In some cases, it might be preferable to have home visits by community nurses to resolve problems and improve compliance in the home setting. [149] To facilitate the evaluation, a voiding diary can be used ([see Appendix I: Voiding diary](#)).

### Material to take home from the hospital

When patients leave the hospital to continue IC at home, they need to be given a sufficient supply of catheter products, lubricants (if required), bags and accessories for the initial period, which varies depending on local policy.

Recommendations	LE	GR
Provide ongoing social support (by consultation/telephone) to improve QoL [121, 140, 145, 147] and prevent complications	2a	B
Assess patient adherence by keeping a log of catheterisation practice, other relevant aspects and IC cessation. [58]	4	C
Explore patient-perceived signs and symptoms of UTIs during follow-up [150]	4	C

# 9. Procedures for intermittent catheterisation

## 9.1 Choice of technique

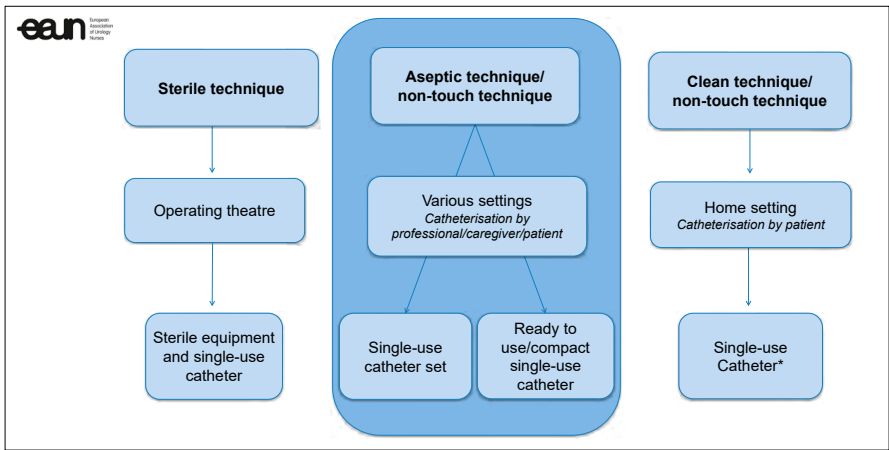
The choice of technique depends on the setting where intermittent catheterisation (IC) takes place, who performs the catheterisation, and the local policy of the different countries (see Diagram 5). In hospital settings, there are rising concerns about infection control, indicating that sterile technique is needed. [24]

A small study (n=36) in spinal cord injury patients who were catheterised by a nurse specialist indicated that clean IC (in these guidelines described as a non-touch technique in the rehabilitation setting) did not place the [110] patients at increased risk for developing symptomatic UTI. [151] The evidence for clean technique is weak and due to the risk of cross-contamination. Catheterisation by a healthcare professional is always with a sterile (theatre) or aseptic technique (ward or community setting). The European Association of Urology guidelines on neurogenic bladder dysfunction state that an aseptic technique is the most appropriate compromise between UTI incidence, practicality and economic viability. [27]

For patients and caregivers in the community setting, clean/non-touch rather than aseptic IC is agreed to be a safe and effective procedure with no increased risk of symptomatic urinary tract infection (UTI).

### Diagram 5. Intermittent catheterisation techniques – simplified

This diagram gives a simplified overview of the use of the different techniques in different settings, but is not meant to be prescriptive in any way.



*NB: If single-use catheters are not available, use reusable catheter*



### 9.1.1 Intermittent catheterisation by healthcare professionals and patients/caregivers

For practical guidelines on how to insert a male or female urethral intermittent catheter, see Appendices B–E and G.

Procedures are listed in:

[Appendix B](#) *Male urethral catheterisation by a healthcare professional – Aseptic procedure*

[Appendix C](#) *Female urethral catheterisation by a healthcare professional – Aseptic procedure*

[Appendix D](#) *Male urethral catheterisation by a healthcare professional – Non-touch procedure*

[Appendix E](#) *Female urethral catheterisation by a healthcare professional – Non-touch procedure*

[Appendix G](#) *Patient/caregiver teaching procedure intermittent self-catheterisation - Female and male*

Recommendations for IC by a healthcare professional	LE	GR
Use local guidelines on procedure for IC [152]	4	C
Use a sterile single-use intermittent catheter to prevent cross-contamination in clinical, rehabilitation, and long-term care settings [24]	1	B
Check for allergies/sensitivity (e.g., lidocaine or chlorhexidine) if using a lubricant* [153, 154]	4	C
Do not use antiseptic lubricants for IC routinely* [153]	4	C

\* Recommendations with an asterisk (\*) should be included in the patient/caregiver education on IC.

## 9.2 Choice of catheter and equipment

Catheter materials are described in Chapter 6. The choice of catheterisation equipment depends on the patient and/or caregiver assessment being undertaken and the patients' preferences as described in Section 7.3. It is recommended that, when choosing a coated intermittent catheter, physicians and patients should not rule out pre-lubricated catheters for safety reasons alone. [54]. In case of incomplete bladder emptying, a micro-hole zone catheter may be useful. [155]

Catheter type and characteristics vary as do reasons why individuals need to perform IC. When choosing which product to use, consideration must be given to patient preference, limitations or disabilities, cost–benefit analysis, cost-effectiveness, ease of use, and storage. Patients may use multiple types of catheters/systems depending on their activity. Availability of different types of catheters differs among countries and patients need to check local reimbursement practices.

## **Lubrication or coated catheter**

### *Hydrophilic-coated catheter*

The risk of urethral trauma while introducing hydrophilic-coated catheters is diminished and there is evidence to suggest a lower incidence of catheter bypass and urethral irritation. [156] Bacteria can be introduced during catheter insertion as a result of trauma; hydrophilic coatings cause less trauma, and thus reduce the risk of complications in terms of haematuria and pain. [68, 157]

A systematic review of real-world data evaluated the incidence of UTI in patients using pre-lubricated versus hydrophilic catheters. Pre-lubricated catheters were associated with a significantly lower number of symptoms suggestive of UTI compared to the group using hydrophilic catheters. [54]

Various studies have shown discomfort on withdrawal of hydrophilic-coated catheters in patients who take a longer time to manage IC. [103, 123, 157, 158] Most of the available literature suggests that most patients prefer to use a coated single-use catheter for convenience, discretion, comfort, improved quality of life, and reduced episodes of UTI. [73, 123, 127, 159]

### *Non-coated catheters*

Non-coated catheters require the use of lubricants. Female catheterisation has traditionally been performed using either no gel or a small amount of lubricant on the catheter tip. In both male and female patients, the vulnerable urothelium can only be protected by an unbroken film of lubricant. This implies that lubricants must be instilled into the urethra, and not on the catheter, or else the lubricant can be wiped off at the entrance to the urethra and, therefore, does not reach the narrow, more vulnerable parts. Lidocaine anaesthetic gel is recommended for men, although some women with urethral sensation may need to use it too. Anaesthetic gels are contraindicated in patients with known allergies/sensitivity to the active ingredients, and those who have damaged/traumatised or bleeding urethral membranes, because there is an increased risk of systemic absorption of lidocaine hydrochloride. [153]

## **9.3 Meatal cleansing**

Except for complete sterile technique in operating theatres ([see Section 4.2](#)), water and soap can be used for meatal cleansing (or only water if there is no evidence of soiling), because it has been shown that water is as safe as antiseptic for preparation of the meatus (men) or vulval area (women) before inserting a catheter. [154, 160-162] However, these studies were all carried out with indwelling catheters.

One study showed that use of chlorhexidine in meatal cleansing reduced catheter-associated UTI. [163]

Recommendations	LE	GR
Clean the urethral meatus with water and pH-neutral soap [154, 160-162]	1a	A
Use lubricants in both women and men when using a non-coated catheter [153]	4	C
Choose lubricant/type of catheter coating based on a comprehensive patient assessment and the reasons for IC	4	C
Choose a catheter size large enough to allow free drainage but small enough to reduce risk of trauma	4	C
Inform patients using reusable catheters how to handle the catheter with cleaning, storage and lubrication according to local guidelines [107]	4	C

# 10. Documentation

When a patient starts catheterisation, the following data must be collected and documented:

- reasons for catheterisation
- residual volume
- frequency
- date and time of catheterisation
- catheter type, tip, length and size
- problems negotiated during the procedure

Obtain verbal or written consent before starting the procedure.  
Documentation should follow local policy.

*A voiding diary can be found in:  
Appendix I: Voiding diary for intermittent catheterisation patients*

Recommendations	LE	GR
Complete a voiding diary for all intermittent catheterisation patients to assess bladder emptying	4	C
Offer patients an individualised care plan based on the above criteria, bearing in mind the patients' and caregivers' lifestyles and the impact this will have on the patients' quality of life. [164]	4	C

# 11. Troubleshooting intermittent catheterisation

Problem	Suggested action
Skin lesions (on the urethral meatus)	<ul style="list-style-type: none"> <li>• Check the skin-cleansing agents and their additives</li> <li>• Change of disinfectants</li> <li>• Check for fungal infection</li> <li>• Removal of disinfectant residues/lubricant with water</li> <li>• Consider referral to a dermatologist</li> </ul>
Urethral mucosal trauma	<ul style="list-style-type: none"> <li>• Check size of the catheter and tip</li> <li>• Check insertion technique</li> <li>• Check catheter material/coating/lubrication</li> </ul>
Problems with insertion of the catheter - Mechanical problems - Blood on the catheter/ catheter tip - Urethral bleeding	<ul style="list-style-type: none"> <li>• Check catheterisation technique</li> <li>• Check sufficient lubrication</li> <li>• Check catheter (tip, rigidity, etc.)</li> <li>• For women, use Tiemann tip as an alternative</li> <li>• Urethral calibration if necessary</li> <li>• X-ray diagnostics of the urethra or cystoscopy if necessary</li> <li>• Check for signs of constipation</li> </ul>
Pelvic floor spasticity/ spastic sphincter	<ul style="list-style-type: none"> <li>• Provide relaxation (breathing technique, cough thrust)</li> <li>• Check or change positioning (e.g., frog position)</li> <li>• Possibly adapt the choice of catheter and catheter tip</li> <li>• In most cases, it helps to wait until the spasticity is relieved</li> </ul>
Pain	<ul style="list-style-type: none"> <li>• Check catheterisation technique</li> <li>• Advocate pelvic floor exercises before inserting catheter</li> <li>• Provide for relaxation during catheter insertion and removal</li> <li>• Check for urinary tract infection</li> <li>• Check catheter system, tip and coating</li> <li>• Use of anaesthetic lubricant (e.g., Instillagel)</li> <li>• Consider psychological aspects</li> </ul>
Incontinence	<ul style="list-style-type: none"> <li>• Check for urinary tract infection</li> <li>• Check catheterisation times</li> <li>• Review drinking log and voiding diary</li> <li>• Temporary supply with absorbent or draining aids</li> <li>• Request bladder function diagnostics</li> </ul>
Change in appearance and odour of the urine	<ul style="list-style-type: none"> <li>• Urine diagnostics</li> <li>• Check daily fluid intake</li> <li>• Think about possible nutritional factors and medications</li> </ul>

If problems persist or complications occur, a medical consultation should be made.  
[165]

# 12. Infection prevention

Urinary tract infection (UTI) has an impact on quality of life in terms of patients refraining from social activities, duration of illness, and number of days lost from work. [48] Bacteriuria is acquired at the rate of 1–3% per catheterisation. Therefore, almost all patients are positive for bacteriuria by the end of the third week. [38] Asymptomatic bacteriuria does not require treatment, only UTI ([definition see Section 4.3](#)).

## 12.1 Urinalysis

Patients performing intermittent catheterisation (IC) routinely have abnormal urinalysis. The majority of patients have chronic or recurring bacteria present in their urine. [39, 61] Dipstick testing alone has limited value to rule out infection because of uncertainty in the performance of urinalysis. [166]

Recommendation	LE	GR
Undertake urinalysis or collect a specimen of urine for culture if an IC user has symptoms suggesting a UTI [26, 53]	1a	A

## 12.2 Fluid intake

Drinking sufficient fluid dilutes the urine and ensures a constant downward drainage and flushing effect. The amount of fluid needed varies and depends on patient size (25–35 ml/kg/day), fluid loss, food intake, and circulatory and renal status. Inadequate fluid intake is a companion problem to inadequate frequency of bladder emptying. When < 1200 ml of urine per day is produced, patients are less inclined to micturate at desired intervals, producing stagnation and distension, which can lead to an increase in infection rate. [113] Excessive fluid intake increases the risk of over-distension of the bladder and overflow incontinence. [113]

Recommendations	LE	GR
Advise users how much fluid they need based on their weight (25–35 ml/kg/day), fluid loss, food intake, and circulatory and renal status	4	B
Encourage IC users to drink enough fluid to maintain a urine output of at least 1200 ml per day [113]	4	C

### 12.3 Cranberries

There is no evidence that the prophylactic administration of cranberry supplementation affects the incidence or risk of catheter-associated UTI as a result of IC. [167, 168] Patients should be informed that the quality of evidence underpinning the use of cranberries is low with contradictory findings.

Recommendation	LE	GR
Do not recommend cranberry supplementation routinely to prevent or treat UTI [168-170]	1b	A

### 12.4 Hand hygiene

To minimise the risk of cross-infection, healthcare professionals should constantly be aware of their hand hygiene. Patients who self-catheterise should disinfect or wash their hands thoroughly with water and soap before and after catheterisation [171, 172]

Recommendations	LE	GR
Adhere to protocols on hand hygiene before catheterisation [38, 172, 173]	1b	A
Educate patients and caregivers in techniques of hand hygiene [172]	4	B

### 12.5 Urinary tract infection assessment tool

The UTI assessment tool for intermittent catheter users is designed to help healthcare professionals assess UTI risk factors in a systematic way, while engaging users and taking their perspective into account. [114]

## 13. Patient quality of life (QoL)

Intermittent catheterisation (IC) is often followed by physical, psychological and emotional impairment of patients' everyday life and perceived quality of life (QoL), and in many instances involves both partners, caregivers and families. [94, 136, 174]

Positive impact on patient QoL:

- improvement of urinary symptoms
- unbroken sleep
- independency
- more self-confidence
- less urine incontinence
- improved sexual health
- less local peri-urethral infection, febrile episodes, stones, and deterioration of renal failure

Negative impact on patient QoL:

- difficult to integrate in daily life (e.g., lack of public toilets, work environment, and holidays)
- participation factors
- preparation of IC
- constrained by the need to plan convenient times
- limited hand function (men)
- inability to sit appropriately (women)
- severe bowel dysfunction
- urinary tract infection  $\geq 4$  per year
- urethral stricture
- dependence on caregiver
- affects family and social life
- can be painful
- time-consuming, and having to watch the time (every 2–3 h)
- fatigue

[58, 136, 175-178]

*Effects of bladder management methods on QoL in patients with neurogenic bladder*

Conservative bladder emptying methods are IC, bladder reflex triggering, indwelling catheter or suprapubic catheter. IC has a positive impact on urinary symptoms and QoL in patients with short- and long-term spinal cord injury (SCI). [2, 3, 178-180] However, a recent retrospective study showed conflicting results and reported that



surgery and indwelling catheters can be superior to IC in reducing urinary symptoms in tetra- and paraplegic patients. [181]

Only a few studies have performed long-term follow-up of adherence and QoL. A recent study reported adherence of up to 84% after 1 year and significantly improved QoL in patients performing clean IC (CIC) compared to indwelling catheterisation. [174] This is supported in a recent review that reported an increase of 28% in Intermittent Self-Catheterisation Questionnaire (ISC-Q) scores in patients performing IC compared to other bladder management methods. [182] Other studies have shown that IC is very well tolerated and improves urinary-specific QoL measured in three domains: bother with limitations, fears, and feelings, as well as overall QoL. [177]

These findings are supported in a population-based study using data from the largest self-reported database of patients with multiple sclerosis (MS), worldwide, The North American Research Committee of Multiple Sclerosis (NARCOMS) Registry. [183] A total of 9397 MS patients responded (66% response rate) to a survey investigating the prevalence of urinary catheterisation and its impact on QoL, including positive versus negative responders. Significant disability defined by the Patient Determined Disease Steps (PDDS) score  $\geq 3$  (representing gait disability or worse), was reported by 65% of the respondents, and 29% of these patients reported moderate-to-severe bladder disability scores. In total, 12.8% of all respondents reported a current need of catheterisation, with IC being the most used method (62%). Among these patients, 61.5% reported a positive change in QoL. [183]

Recommendation	LE	GR
Educate patients and caregivers to use IC to improve long-term QoL in patents with neurogenic bladder [168]	3	A

*Reasons for cessation of IC*

Transition from IC to other less optimal bladder emptying strategies such as indwelling catheters is common, due to lack of adherence to IC, as shown in a population-based study among patients with SCI. [184] The most common reasons for discontinuing IC were inconvenience, urinary leakage and urinary tract infections (UTIs) in paraplegic patients. A regression analysis revealed that increased time since SCI was associated with worse bladder symptoms,  $\geq 4$  UTIs in a year were associated with worse satisfaction and feelings about bladder symptoms. Thus, paraplegic patients had lower QoL than tetraplegic patients, who had greater satisfaction and more positive feelings about bladder symptoms. [184] Thus, an individual approach balancing clinical complications with QoL concerns is recommended when exploring

reasons for treatment transition and adherence for bladder management in patients with SCI. [136, 184]

Recommendation	LE	GR
Explore patients' QoL and risk of complications to improve IC adherence [120, 169]	3	A

*QoL and safety in patients performing IC with single or reusable catheters*

A single-centre study evaluated the safety and QoL of single-use and reusable catheters. Single-use catheters improved QoL and were superior to reusable catheters with respect to colonisation by microorganisms and some with biofilm. [185] For this reason single-use catheters result in better health status as compared with reusable catheters. [186] Moreover, single-use catheters have significantly higher patient acceptance. [185, 187]

Recommendation	LE	GR
Recommend single-use catheters to promote patient QoL	3	A

*Frequency*

The number of times a day that patients carry out IC has major implications for QoL. Those who are catheterised twice daily are more able to develop a routine that does not require catheterisation outside the home. This avoids many of the difficulties described so far and allows them, in general, to carry out their normal activities unhindered. [174] QoL and long-term adherence to IC are improved with the use of catheters that are associated with reduced preparation time or fewer steps in preparation, lower UTI rate and less pain. [94, 187]

*Sexuality and body image*

Few studies have addressed the impact of IC on sexuality and body image. Several negative influences have been described in case reports.

One woman stated that CIC created a barrier between her and her husband because he resented having to perform CIC for her, and their sexual relationship had suffered because he feared hurting her. One young man commented that his personal sexual life virtually stopped. [135]

Performing self-catheterisation might negatively affect intimacy and sexuality, especially in patients aged < 65 years. Patients may avoid confronting (potential)

partners with clean intermittent self-catheterisation and therefore skip one or more occasions when having dates or intimate encounters. [58]

Recommendation	LE	GR
Discuss sexuality and impact of IC as a part of patient assessment; if necessary, refer to a psychologist/sexologist	4	C

## 14. Patient perspective/experience with intermittent catheterisation

About 20% of people experience negative feelings with catheterisation. [188] The health benefits of intermittent self-catheterisation (ISC) depend on adherence to the procedure, and how individuals respond to the treatment depends on several factors; those who experienced unpleasant symptoms find ISC beneficial, while others find it intrusive and time-consuming. [189] Managing the procedure increases the independence of the individual and reduces the risk of complications. A survey of 73 patients showed that their choice of catheter was mainly influenced by the nurses' explanation and comfort of the catheter. [190] However, people who worry about doing self-harm and who have experienced complications with ISC feel a low level of satisfaction with the procedure. [191]

The most common worries are:

- fear of being dependent on intermittent catheterisation
- leakage
- accidentally injuring oneself
- embarrassment
- having sex
- causing an infection
- bleeding
- fear of feeling pain
- confidence about maintaining hygiene.

[125, 135, 150, 188, 191, 192]

**Barriers to performing ISC are:**

- the need to plan convenient times to catheterise
- preparation before the procedure because of dependency on bathroom access and sanitary facilities [136]
- type and cost of intermittent catheters [136, 137, 193]

**Facilitators to ISC are:**

- achieving a positive self-image, because ISC aids maintenance of a normal body image [194]
- good teaching instruction [136, 190]
- on-going support when needed [135, 136]
- guidance to choose the right catheter gauge and length, and comfort of insertion [194]

Psychological coping is affected by patients’ initial acceptance or avoidance and denial of ISC. [189] Patients describe the importance of feeling normal when using ISC because this gives them control over their bladder function and makes them independent. [189]

To support positive and active coping strategies that engender a feeling of normalisation, nurses must explore the patients’ perspective to understand how everyday life appears to the individual patient. Such knowledge enables nurses to support patients to overcome potential barriers to adherence to ISC. A small study showed that letting patients or caregivers train with ISC procedures on a low-fidelity simulator increased self-confidence in the procedure. [195]

Recommendations	LE	GR
Explore emotional factors for patients and families during training for bladder IC [188]	3	B
Explore the everyday life of patients to guide their choice of the right catheter/catheter system for use inside and outside the home [136, 194]	4	C

# 15. Intermittent urethral dilatation

Strictures are more common in men because the male urethra is longer than the female and the female urethra is straighter than the male. Urethral strictures/stenosis can occur due to:

- infection
- trauma
- catheterisation – indwelling and intermittent
- intra-urethral diagnostics and surgery
- radiotherapy
- congenital abnormalities
- inflammation
- putting foreign objects in the urethra

In addition to the above, the cause can be unknown. [11]

Identifying the cause of strictures can help treatment options to prevent occurrence of strictures and help to decrease iatrogenic causes. [196]

**Table 13. European Association of Urology classification according to degree of urethral narrowing**

Category	Description	Urethral lumen (French [Fr.])	Degree
0	Normal urethra on imaging	–	–
1	Subclinical strictures	Urethral narrowing but ≥ 16 Fr	Low
2	Low-grade strictures	11–15 Fr	
3	High-grade or flow-significant strictures	4–10 Fr	High
4	Nearly obliterative strictures	1–3 Fr	
5	Obliterative strictures	No urethral lumen (0 Fr)	

## 15.1 Indications

- Urethral stricture disease
- Stenosis of the external urethral meatus
- Bladder outflow obstruction
- Incomplete bladder emptying
- Inability to void

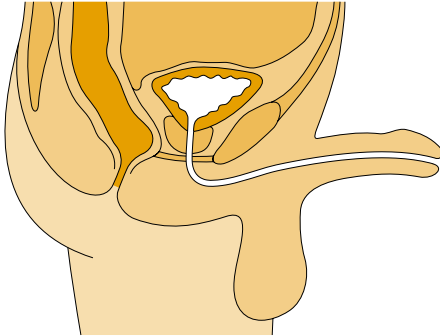
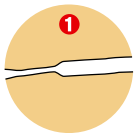
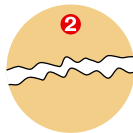


Fig. 18 Common positions of strictures

(Adapted from Manfred Sauer GmbH)



Meatal stenosis/stricture



Strictures of the urethra



Bulbar urethral stricture

## 15.2 Contraindications

1. Suspected or confirmed urethral rupture
2. Suspected or confirmed urinary tract infection
3. Suspected or confirmed false passage

A urethral stricture can result from any process that causes injury to the urethral epithelium and then lead to scarring during the healing process and subsequent formation of a stricture. Urethral strictures predominantly occur in males causing obstructive voiding symptoms.

Urethral strictures are common and can be a result of intermittent catheterisation (IC) [80] or other causes: infection, trauma, lichen sclerosus, post-prostate cancer treatment (e.g., radiotherapy), or idiopathic. [196] Hospital Episode Statistics in the UK and similar data from the USA suggest that men are affected with an increasing incidence from about 10 in every 100,000 up to 25 years, to 40 in every 100,000 by the age of 65 years, and > 100 in every 100,000 over 65 years. [198, 199]

However, while female urethral strictures (FUS) are not so common, they can lead to equally irritative and obstructive voiding symptoms. [200]. Female urethral strictures affect 0.1–1% of women with voiding complaints. In a review by Chakraborty et al. of surgical interventions for female urethral strictures, 53.48% were presumably idiopathic and 91.29% had a history of prior intervention. [201] Smith et al. found 8% of strictures in females were a result of inflammation and infection and 6.6% of trauma. [11]

Urethral strictures can occur at any point along the urethra in males, but are commonest in the bulbar urethra (50 %) and at the urethral meatus. Intermittent dilatation is a well-established method of palliative management of refractory urethral strictures in selected patients as it can reduce stricture recurrence up to 68%. Urinary diversion (e.g., continent stoma or ileal conduit) is required in patients when urethral reconstruction is not possible, or after failed attempts at repair. [202, 203]

A Cochrane review [204] 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. A small RCT (n=49) comparing clean intermittent self-catheterisation (CISC) and repeated sounds dilatation showed a statistical significant difference for patients performing CISC who had a significant improvement in flow rate and improved QoL. [205]

## **Why**

Intermittent urethral dilatation is performed to maintain the patency of the urethra, bladder neck, or external urethral meatus. The decision to commence urethral dilatation is on medical advice. Long-term IC in women who have strictures can avoid major surgery.

## **When**

When the medical decision is made that a patient would benefit from urethral dilatation, the patient is taught to self-dilate within a month of surgery. Ideally, the catheter should be a size 16 or 18 Ch. [202] Occasionally, the patient may need to commence intermittent self-dilatation (ISD) initially with a smaller Charrière size because the urethra does not accommodate a larger catheter. If this is the case, the Charrière size should be increased over time to a larger diameter catheter if possible.

## **How long**

Urethral dilatation is considered a long-term solution; patients should be informed that they need to continue to dilate intermittently in the long term [12], unless reconstructive surgery is considered.



### 15.3 Materials and procedure

The procedure and material for intermittent urethral dilatation are the same as for IC. When teaching patients to self-dilate, it is important that healthcare professionals and patients are aware of the location of the urethral stricture. This determines how far the catheter needs to be inserted along the urethra because all strictures require the catheter to be advanced beyond the stricture.

Female patients:

In practical terms, because of the shortness of the female urethra, women should introduce the catheter all the way into the bladder to ensure the stricture has been passed.

If a woman has difficulties to see the location of the urethra, a mirror can be helpful ([details in Appendix F](#)).

Male patients:

- Meatal strictures and strictures occurring in the penile urethra can be negotiated with a meatal dilator or a female-length catheter.

A male-length catheter is required for all other urethral strictures.

- Mid-penile strictures need to be passed beyond the stricture. If there is any doubt that the stricture has been negotiated, the catheter should be passed into the bladder.
- For all bulbar and membranous strictures, the catheter should be advanced all the way into the bladder to ensure that the stricture has been dilated.

The procedure for undertaking urethral dilatation is found in:

[Appendix F: Intermittent urethral dilatation – female and male](#)

The principles for teaching urethral dilatation are the same as for teaching patients and caregivers how to catheterise intermittently.

Recommendations	LE	GR
Adhere to the hospital protocol on the frequency of dilatation	4	C
Advise a catheter type suitable for the location of the stricture	4	C

## 15.4 Frequency of dilatation

The frequency of dilatation is prescribed by a medical doctor or nurse specialist (depending on local policy). In the early days of learning, frequency should be up to daily. Thereafter, frequency can be less often depending on individual symptoms. [11, 12, 202] The recurrence of strictures is much lower when urethral dilatation is continued for > 12 months. [205]

# 16. Figure reference list

Figure front page: Intermittent catheterisation in males and females: Courtesy of Rochester Medical, [www.rocm.com](http://www.rocm.com)

- Fig. 1 **The four components that should be included in evidence-based nursing practice**  
Adapted from Tammy Hoffmann, Sally Bennett, Chris Del Mar Introduction to evidence based practice Chapter one – Nurse Key  
<https://nursekey.com/introduction-to-evidence-based-practice/>
- Fig. 2 **Example of a catheter packed with gel or water:** Courtesy of Manfred Sauer GmbH,  
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- Fig. 3 **Flexible tips with various Charrières - Ergothan tips:** Courtesy of Teleflex Ltd.,  
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## 17. Appendices

Several procedures are described in the following pages. These procedures do not have a high level of evidence, but they are based on the experience (best practice) of the Working Group as well as on protocols and care standards of various hospitals. Consequently, the evidence level for these documents is mostly 4.

Appendix A	Checklist for patient information
Appendix B	Male urethral catheterisation by a healthcare professional – Aseptic procedure
Appendix C	Female urethral catheterisation by a healthcare professional – Aseptic procedure
Appendix D	Male urethral catheterisation by a healthcare professional – Non-touch procedure
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Appendix H	Help devices
Appendix I	Voiding diary
Appendix J	Changes in urine due to food and medication
Appendix K	Medical travel document for patients
Appendix L	Questionnaires/tools for evaluating intermittent catheterisation/ intermittent self-catheterisation

# Appendix A

## Checklist for patient information

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

### Patients need to know

- Purpose of IC
- Basic anatomical knowledge about the urogenital tract
- Technique to perform the IC procedure.
- The technique of IC may vary in different settings (e.g. hospital, outpatient clinic, and home)
- Techniques to avoid urinary tract infection (UTI)
- Educate about hand hygiene practices before and after procedure
- Wash genitalia with soap and water to avoid any infection
- Frequency to perform IC
- Possible complications that may occur during or after the IC procedure
- List equipment required for IC, name, size/length of catheter
- To check the expiry date of the material before use
- Availability of appropriate aids to help with catheterisation such as mirrors, hand grips, leg abductors, integrated drainage bags, and travel kits
- How to prepare the catheter for use
- Clean and disinfect reusable equipment and ensure safe storage of the catheters
- Proper and safe disposal of the used catheters
- How to obtain supplies of the catheter
- Lifestyle modification, importance of:
  - hydration and fluid intake
  - a healthy diet to avoid constipation
  - good hygiene
  - exercise
- Recognising symptoms or the common signs of UTI:
  - pain or burning sensation during urination
  - frequent urination or urgency to urinate
  - offensive/strong smelling urine
  - change in urine colour, cloudy/dark, blood in urine
  - fever, chills or shaking and other flu-like symptoms
  - confusion, agitation or delirium in older adults, especially those with underlying health conditions

- difficulties during insertion or removal of the catheter
- Instructions when travelling abroad
- Contact information for a healthcare professional in case of problems with bladder management and IC
- Follow-up care (encourage to have regular follow-up with healthcare professional to ensure the catheterisation technique)

# Appendix B

## Male urethral catheterisation by a health care professional – Aseptic procedure

### Material for catheterisation

1. Catheterisation pack; sterile content varies, but should at least contain:
  - one drape
  - one bowl with swabs
  - one pair of gloves
2. One pair of non-sterile gloves
3. Sterile catheter  
Selection of appropriate catheters; it is advisable to take a spare catheter in addition to the one that is wanted, and one of a different/smaller size (non-coated, hydrophilic or pre-lubricated)
4. Sterile (anaesthetic) lubricating gel (syringe 6 ml) (if the catheter is not pre-lubricated)
5. Disposable towel
6. Disposable pad for bed protection
7. Container of 20 ml sterile water for hydrophilic catheter (if not pre-packed)
8. Universal specimen container (if required)
9. Cleansing solution (water and pH neutral soap)
10. Bactericidal alcohol hand disinfection
11. Catheter drainage bag or sterile receptacle for urine

Action	Rationale
1. Check the indication and patient file for past problems, allergies etc.	To maintain patient safety
2. Before the procedure, explain the process to the patient	To gain consent and cooperation and to ensure the patient understands the procedure
3. Undertake procedure on the patient's bed or in clinical treatment area using screens/curtains. Assist the patient to get into a relaxed supine position of 30° (if possible) with the legs extended to ensure the penis is accessible. Do not expose the patient at this stage of the procedure.	To ensure patient's privacy  To maintain patient's dignity and comfort
4. Hand hygiene using soap and water/ bactericidal alcohol hand rub.	To reduce risk of infection

5. Clean and prepare the trolley, placing all equipment required on the bottom shelf	The top shelf acts as a clean working surface
6. Take the trolley to the patient's bedside	
7. Open the outer cover of the catheterisation pack and slide the pack onto the top shelf of the trolley	To prepare equipment
8. Make the swabs wet with the cleansing solution	To cleanse the genitals
9. The following steps may vary if using a (a) coated or (b) non-coated catheter: (a) If using a pre-lubricated ready-to-use catheter, open the package and hang the package beside the patient or trolley. (a) If using a catheter with a lubricating bag in the package, break the lubricating bag, open the outer package, and hang the package with the catheter beside the patient. (a) If using a hydrophilic pre-lubricated or ready-to-use catheter, open the package and hang the package beside the patient. (b) If using a non-coated catheter, open the catheter package and lubricating gel and put it on the sterile drape.	To activate the coating of the catheter
10. Using an aseptic technique, connect the bag to the catheter	To reduce the risk of cross-infection
11. Remove cover that is maintaining the patient's privacy and position a disposable pad or disposable towel under the patient's buttocks and thighs	To ensure urine does not leak onto the bed
12. Put on non-sterile gloves	To reduce risk of cross-infection
13. Place a sterile drape across the patient's thighs (if required by local policy)	To create a protective field
14. Place the receptacle between the patient's legs (if a receptacle is used)	
15. Lift the penis and retract the foreskin using a gauze swab and cleanse the glans penis with the wet swabs (beginning with the urethral meatus, the glans and foreskin at the end). Use for each part a new swab.	To prevent infection To create a protective field



<p><b>16. Steps 16–18 refer to situation non-coated catheter only</b></p> <p><b>(b)</b> Allow some gel on the meatus, insert the cone of the lubricant syringe. Instil 10–15 ml of the (anaesthetic) lubricating gel slowly into the urethra while holding the penis firmly below the glans with the thumb and fingers, and the syringe firmly onto the meatus to prevent the gel from leaking out.</p>	Adequate lubrication helps to prevent urethral trauma. Use of a local anaesthetic minimises the discomfort experienced by the patient and can aid success of the procedure.
<p>17. <b>(b)</b> Remove the syringe from the urethra and hold the penis upright and closed so that the gel stays in the urethra. Alternatively, a penile clamp may be used.</p>	
<p>18. <b>(b)</b> In case of anaesthetic lubrication, wait as recommended by the product (3–5 min).</p>	To ensure a maximised anaesthetic effect
<p>19. Replace existing gloves with a sterile pair</p>	To prevent infection
<p>20. Take the catheter with the other hand (wearing sterile gloves)</p>	To prevent infection
<p>21. Insert the catheter in the meatus and gently advance the catheter into the urethra until urine drains (then insert the catheter 2 cm deeper), or until the end of the catheter. During insertion, hold the penis upright with traction of the other hand.</p>	Advancing the catheter ensures that it is correctly positioned in the bladder. To be sure that the catheter is in the bladder. Lifting the penis straightens the urethra and facilitates catheterisation.
<p>22. Connect the catheter to the bag with an aseptic technique, if it has not been done before insertion of the catheter</p>	To maintain closed system
<p>23. If no urine flows gently apply pressure over the symphysis pubis area.</p> <p>Do not use force if there are difficulties inserting the catheter.</p>	To prevent injuries of urethra and bladder neck
<p>24. Make sure the urine collection bag is below the level of the bladder</p>	Makes sure the urine flows
<p>25. When urine flow stops, withdraw the catheter very slowly, in centimetre steps. If the urine flow starts again during withdrawal, discontinue withdrawal and wait for the flow to stop before resuming catheter withdrawal.</p>	Makes sure that the bladder is empty and prevents residual urine

26. Discard the catheter completely	
27. Ensure that the glans and penis are cleansed after the procedure and reposition the foreskin if present	Retraction and constriction of the foreskin behind the glans penis resulting in paraphimosis may occur if this is not done
28. Help the patient into a comfortable position. Ensure that the patient's skin and bed are both dry.	If the area is left wet or moist, secondary infection and skin irritation may occur
29. Measure the amount of urine	To be aware of bladder capacity for patients with previous occurrence of urinary retention. To monitor renal function and fluid balance.
30. Take a urine specimen for laboratory examination, if required.	To rule out urinary tract infection
31. Dispose of equipment in a plastic clinical waste bag and seal the bag before moving the trolley	To prevent environmental contamination
32. Record information in relevant documents; this should include: <ul style="list-style-type: none"> <li>• reasons for catheterisation</li> <li>• residual volume</li> <li>• date and time of catheterisation</li> <li>• catheter type and size</li> <li>• colour and odour of urine</li> <li>• problems negotiated during the procedure</li> <li>• patient experience and problems</li> </ul>	To provide a point of reference or comparison in the event of later queries

# Appendix C

## Female urethral catheterisation by a healthcare professional – Aseptic procedure

### Material for catheterisation

1. Catheterisation pack; sterile content varies, but should at least contain:
  - one drape
  - one bowl with swabs
  - one pair of gloves
2. One pair of non-sterile gloves
3. Sterile catheter  
Selection of appropriate catheters; it is advisable to take a spare catheter in addition to the one that is wanted, and one of a different/smaller size (non-coated, hydrophilic or pre-lubricated)
4. Sterile (anaesthetic) lubricating gel (syringe 6 ml) (if the catheter is not pre-lubricated)
5. Disposable towel
6. Disposable pad for bed protection
7. Container of 20 ml sterile water for hydrophilic catheter (if not pre-packed)
8. Universal specimen container (if required)
9. Cleansing solution (water and pH neutral soap)
10. Bactericidal alcohol hand disinfection
11. Catheter drainage bag or sterile receptacle for urine

Action	Rationale
1. Check the indication and patient file for past problems, allergies etc.	To maintain patient safety
2. Before the procedure, explain the process to the patient	To gain consent and cooperation and to ensure the patient understands the procedure
3. Undertake procedure on the patient's bed or in clinical treatment area using screens/curtains to promote and maintain dignity. Assist the patient to get into a relaxed supine position of 30° (if possible). Do not expose the patient at this stage of the procedure.	To ensure patient's privacy. To maintain patient's dignity and comfort during the procedure.
4. Hand hygiene using soap and water/ bactericidal alcohol hand rub	To reduce risk of infection



15. Separate with one hand the labia and give traction upward with one hand	To ease cleaning of the labia and meatus
16. If tweezers are used for inserting the catheter skip step 18 and read “tweezers” for “the hand with the sterile glove” in step 23	
17. Clean the labia majora exterior and then interior, and then the labia minor exterior, then interior, and finally the urethral meatus. One swab for each labia and meatus – use the wipe anterior to posterior. Alternatively, tweezers with swabs could be used for cleaning.	To avoid wiping any bacteria from the perineum and anus forwards towards the urethra
18. Put on sterile gloves	To work aseptically and prevent infection
19. Place the receptacle between the patient’s legs (if a receptacle is used)	
20. When using a non-coated catheter, put some lubrication on the meatus and then insert the cone of the syringe with (anaesthetic) lubrication in the meatus and slowly instil 6 ml gel into the urethra. Remove the nozzle from the urethra.	Adequate lubrication helps to prevent urethral trauma. Use of a local anaesthetic minimises the discomfort experienced by the patient and can aid success of the procedure.
21. In case of anaesthetic lubrication wait as recommended by the product (3–9 min)	To ensure a maximised anaesthetic effect
22. Separate with one hand the labia and give traction upward with one hand	To obtain a good view of the meatus and to minimise the risk of contamination of the urethra
23. Take the catheter in the hand with the sterile glove. Insert the catheter in the meatus and gently advance the catheter into the urethra until it is in the bladder and urine drains. If no urine flows, gently apply pressure on the symphysis pubis area) until urine drains.	
24. Make sure the urine collection bag is below the level of the bladder	Assist in urine flow
25. When urine flow stops, withdraw the catheter very slowly, in small centimetre steps. If the urine flow starts again during withdrawal, discontinue withdrawal and wait for the flow to stop before resuming catheter withdrawal.	Make sure that the entire bladder is empty

26. Discard the catheter completely	
27. Clean the labia and meatus	To avoid skin irritation
28. Help the patient into a comfortable position. Ensure that the patient's skin and bed are both dry	If the area is left wet or moist, secondary infection and skin irritation may occur
29. Measure the amount of urine. To be aware of bladder capacity for patients with previous occurrence of urinary retention.	To monitor renal function and fluid balance. It is not necessary to measure the amount of urine if the urinary catheter is routinely changed.
30. Take a urine specimen for laboratory examination, if required	To rule out urinary tract infection
31. Dispose of equipment in a plastic clinical waste bag and seal the bag before moving the trolley	To prevent environmental contamination
32. Record information in relevant documents; this should include: <ul style="list-style-type: none"> <li>• reasons for catheterisation</li> <li>• residual volume</li> <li>• date and time of catheterisation</li> <li>• catheter type and size</li> <li>• colour and odour of urine</li> <li>• problems negotiated during the procedure</li> <li>• patient experience and problems</li> </ul>	To provide a point of reference or comparison in the event of later queries

# Appendix D

## Male urethral catheterisation by a healthcare professional – Non-touch procedure

Checklist equipment:

1. Set with swabs
2. Non-touch catheter (types see below)
3. Disposable towel
4. Disposable pad for bed protection
5. One pair of non-sterile gloves
6. Sterile water (20 ml) for hydrophilic catheter, if necessary
7. Sterile (anaesthetic) lubricating gel (syringe 6 ml) (if the catheter is not pre-lubricated)
8. Universal specimen container, if required
9. Cleansing solution (water and pH neutral soap)
10. Bactericidal alcohol hand disinfection
11. A catheter drainage bag or receptacle for urine
12. In case of infected and/or immunocompromised patient follow local guidelines

Additionally:

13. Spare catheter (same type)
14. Catheter of a different/smaller size (hydrophilic or pre-lubricated)

*For examples of catheters, see Chapter 7*

Action	Rationale
1. Verify the practitioner's order	To maintain patient safety
2. Confirm the patient's identity	To maintain patient safety
3. Check the indication and patient file for past problems, allergies etc.	To maintain patient safety
4. Before the procedure, explain the process to the patient	To gain consent and cooperation and to ensure the patient understands the procedure
5. Undertake procedure on the patient's bed or in clinical treatment area using screens/curtains to promote and maintain privacy and dignity	To ensure patient's privacy

<p>6. Assist the patient to get into a relaxed supine position of 30° (if possible) with the legs extended to ensure the penis is accessible.</p> <p>Do not expose the patient at this stage of the procedure.</p>	To maintain patient's dignity and comfort during the procedure
7. Hand hygiene using soap and water/ bactericidal alcohol hand rub	To reduce risk of infection
8. Clean and prepare the trolley, placing all equipment required on the bottom shelf	To prevent hospital-acquired infections Top shelf acts as a clean working surface
9. Take the trolley to the patient's bedside	
10. Make the swabs wet with the cleansing solution	To cleanse the genitals
<p>11. Prepare the catheter so that it is ready to use.</p> <ul style="list-style-type: none"> <li>- When using a hydrophilic catheter that requires hydration, open the package and fill with sterile water (following the manufacturer's instructions) and hang the packaging beside the patient or trolley and wait the recommended time</li> <li>- When using a catheter with a lubricating bag in the package, break the lubricating bag, open the package and hang it beside the patient</li> <li>- When using a hydrophilic ready to use or a pre-lubricated ready-to-use catheter, open the package and hang it beside the patient</li> </ul>	<p>To activate the catheter coating</p> <p>To activate the catheter coating</p>
12. Using an aseptic technique, connect the bag to the catheter	To reduce the risk of cross-infection
13. Remove cover that is maintaining the patient's privacy and position a disposable pad under the patient's buttocks and thighs	To ensure urine does not leak onto the bed
14. Hand hygiene using soap and water/ bactericidal alcohol hand rub	Hands may have become contaminated by handling the outer packs
15. Put on non-sterile gloves	To reduce risk of cross-infection



16. Lift the penis and retract the foreskin (uncircumcised) if present using a gauze swab and clean the glans penis with the solution. Begin with the foreskin, then the glans, and finally the urethral meatus. Use a new swab for each part. Place the drape across the patient's thighs and under the penis.	To prevent infection
17. Take the catheter with the other hand, holding only the plastic cover or the end of the catheter without touching the catheter	To avoid need for sterile gloves and to prevent infection
18. Insert the catheter in the meatus and gently advance the catheter in the urethra until it is in the bladder and until urine drains (then insert the catheter 2 cm deeper) or until the end of the catheter	Advancing the catheter ensures that it is correctly positioned in the bladder. To ensure that the catheter is in the bladder.
During insertion, hold the penis upright (90°) with traction	Lifting the penis straightens the penile urethra and facilitates catheterisation
19. If no urine flows gently apply pressure over the symphysis pubis area till urine drains	Makes sure the urine flows
20. Do not use force if there are difficulties inserting the catheter	To prevent injuries of urethra and bladder neck
21. Make sure the urine collection bag is below the level of the bladder	Makes sure the urine flows
22. When urine flow stops, withdraw the catheter very slowly, in centimetre steps. If the urine flow starts again during withdrawal, discontinue withdrawal and wait for the flow to stop before resuming catheter withdrawal	Makes sure that the bladder is empty, and prevents residual urine
23. Discard the catheter completely	
24. Ensure that the glans penis is cleansed after the procedure, and reposition the foreskin if present	Retraction and constriction of the foreskin behind the glans penis resulting in paraphimosis may occur if this is not done
25. Help the patient into a comfortable position. Ensure that the patient's skin and bed are both dry.	If the area is left wet or moist, secondary infection and skin irritation may occur
26. Measure the amount of urine	To be aware of bladder capacity for patients with previous occurrence of urinary retention. To monitor renal function and fluid balance.

27. Take a urine specimen for laboratory examination, if required	To rule out urinary tract infection
28. Dispose of equipment in a plastic clinical waste bag and seal the bag before moving the trolley	To prevent environmental contamination
29. Maintain hand hygiene according to hospital policy	To reduce risk of infection
30. Record information in relevant documents; this should include: <ul style="list-style-type: none"> <li>• reasons for catheterisation</li> <li>• residual volume</li> <li>• date and time of catheterisation</li> <li>• catheter type and size</li> <li>• colour and odour of urine</li> <li>• problems negotiated during the procedure</li> <li>• patient experience and problems</li> </ul>	To provide a point of reference or comparison in the event of later queries

# Appendix E

## Female urethral catheterisation by a healthcare professional – Non-touch procedure

### Checklist equipment:

1. Set with swabs
2. Disposable towel
3. Disposable pad for bed protection
4. One pair of non-sterile gloves
5. Catheters
6. Sterile water (20 ml) for hydrophilic catheter, if required
7. Sterile (anaesthetic) lubricating gel (syringe 6 ml) (if the catheter is not pre-lubricated)
7. Universal specimen container, if required
8. Cleansing solution (water and pH neutral soap)
9. Bactericidal alcohol hand disinfection
10. A catheter drainage bag or receptacle for urine

### Additionally:

11. Spare catheter (same type)
12. Catheter of a different/smaller size (hydrophilic or pre-lubricated)

*For examples of catheters, see Chapter 7.*

Observation	Rationale
1. Confirm the patient's identity	To maintain patient safety
2. Check the indication and patient file for past problems, allergies etc.	To maintain patient safety
3. Before the procedure, explain the process to the patient	To gain consent and cooperation and to ensure the patient understands the procedure
4. Undertake procedure on the patient's bed or in clinical treatment area using screens/curtains to promote and maintain privacy and dignity	To ensure patient's privacy
5. Assist the patient into a relaxed supine position of 30° (if possible). Do not expose the patient at this stage of the procedure.	To maintain patient's dignity and comfort during the procedure

6. Hand hygiene using soap and water/ bactericidal alcohol hand rub according to hospital policy	To reduce risk of infection
7. Clean and prepare the trolley, placing all equipment required on the bottom shelf	The top shelf acts as a clean working surface
8. Take the trolley to the patient's bedside	
9. Open the set with swabs	To prepare equipment
10. Make the swabs wet with the cleansing solution	To cleanse the genitals
11. If using a hydrophilic catheter that requires hydration, open the package and fill with sterile water (following the manufacturer's instructions) and hang the packaging beside the patient or trolley and wait the recommended time. To activate the catheter coating.	For smoother and efficient insertion process
12. If using a catheter with a lubricating bag in the package, break the lubricating bag, open the outer package and hang it beside the patient	To activate the catheter coating and lubrication for smoother and efficient insertion process
13. If using a hydrophilic pre-lubricated or ready-to-use catheter, open the package and hang the package beside the patient	
14. Using an aseptic technique, connect the bag to the catheter	To reduce the risk of cross-infection
15. Remove cover that is maintaining the patient's privacy and position a disposable pad under the patient's buttocks and thighs	To ensure urine does not leak onto bed
16. Maintain hand hygiene according to hospital policy To reduce risk of infection. Hands may have become contaminated by handling the outer packs.	
17. Put on non-sterile gloves	To reduce risk of cross-infection
18. Spread the legs in a gynaecological position	To obtain a good view of the meatus
19. Separate with one hand the labia and give traction upward	To clean the labia and meatus more easily

20. Clean the labia majora exterior and interior, and then the labia minor exterior and interior, and finally, the urethral meatus. One swab for each labia and meatus – use the wipe anterior to posterior.	To avoid wiping any bacteria from the perineum and anus forward to the urethra
21. Separate with one gloved hand the labia and give traction upward	To obtain a good view of the meatus and to minimise the risk of urethral contamination
22. Take the catheter with the other gloved hand holding only the plastic cover or the end of the catheter without touching the catheter	To maintain sterility of the catheter
23. Insert the catheter in the meatus and gently advance the catheter in the urethra until in the bladder and urine flows out	
24. Make sure the urine collection bag is below the level of the bladder	Assist in urine flow
25. When urine flow stops, apply slight pressure to the bladder until urine flow resumes	Make sure that the entire bladder is empty
26. When urine flow stops, withdraw the catheter very slowly, in centimetre steps. If the urine flow starts again during withdrawal, discontinue withdrawal and wait for the flow to stop before resuming catheter withdrawal.	Make sure that the entire bladder is empty
27. Discard the catheter completely	
28. Clean the labia and meatus	To avoid skin irritation
29. Help the patient into a comfortable position. Ensure that the patient's skin and bed are both dry.	If the area is left wet or moist, secondary infection and skin irritation may occur
30. Measure the amount of urine	To be aware of bladder capacity for patients with previous occurrence of urinary retention. To monitor renal function and fluid balance. It is not necessary to measure the amount of urine if the urinary catheter is routinely changed.
31. Take a urine specimen for laboratory examination, if required	To rule out urinary tract infection
32. Dispose of equipment in a plastic clinical waste bag and seal the bag before moving the trolley	To prevent environmental contamination

- |   |  |
|---|--|
| <p>33. Record information in relevant documents; this should include:</p> <ul style="list-style-type: none"><li>• residual volume</li><li>• reasons for catheterisation</li><li>• colour and odour of urine</li><li>• date and time of catheterisation</li><li>• catheter type and size</li><li>• problems negotiated during the procedure</li><li>• review date to assess the need for continued catheterisation or date of change of catheter</li></ul> |  |
|---|--|

# Appendix F

## Intermittent urethral dilatation – female and male

The procedure for female and male urethral dilatation is almost the same as for intermittent catheterisation (IC).

### Material

#### *Procedure*

If healthcare professionals perform the dilatation procedure, they should use an aseptic (non-touch) technique. When patients undertake the procedure at home they should always use a non-touch technique.

#### *Catheter type*

Choose a larger Charrière size than for normal catheterisation. Healthcare professionals can advise the patients in choosing the correct Charrière size. A catheter with a flexible rounded or pointed tip could be helpful to dilate the stricture. ([see Section 7.3](#))

Observation	Management
1. Prepare material for catheterisation	
2. Choose catheter for dilatation as per physician's orders	
3. The procedure for dilatation is the same as for IC	
4. For dilatation of the stricture, the catheter should be inserted as far as the healthcare professional advises	To ensure that the stricture is passed
5. Gentle pressure may be needed to insert the catheter past the point of narrowing	
6. Advance the catheter until the stricture has been passed	
7. It could be helpful to start with a smaller size of catheter and follow with a larger size in the same dilatation procedure	
8. The further procedure is the same as for IC	
9. Documentation of the dilatation procedure	To provide a point of reference or comparison in the event of later queries

# Appendix G

## Patient/caregiver teaching procedure for intermittent self-catheterisation – female and male

The procedure for female and male intermittent self-catheterisation (ISC) has the same principles with a few changes when compared to intermittent catheterisation by healthcare professionals.

### Procedure

When patients perform ISC themselves, non-touch techniques are preferred. When non-touch techniques are not feasible, clean techniques should be used.

### Catheter type

Healthcare professionals can advise an appropriate catheter and Charrière, depending on the situation ([see Sections 9.1 and 9.2](#)).

Action	Rationale
1. Prepare the patient for ISC using visual aids and written information booklet	Booklet/DVD. Website-available for view at home. Use of model demonstration for hand/finger placement.
2. Obtain written or verbal consent depending on local guidelines. Document consent in notes.	
3. Explain rational for ISC to patient. Allow time for patient to process information.	
4. Check patient's knowledge of ISC, manual dexterity, mobility and cognitive status. Verify consent to proceed with ISC.	To ensure that the stricture is passed
5. Check patient's capability to perform ISC	Are there special devices needed?
6. Check patient's motivation in performing ISC. If possible, give time to patient to process information given.	If motivation is insufficient, try to motivate the patient before instruction begins
7. Choose the appropriate catheter with the patient	
8. Choose non-touch or clean method for ISC in consultation with patient	
9. Choose, together with patient, most appropriate place to perform ISC	Bed, bathroom, toilet or wheelchair



10. Verbal explanation of insertion procedure. Allow the patient to practice on the models.	Use chosen technique, non-touch or clean. Use models to assist with this demonstration.
11. Educate patient regarding hand hygiene, which should be performed before and after ISC. Alcohol gel can be used if no visible dirt/soilage.	
12. Explain and practise cleansing of the genitals. Males: retract foreskin in uncircumcised men and clean head of penis. Females: One wipe one way. Wipe front to back.	
13. Healthcare professional should perform first intermittent catheter insertion to ensure procedure is possible. However, there are occasions when the patient may wish to do procedure him/herself, such as conversion from indwelling catheterisation to ISC. Decide together with patient whether the first attempt will be done by the healthcare professional or by the patient.	
14. If desired, perform the insertion procedure for the patient	As life example for patient
<p>15. Patient performs the insertion procedure by him/herself, supported by verbal instruction</p> <p>Male:</p>  <p>Female:</p>  <p><i>Fig. 19a Insertion of the catheter by a male patient (Courtesy of Hollister Incorporated)</i></p> <p><i>Fig. 19b Insertion of the catheter by a female patient</i></p>	Patient uses the chosen, non-touch or clean technique.
16. Remove catheter when the bladder is completely empty. Advise the patient to withdraw the catheter very slowly once no urine drainage is noted. When urine is noted stop and allow urine to drain.	Explain to patient that they should normally wait until bladder is completely empty

17. Demonstrate disposal of catheter and drainage of urine bag should catheter set be used Demonstrate to patient how to note and record urine volume	Discuss relevance of fluid intake and how it affects urine output
18. Wash hands	
19. Wait short time to recuperate the urethra and to refill the bladder. If possible, allow patient to have time to process information.	Time between practice depends on patient's experience with the procedure. Perhaps let patient have food and drink to let them process information.
20. Assess patient's understanding by asking them to verbalise ISC procedure	Assess the patient's knowledge before performing insertion procedure him/herself.
21. In hospital setting, observe patient doing procedure	Change insertion position if necessary
22. Check if patient feels comfortable with the procedure. Answer questions.	Change position or material if desired
23. Check if patient feels at ease with the ISC procedure and can perform it on their own	If not, establish the reason and try to solve the problem
24. Give patient catheters until first evaluation. Order or give prescription to patient to order supply	After evaluation the type of catheter sometimes needs to be changed
25. Inform patient regarding storage of catheters	
26. Give further information about frequency, availability, difficulties/troubleshooting, etc. which may occur ( <i>see Appendix A</i> ).	Appendix A can be used to check that all relevant information has been given and it can also be used to check patient's knowledge.
27. Document the teaching procedure/ISC session in notes as per local guidelines	To provide a point of reference or comparison in the event of later queries
28. Give voiding diary to patient. <i>See Appendix I</i> . Explain to patient how to complete bladder diary.	To visualise the progress of ISC at home. Bladder diary apps available via App stores should patient prefer.
29. Make appointment for follow-up. Give contact details for healthcare specialist/team.	

# Appendix H

## Help devices

Due to a new European medical device regulation many help devices are no longer available. Still available are:

### Mirrors for females

There are mirrors that are designed to fix to the leg to enable the optimum use and view, while leaving both hands free for catheter insertion.

The use of a mirror may also complicate catheterisation (they need to be carried, the view is reversed, and manual dexterity may be limited); therefore, patients are often encouraged to learn to catheterise without them. Some available types:

- Leg mirrors – often fixed to the leg with Velcro
- Mirrors designed to use in bed
- A cushion with a mirror – also may be helpful in case of spasticity.

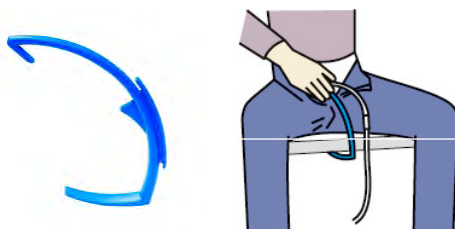


*Fig. 20 Cushion with mirror*

*(Courtesy of Manfred Sauer GmbH)*

### Freehand clothing holder

The Freehand clothing holder enables catheter users to manage clothing in a discrete manner and leave both hands free for catheterisation.



*Fig. 21a and 21b*

*Freehand clothing holder*

*(Available: [www.rolli-world.de/inkontinenz/inko-zubehoer/freehand-hosenhalter/#](http://www.rolli-world.de/inkontinenz/inko-zubehoer/freehand-hosenhalter/#))*

*(Courtesy of V. Geng/Manfred Sauer GmbH)*

## Uribag

The Uribag is a small urinal that enables people to catheterise if there is no toilet available. Available for males and females.



Fig. 22 Uribag®

(Courtesy of Uribag.com)

## KIC-System® = K(c)ondom and intermittent catheterisation

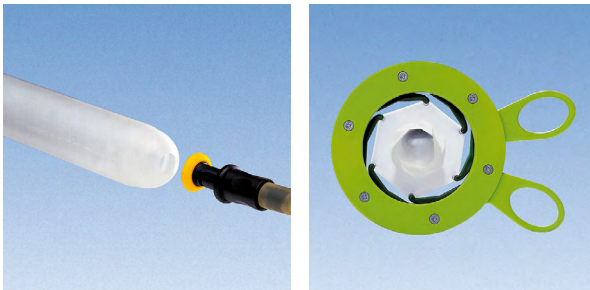


Fig. 23a and 23b KIC-System®

(Courtesy of Manfred Sauer GmbH)

The KIC-System® has a removable connector instead of a fixed tube to connect the leg bag. This connector can be removed from the urinary condom and, using the special condom expander tool, the condom can then be pulled over the penis shaft so that the penis tip is left free for disinfecting and catheterisation. Afterwards, the urinary condom can be restored to its original position and connected to the existing drainage system. This procedure can be repeated several times.

With the KIC-System®, only one urinary condom per day is needed – this protects the skin, but it is also more economic.

# Appendix I

## Voiding diary

Also known as bladder diary, input/output protocol/chart or record or frequency-volume chart

### Instructions

- Complete the diary over the agreed time (may be 3 days or longer)
- Comments are additional information for the health care practitioner

Voiding diary	
Name	
Date of birth	
Reason for catheterisation	
Frequency	
Catheter type	

Date	Time	Amount of drink (ml)		Urine volume (ml)	Type of voiding	Comments (leakage, activity)
1.10.2023	7:00 am	250	milk coffee	320	IC	
	11:00 am	200	water			
	11:30 am			380	IC	cloudy urine and bad smell
	13:00	250 ml	juice			
	14:40			350	spontaneous	wet before IC

# Appendix J







## Changes in urine due to food and medication

Urine consists mostly of water (about 95%). However, the remaining contents can vary depending on what someone has eaten, drunk, breathed, or been exposed to. The changes in urine colour for these reasons do not differ between catheterised and non-catheterised people. Normal urine is clear, straw-coloured, with almost no odour. [206]

**Table 13. Possible colour and odour changes in urine caused by medication, food or drink**

Colour		Food causes	Drug causes	
Offensive smell		Asparagus	Antibiotics (not all)	

Colour		Food causes	Drug causes	Diseases
Transparent clear		Well hydrated		
Yellow to amber				Slight dehydration
Yellow -cloudy				Bacterial infection/UTI Kidney stones Excessive cellular material Proteinuria
Yellow		Carrot, Cascara, Vitamin B & C	Phenothiazines Warfarin Uropyrine Danthron	Concentrated urine Diabetes Gallbladder disease Liver disease Hypothyroidism Infection Dehydration due to increased concentration of urochrome
Orange				
Yellow-orange to red to brown			Senna Rifampicin Chloroquine Anthraquinones (in alkaline urine)	

Red or pink	 	Beets Blackberries Rhubarb	Phenytoin Rifampin Uprofen Ibuprofen Levodopa Chlorpromazine Thioridazine Propofol	Haematuria (haemoglobin, myoglobin)
Pink Pink-brown	 	Fava beans	Nitrofurantoin Phenothiazines Levodopa Metronidazole	Bile pigment Myoglobin
Brownish- black	 	Cascara Senna Aloe		Bile pigment melanin Methaemoglobin <i>Proteus spp. UTI</i> Liver disorders
Green or blue	 	Asparagus (offensive smell)	Sulphonamides Amitriptyline Indomethacin Cimetidine Promethazine Triamterene Sildenafil Methylene Blue	<i>Pseudomonas</i> spp. UTI  Tryptophan malabsorption
Darkens on standing (red- black)	 		Methyldopa Metronidazole Levodopa Imipenem– cilastatin	

From Simerville 2005 [207], Panesar 2009 [208]





# Appendix L

## **Questionnaires/tools for evaluating intermittent catheterisation/intermittent self-catheterisation**

In recent years, several tools have been developed to assess satisfaction, acceptance, adherence and quality of life (QoL) related to intermittent catheterisation (IC).

For nurses and therapists, the feasibility questionnaire as well as urinary tract infection (UTI) assessment tool can be used to include the patients' perspective to improve the quality of UTI management.

### **InCaSaQ – Intermittent Catheterisation Satisfaction Questionnaire**

To evaluate the satisfaction of patients with the urinary catheter that is provided.

Reference: Validation of the InCaSaQ, a new tool for the evaluation of patient satisfaction with clean intermittent self-catheterization. A Guinet-Lacoste, M Jousse, D Verollet, S Sheikh Ismael, F Le Breton, E Tan , G Amarenco. *Ann Phys Rehabil Med* 2014 Apr;57(3):159–68.

doi: 10.1016/j.rehab.2014.02.007.

<https://www.sciencedirect.com/science/article/pii/S1877065714000414>

### **I-CAT – Intermittent Catheterisation Acceptance Test**

Assessing the acceptance of clean intermittent self-catheterisation (CISC) in a neurological and non-neurological population with indications for self-catheterisation.

Reference: Intermittent catheterization acceptance test (I-CAT): A tool to evaluate the global acceptance to practice clean intermittent self-catheterization. Amandine Guinet-Lacoste, Jacques Kerdraon, Alexandra Rousseau, Philippe Gallien, *et al.* *Neurourology and Urodynamics*; Volume36, Issue 7 September 2017; 1846-1854.

<https://doi.org/10.1002/nau.23195>

<https://onlinelibrary.wiley.com/doi/10.1002/nau.23195>

### **ISC-Q – Intermittent Self-Catheterisation Questionnaire**

Patient-reported outcome measure that evaluates QoL for patients performing ISC.

Reference: Development and Psychometric Validation of the Intermittent Self-Catheterization Questionnaire. Binder P, Lloyd A.L., Elwick H., Denys P., *et al.* *Clinical Therapeutics Col.* 23 Iss.12 December 2012 p. 2302-2313.

<https://pubmed.ncbi.nlm.nih.gov/23178033/>

### **ICAS – Intermittent Catheterisation Adherence Scale**

The ICAS is an evaluation scale that is simple, acceptable, valid and reproducible, and in some cases, it may facilitate the medical follow-up of ISC patients.

Reference: ICAS - Intermittent catheterisation adherence scale. Amandine Guinet-Lacoste, Audrey Charlanes, Camille Chesnel, Emilie Blouet, *et al.*

<https://doi.org/10.1002/nau.23746>

### **ICDQ – Intermittent Catheterisation Difficulty Questionnaire**

A tool for the evaluation of patient difficulties with clean intermittent self-catheterisation (CISC).

Amandine Guinet-Lacoste, Marylène Jousse, Eliane Tan, Murielle Caillebot, *et al.*

<https://onlinelibrary.wiley.com/doi/10.1002/nau.22686>

### **USQNB-IC – Urinary Symptom Questionnaire for individuals with Neuropathic Bladder using Intermittent Catheterisation**

This instrument originates from and has an emphasis on the lived experiences of patients with neurogenic bladder who use intermittent catheterisation (IC).

Reference: Preliminary validation of a Urinary Symptom Questionnaire for individuals with Neuropathic Bladder using Intermittent Catheterization (USQNB-IC): A patient-centered patient reported outcome. Tractenberg RE, Groah SL, Rounds AK, Ljungberg IH, Schladen MM (2018) PLoS ONE 13(7): e0197568.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0197568>

### **Qualiveen**

The 30-item Qualiveen is a specific health-related quality of life questionnaire for urinary disorders in patients with neurological conditions, such as multiple sclerosis and spinal cord injury.

Reference: Bonniaud V, Bryant D, Parratte B, Guyatt G. Development and validation of the short form of a urinary quality of life questionnaire: SF-Qualiveen. J Urol. 2008 Dec;180(6):2592-8.

Epub 2008 Oct 31. PMID: 18950816. <https://doi.org/10.1016/j.juro.2008.08.016>

### **TPE-ISC – Therapeutic Patient Education in Intermittent Self-Catheterisation Programme**

A programme to ensure the correct technique for ISC.

Reference: Assessment of the feasibility of intermittent self-catheterisation among patients with neurogenic bladder. British Journal of Neuroscience Nursing Vol. 19, No. 2. Balhi, S. published online 3 May 2023 <https://doi.org/10.12968/bjnn.2023.19.2.61>

<https://www.magonlinelibrary.com/doi/abs/10.12968/bjnn.2023.19.2.61>

### **UTI assessment tool for intermittent catheter users: a way to include user perspectives and enhance quality of UTI management**

Assessment tool for UTI, not validated. Intended to be used by nurses together with patients.

Reference: Lauridsen SV, Averbek MA, Krassioukov A, Vaabengaard R, Athanasiadou S. UTI assessment tool for intermittent catheter users: a way to include user perspectives and enhance quality of UTI management. BMC Nurs. 2022;21(1):272. Published 2022 Oct 6. doi:10.1186/s12912-022-01033-7.

<https://pubmed.ncbi.nlm.nih.gov/36199133/>

## 18. About the authors

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Susanne Vahr is a Clinical RN and Senior Researcher, working at the Surgical Department, Herlev-Gentofte, Copenhagen University Hospitals and at WHO Collaborating Centre, the Parker Institute, Bispebjerg and Frederiksberg Hospitals, Copenhagen University Hospital, Denmark. She has a Masters in Human Resource Development/Adult Learning and a PhD. She has worked in the field of urology since 1992.

Susanne is doing research in clinical health promotion with special focus on modifiable lifestyle factors Smoking – Nutrition – Alcohol – Physical inactivity (SNAP) and prevention of catheter-associated urinary tract infections (UTIs) and trauma to the urinary tract.

Susanne is a member of the Danish Association of Urology Nurses and of the Danish Nurses Research Council.

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Veronika currently works as a project leader for the Manfred Sauer Foundation in Lobbach, Germany. She has performed clinical studies on the incidence of hospital-acquired UTIs. Veronika previously contributed, as a panel member, to guidelines on male external catheters and also produced an instructional videotape on this topic.

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Sajida worked as a nurse manager in nephrology/urology services, with a focus on practice and protocol development. She developed several patient educational materials pertinent to urology, and patient care pathways on percutaneous nephrolithotomy, lithotripsy, and renal transplantation. She is currently working on pathway about enhanced recovery after surgery for patients undergoing radical cystectomy. She revamped the bladder irrigation record sheet to make it user friendly. She worked with renal transplant patients, and on system alerts for timely notification of patients to the primary care team for appropriate management. She is a Member of the EAUN since 2017.

Special interests: quality and patient safety, patient-centred care to improve care process and systems.

### **Anne Daniels, ANP in Urology/Uro-Oncology (IE)**

Anne is an Advanced Nurse Practitioner in Urology/Uro-Oncology in University Hospital Waterford, Ireland. Anne has been working as a nurse specialist in urology since 2015. She developed the urology nursing service in University Hospital Waterford and established numerous nurse led clinics and clinical care pathways. Anne progressed to Advanced Nurse Practitioner in Urology/Uro-Oncology in 2022 and is providing care for patient cohorts with benign conditions and urological cancers. She is also a nurse cystoscopist.

Anne is a committee member of the IAUN (Irish Association of Urology Nurses). Anne enjoys continuous learning, promoting urology and developing the nursing service to improve experiences and outcomes for both patients and nurses alike.

Special interests: bladder cancer and bladder dysfunction, clinical practice, quality improvement

### **Therese Kelly, RANP, RNP, MSc, HDip Management & Urological Nursing (IE)**

Therese has worked in the field of urology for over 30 years. She is currently working in Galway & Portlaoine University Hospitals and her caseload involves stone management via lithotripsy (ESWL) and lower urinary tract assessments, treatment and evaluation of treatments with IC is a key component of her clinics. She manages and counsels patients through conservative management including prescribing IC and medicinal products. She is involved in the development of local/national guidelines and has been involved in developing nurse led LUTS and ESWL clinics in her region.

Therese has a keen interest in research and evidence-based practice, she is an active member of her local journal/research club. Therese is one of the founding members

of her local network, SAOLTA urology/continence nurses network (SUNN). She is a member of the IAUN, ICS and EAUN.

### **Hanneke Lurvink (NL)**

Hanneke has worked for the European Association of Urology since 2006. She was appointed coordinator for all European Association of Urology Nurses (EAUN) activities in 2006. She has assisted the EAUN Working Groups for all eight EAUN Guidelines since 2007 with editorial work, finding the right illustrations, copyright, literature search, data extraction and retrieving full-text papers, contributing to the design of flowcharts, and playing an important role in the planning and keeping of deadlines. She is a member of the Guidelines International Network.

### **Marcin Popiński, NS (PL)**

Bachelor of English Studies (2014), Bachelor's Degree in Nursing (2015), and Master's Degree (2017). Nurse specialist in the field of surgical nursing (2021).

Marcin has worked in the Urology Clinic (University Hospital no. 2 "Jan Biziel") in Bydgoszcz, Poland since 2015. He mentors student practicals and internships. He has worked as a clinical research nurse and clinical research coordinator since 2017. He is a member of EAUN Board since 2023.

Special interests: adult urology, prostate cancer, incontinence.

### **Ian Pearce (GB)**

Ian has been a Consultant Urological Surgeon at Manchester Royal Infirmary, UK since 2002, having trained in Nottingham, Stoke and Greater Manchester.

He is currently the Vice President of the British Association of Urological Surgeons (BAUS) (2022 – 2024) and will become President in June 2024 until June 2026.

Special interests: bladder dysfunction and andrology.

### **Bente Thoft Jensen, RN-MPH, PhD-FAAN (DK)**

Research Nurse, Department of Urology, Aarhus University Hospital & Department of Clinical Institute, Centre of Research in Rehabilitation, Aarhus University Bente has been working in urology for 30 years both in Copenhagen and at Aarhus University Hospital, Denmark.

In 2015 she accepted a position at the Memorial Sloan Kettering Cancer Centre in New York (US). She has an ongoing interest for developing clinical practice in urological nursing.

Bente has also been involved in innovative educational initiatives such as: the European Bone Health Programme in cooperation with the European Oncology Nursing Society (EONS) and the Skeletal Care Academy (SCA), the online Bone Health course (EAUN), the European Specialist Nurses Organisation (ESNO), and recently, the European School of Urology Nursing (ESUN). Within the EAUN, Bente chairs the Bladder Cancer Special Interest Group and she is a member of the Patient Information Office of the EAU.

### **Giulia Villa, RN, PhD (IT)**

Registered Nurse, PhD in Nursing Sciences and Public Health.

She has worked in the field of urology since 2005 as Clinical RN and Head Nurse at the Urology Department of San Raffaele Hospital, Milan. She has worked as lecturer and since 2021 she is an Assistant Professor in Nursing Science at Vita-Salute San Raffaele University, Milan, Italy.

Her main activities are research and education. She is doing research in ostomy and incontinence. She is a member of different national and international associations.

Special interests: ostomy, urinary diversion, bladder and prostate cancer, UTI, nutrition.

### **Sallian M. Wildeman (NL)**

Registered nurse and specialist uro-oncology nurse.

Clinical nurse at the Urology Department of Franciscus Gasthuis and Vlietland Groep, Rotterdam, The Netherlands. Sally has worked in urology since 1992, and since 2000, she has worked as a specialist urology nurse in the urology outpatients department. In 2007, Sally specialised in uro-oncology. She teaches courses on urology (catheters, intermittent catheterisation technique for nurses and patients) and uro-oncology. Sally is a member of the Dutch Nursing Society (V&VN Urology), and the EAUN.

Current activities: research projects, teaching/presenting and running nurse-led clinics (uro-oncology), specialised nurse in sexual dysfunction (prostate and bladder cancer).

Special interests: adult urology, incontinence, catheter care and intermittent catheterisation technique, sexuality side effects, treatment and psychosocial care. Development of patient care pathways.

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