

A prevalence survey of patients with indwelling urinary catheters on district nursing caseloads in the United Kingdom: The Community Urinary Catheter Management (CCaMa) Study

Journal:	<i>Journal of Infection Prevention</i>
Manuscript ID	JIP-OA-19-0061.R1
Manuscript Type:	Original Article
Keyword:	Urinary Catheter, prevalence survey, community nursing, documentation, catheter management, catheter plan, Catheter Associated Urinary Tract Infection
Abstract:	<p>Background: Catheter-associated urinary tract infection (CAUTI) is common in both hospitals and the community.</p> <p>Aim: To investigate the prevalence of indwelling urinary catheters on district nursing caseloads in the United Kingdom (UK).</p> <p>Method: Participants were recruited through the Infection Prevention Society (IPS). An electronic survey was undertaken on a single day between November 2017 and January 2018. Data were analysed using descriptive statistics.</p> <p>Findings: 49,575 patients were included in the survey of whom 5352 had an indwelling urinary catheter. This gave a point prevalence of 10.8% [95%CI 10.53-11.07], which varied between organisations, ranging from 2.36% [95% CI 2.05-2.73] to 22.02% [95% CI 20.12-24.05]. 5% of catheters were newly-placed (within four weeks). Of these, most (77%) had a documented indication for insertion. Only half of patients with a newly-placed catheter had a plan for its removal. This varied between organisations from 20% to 96%. Only 13% of patients had a patient-held management plan or 'catheter passport' but these patients were significantly more likely to also have an active removal plan (28/36, 78% vs 106/231, 46%, $p < 0.0001$). Alternative bladder management strategies had been considered for 70/267 (26%) patients.</p> <p>Discussion: The management of patients with an indwelling urinary catheter represents a significant component of district nursing caseloads. Given the high proportion of newly-catheterised patients without an active management plan for removal of the catheter, the establishment of an optimal management pathway should be the focus of future prevention efforts.</p>

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Keywords

Urinary catheter, prevalence survey, community nursing, documentation, catheter management, catheter plan, catheter-associated urinary tract infection

Introduction

Indwelling urinary catheters are commonly employed as a bladder management strategy in healthcare and are known to be overused in hospitals (Murphy et al., 2015; Tiwari et al., 2012),

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3 where they are a major predisposing factor for urinary tract infection and other complications (Saint
4 et al., 2018; Public Health England, 2016). Effective strategies to decrease unnecessary urinary
5 catheter use in hospitals require clear criteria for appropriate placement (Meddings 2014; Murphy et
6 al., 2014), which extend to those catheters still in place when the patient is discharged from hospital.
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8 However, much less is known about the prevalence and appropriateness of catheter use in
9
10 community settings and so the potential to reduce unnecessary use is unclear. Getliffe and Newton
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12 (2006) reported limitations in the quality and consistency of catheter-related information collected
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14 by community healthcare services. They concluded that this, together with the lack of a standardised
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16 approach to monitoring the rate of catheter-associated urinary tract infection (CAUTI) among
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18 patients on district nursing caseloads, made it difficult to estimate CAUTI prevalence and impact as a
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20 baseline to inform improvement interventions.
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22 Prolonged catheterisation is the most important, potentially modifiable risk factor for catheter-
23 associated UTI (Maki and Tambyah, 2001). Appropriate use of indwelling urinary catheters, together
24 with improved management of urinary tract infections, have been identified as key targets for
25 intervention in a recent surveillance study of *E. coli* bacteraemia (Abernethy et al., 2017). Evidence-
26 based practice relating to the use and management of urinary catheters is well-defined, both in
27 hospitals and the community (Loveday et al., 2014; National Institute for Health and Care Excellence
28 (NICE), 2017). This recommends using catheters only when clinically indicated and when alternative
29 methods are deemed unsuitable. Catheters intended for short-term use require daily review of
30 ongoing need and prompt removal when no longer needed (Loveday et al., 2014). Crucially, when
31 discharging or transferring a patient with a short-term catheter, a clear plan is needed to ensure its
32 timely review and removal (Loveday et al., 2014). The benefits to patients are realised through
33 improved experience owing to reduced infection rates, shorter stay in hospital and avoidance of
34 unnecessary catheterisation, whilst appropriate antimicrobial prescribing impacts positively on
35 population health through reduced antimicrobial resistance (Department of Health and Department
36 for Environment Food and Rural Affairs, 2013).
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48 Catheter management plans or 'passports' designed to improve communication at service interfaces
49 about urinary catheter management are being promoted for use within the NHS in England (NHS
50 Improvement, 2019). Despite being a suggested action to improve catheter management, only two
51 reports on the use of a catheter passport have been published (Codd, 2014; De Jaeger et al., 2017).
52 One of these (De Jaeger et al., 2017) included an evaluation of efficacy and found that a catheter
53 passport improved information provision for patients and nurses and supported the transition from
54 hospital to home. However, it was not clear whether the passport influenced community nurses'
55 decision-making about catheter management or whether nurses had the necessary knowledge, skills
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3 and resources to ensure prompt removal of catheters when no longer needed. There is a pressing
4 need to better understand the problem of overuse of catheters and to establish the efficacy of
5 catheter passports and other strategies designed to improve catheter management when patients
6 move between healthcare settings and home.
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10 The aim of this study was to investigate the prevalence of patients with indwelling urinary catheters
11 on district nursing caseloads in the United Kingdom and Republic of Ireland, and for patients recently
12 referred to the district nursing caseload with a newly-placed catheter (within four weeks of the
13 survey), evidence of documentation of the reason for the catheter and a management plan for its
14 continued use or removal.
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20 21 **Methodology**

22 The study was focused on patients with a catheter who were managed by the District Nursing
23 service of organisations providing community healthcare services in the United Kingdom and
24 Republic of Ireland. The study design was a cross-sectional survey intended to answer the following
25 research questions:
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- 29 1. What proportion of patients managed by District Nurses (DN) have an indwelling urinary
30 catheter?
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- 32 2. How many of these patients have been referred with a newly-placed catheter (within the
33 last 4 weeks), having not previously had a catheter prior to referral?
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- 35 3. What proportion of these newly-placed catheters have an indication for their presence and a
36 management plan for their continued use or removal?
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41 *Recruitment:* Participants were recruited through the Infection Prevention Society (IPS). Interested
42 community Infection Prevention & Control (IPC) teams were asked to complete an expression of
43 interest form, which included obtaining the necessary permission to participate in the survey.
44 Information about the study was disseminated via a webinar and IPS website.
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48 *Ethical approval:* Ethical approval was obtained from the College of Nursing, Midwifery & Healthcare
49 Ethics Committee at the University of West London [UWLREC/CREP00300]. The study did not require
50 permission from the Health Research Authority or a NHS research ethics committee. No patient
51 identifiable data or organisation-specific data were collected and the study was considered to be
52 clinical audit of indwelling urinary catheters not research.
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57 *Data collection:* The IPC practitioner and each DN team who agreed to participate in the survey
58 collected the data using an electronic survey, created in Qualtrics™. A unique code was assigned to
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3 each participating DN team, which was required to access and complete the survey. Participating
4 teams were asked to collect prevalence data on a single day of their choice between the beginning
5 of November 2017 and mid-January 2018.
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9 Participating centres could choose to collect data for one or more of their DN localities. The survey
10 enquired about the total number of patients in the DN caseload on the day of data collection, the
11 number of patients who had a catheter and the number of patients with a newly-placed catheter.
12 We defined a newly-placed catheter as a catheter inserted in the last four weeks in a previously non-
13 catheterised patient. For patients with a newly-placed catheter demographic data and information
14 about the care requirements for the catheter and any plans for its removal (active removal plan)
15 were collected. An active removal plan was defined as a plan that included one or more of the
16 following: (1) a date for review of the ongoing need for the catheter, (2) a date for removal of the
17 catheter ('trial without catheter' or 'TWOC'), (3) referral to DN/urology/continence service. In
18 addition, data were captured on whether a patient-held record or catheter passport was in use.
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27 *Data analysis:* Survey responses were transferred into IBM SPSS v24 statistical software and
28 analysed using descriptive statistics. Prevalence was calculated as (1) the total number of catheters
29 per total number of patients and (2) the total number of newly-placed catheters per total number of
30 catheters, and was expressed as a percentage.
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36 **Results**

37 **Participating organisations**

38 24 organisations agreed to complete the survey, of which 20 provided data from 150 localities across
39 England, Wales, Scotland and Northern Ireland. No organisations were recruited from the Republic
40 of Ireland. The median number of localities from which data were collected by participating
41 organisations was 4 (range 1-27). Point prevalence data were collected on one day between 6th Nov
42 2017 and 17th Jan 2018. A total of 49,575 patients were included in the survey, ranging between
43 organisations from 69-7654.
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52 **Prevalence of catheters**

53 A total of 5352 patients had a urinary catheter; with a mean catheter prevalence of 10.8% [95%CI
54 10.53-11.07]. Catheter prevalence ranged between organisations from 2.36% [95% CI 2.05-2.73] to
55 22.02% [95% CI 20.12-24.05] (Figure 1). Of these 5352 catheters, 269 had been inserted within four
56 weeks of the survey. The overall prevalence of newly-placed catheters was 5.02% [95%CI 4.47-5.64].
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Demographic data

Data were available for 267/269 (99%) patients with newly placed catheters. Most patients with a catheter were male (204/267, 76.4%) and 70 years or older (201/267, 75%). The majority lived at home (235/267, 88%) with a smaller proportion in residential care or an assisted living unit (30/267, 11%).

The care setting where the referral originated was reported for 265/267 (99%) of patients. The largest proportion coming from general medicine wards in hospitals (12/265; 45%), followed by urology (34/265, 13%), A&E (13/265, 5%), other hospital departments (16/265, 6%), GPs (42/265, 16%) and self-referrals (9/265, 3%).

Indication for catheter

Of the 267 newly placed catheters, 259 (97%) were urethral and 8 (3%) were suprapubic. The indication for the insertion of the catheter was recorded for 207/267 (77%) patients, with urinary retention the most common indication (137/267, 51%) (see Table 1). For a small number of patients (10/267; 3.7%) the recorded indication for insertion was for a non-clinical reason such as patient choice, decreased mobility or incontinence.

Catheter management plan

A total of 207/267 (77%) patients had a plan for catheter care, 19% (51/267) no plan and 3% (7/267) this was unknown. For 131/267 (49%) patients there were documented instructions for the frequency of catheter change and 43% (114/267) for the management of the urinary drainage system. The most common catheter change frequency was 9-12 weekly (74%, 97/131), with 8% (11/131) more than 12 weeks and 11% (14/131) between 2 and 8 weeks. Management of the drainage system was expected to occur weekly for 77% (88/114) of patients where this was reported.

Only half (134/267, 50%) of patients had an active plan for the removal of the catheter. Patients were more likely to have an active removal plan if discharged from urology (23/34, 67%) or A&E (11/13, 85%, $p=0.024$). Active removal plans included a specified date for removal in 56% (116/207) of cases and/or referral to the continence service or urology team for trial without catheter (97/207, 47%). Only 13% of patients had a patient-held management plan or 'catheter passport' but these patients were significantly more likely to have an active removal plan (28/36, 78% vs 106/231, 46%, $p<0.0001$).

Alternative bladder management strategies had been considered for 53/267 (20%) of patients, with incontinence pads (22/53, 42%), and intermittent catheter (13/53, 25%) the most commonly considered alternatives.

Patients with retention

A total of 137/267 (51%) patients had a catheter due to retention. Male patients were more likely than females to have an indication of retention (114/204, 56% vs 23/63, 36%; $p=0.007$). The majority (104/137, 76%) were 70 years or older and a large proportion lived at home (120/137, 88%), although this was not different to the patients with a catheter due to other reasons ($p=0.296$ and $p=0.994$ respectively). A plan for catheter care was available for 113/137 (82%), which was similar to that observed for other patients (94/130, 72%; $p=0.20$). There was no difference in the proportion of patients in retention with an active removal plan (75/137, 55%) compared with other patients (59/130, 45%; $p=0.080$). Source of referral was provided for 134/137 (98%) with the largest proportion from general hospital wards (59/137, 43%). Other sources included hospital urology (20/137, 15%), GP (19/137, 14%), hospital A&E (10/137, 47%), other hospital departments (8/137, 6%) and self-referrals (5/137, 4%). Differences in referral source for catheters due to retention compared to other indications was not significant ($p=0.536$). Alternative bladder management strategies were considered for 26% (36/137) of patients with retention, similar to that observed in other patients 26% (34/130, $p=0.982$).

Differences between organisations

For the organisations that had at least ten patients with a newly inserted catheter ($n = 14$), the mean proportion of patients with a recorded indication for use was 83% (198/239), although this varied between organisations from 30% to 100% (see Figure 2a). The mean proportion with active removal plan was 51% (121/239) and varied between organisations from 20% to 96% (see Figure 2b). Only 4/14 (29%) of the organisations had a catheter management plan for at least 90% of patients. The presence of a catheter management plan was strongly correlated with a documented catheter indication ($r=0.790$, $p=0.001$), but there was no correlation between management and active removal plans ($r=0.472$, $p=0.088$). Two organisations with the highest proportion of catheter management plans also had a high proportion with an active removal plan.

Discussion

In this study almost 50,000 patients were included on district nurses' caseloads across 20 organisations in England, Wales, Scotland and Northern Ireland and 5,352 of these had an indwelling urinary catheter. We believe this to be the first study of this magnitude in the United Kingdom to investigate the prevalence of indwelling urinary catheters managed in the community by District

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3 Nursing services, which differentiates patients not previously catheterised who were newly referred
4 for catheter management from those with a long-term catheter.
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7 The prevalence of 10.9% of catheterised patients on district nursing caseloads is higher than the 7%
8 estimated by NHS Safety Thermometer for patients in community settings in England (Shackley et
9 al., 2017), although the latter excluded suprapubic catheters. A recent study of long-term catheter
10 use in the south and west of England (Gage et al, 2017), reported a population prevalence of 0.14%,
11 with 40% use of suprapubic catheters. Forde and Barry (2017) reported a much lower prevalence of
12 catheter use (1.9%) among people in Ireland living at home and receiving a community nursing
13 service. However, this difference may be explained by case-mix as the denominator was estimated
14 from annually reported data rather than actual caseloads at the time of the survey.
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21 The wide variation in prevalence of catheter use found in our survey is notable and may reflect
22 differences in catheterisation practice in local acute care settings, although this may also be
23 influenced by variation in patient case mix or demographics. Forde and Barry (2017) reported a
24 prevalence of 31% in patients aged 85 years or older and a ratio of 2:1 male to female patients.
25 Thus, local demographics are likely to have a significant influence on the prevalence of catheters.
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30 Most of the catheters being managed by district nurses were not newly-placed. Of those that were,
31 three-quarters were for male patients over 70 years old. A high proportion of newly-placed
32 catheters had an indication of urinary retention and only half had an active management plan likely
33 to result in earlier removal of the catheter and reduced infection risks. Those patients discharged
34 from a urology service or accident and emergency department were significantly more likely to have
35 such a plan. This suggests that patients who are most at risk of a catheter remaining in place long-
36 term by default are those catheterised for urinary retention with a less well-defined care pathway
37 and no specialist urological input.
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44 Our survey did not distinguish acute and chronic urinary retention and we do not know what
45 information was available to district nurses about the underlying cause of retention. Acute urinary
46 retention (AUR) refers to the sudden and painful inability to void despite having a full bladder and
47 would be expected to be managed by urethral or suprapubic catheterisation (Fitzpatrick and Kirby,
48 2006). Chronic urinary retention (CUR) is associated with incomplete bladder emptying and
49 increased residual volume but no pain (Negro & Muir 2012). It is possible that our sample comprised
50 patients catheterised for AUR whose catheters were not removed prior to discharge from hospital,
51 or were replaced following unsuccessful trial without catheter and also patients newly presenting
52 with CUR. A more detailed investigation would be needed to determine the relationship between
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3 reason for ongoing catheterisation in patients with acute or chronic retention and presence (or
4 absence) of an active management plan.
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7 It has been suggested that CUR is associated with an increased risk of infection and chronic renal
8 disease, but there is little published evidence to support this (Rule et al 2005). Evidence to support
9 best practice is also limited. Obstruction is the most common cause of CUR, particularly benign
10 prostatic hyperplasia, which accounts for 50% of cases in males (Selius and Subedi, 2008). However,
11 CUR is poorly defined, with residual volumes of between 300 and 1000ml being considered
12 indicative but these can vary widely in the same individual at different points in time and the
13 problems associated with residual volume vary widely (NICE 2015, Negro & Muir 2012). Surgical
14 intervention, laser or microwave therapy can be an effective treatment and clean intermittent self-
15 catheterisation has also been shown to restore bladder function and reduce symptoms (Negro &
16 Muir 2012). The use of long-term catheters has been recommended for management of CUR in men
17 who cannot have surgery or who 'are distressed by bed and clothing changes' (NICE 2015), but this
18 guidance appears to ignore the significant infection risks associated with long-term catheterisation,
19 which may be greater than the risk associated with incomplete bladder emptying.
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22 Our study found many patients, mainly older men, who were catheterised for urinary retention
23 without an apparent strategy to ensure their symptoms were properly investigated and actively
24 managed. There was also wide variation between participating centres in the proportion of patients
25 who had an active management plan for the catheter. Although the difference may be due to
26 variation in case mix, it may also reflect variation in the efficacy of healthcare economy systems for
27 supporting the early removal of indwelling urinary catheters. Given the increasing challenge of
28 antimicrobial resistance among uropathogens and steady increase in severe invasive infections
29 associated with inadequate treatment of repeat UTI (Abernethy et al 2017), collaboration across
30 healthcare economies to implement effective strategies to support early removal or alternatives to
31 long-term indwelling catheters should be a key priority.
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34 Whilst only a small proportion of patients had a patient-held management plan or catheter passport,
35 these patients were significantly more likely to also have an active removal plan. This suggests a
36 potential benefit of using a patient-held catheter management plan, although it is uncertain whether
37 this is due to the plan itself or to better integrated pathways for catheterised patients. Patient-held
38 records have been used in healthcare with the aim of facilitating communication between patients
39 and healthcare professionals (Sartain et al., 2014) offering a practical intervention to address the
40 problem of fragmented communication as the patient moves between healthcare sectors. However,
41 given that little is known about the effectiveness of catheter management plans or passports,
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3 evaluation studies are needed to measure their impact on rates of catheter use and removal. The
4 evaluation study by De Jaeger and Robinson (2017) did not investigate whether improved
5 information provision resulted in removal of catheters not indicated for long-term use.
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9 In our survey most catheters had been in place for at least four weeks, although it was not in the
10 remit of the study to determine appropriateness of indications for these catheters. Forde and Barry
11 (2017) sought to determine if the documented reason for catheter use among patients was
12 appropriate according to nationally agreed indications. Of the 80 patients for whom nursing notes
13 were available, only half (n=42) had an appropriate indication documented. Further studies are
14 required to determine the indications for long-term indwelling catheter use among people receiving
15 healthcare in hospital and community settings in order to establish the extent of inappropriate use
16 and the potential to better exploit alternative bladder management strategies, including
17 intermittent self-catheterisation.
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24 **Study limitations**

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26 The findings of this study are not representative of practice across the UK as data collection relied on
27 voluntary participation by district nursing teams. Recruitment via the Infection Prevention Society
28 resulted in a self-selected sample as not all district nursing teams would have had access to a
29 member of the Society. Since participating teams did not necessarily capture data on their entire
30 caseload we cannot be certain that the localities selected for inclusion had the same rate of
31 catheterisation as for the caseload as a whole. Moreover, as it cannot be assumed that every
32 patient in the community who has a catheter is being managed by a district nurse, the prevalence
33 reported here may be an underestimate.
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41 **Implications for practice**

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43 The findings of a recently published study in the United States (US) by Saint *et al.* (2018) on the
44 infectious and non-infectious complications associated with indwelling urethral catheters
45 demonstrates the impact of an indwelling catheter on a person's functional and social activity. There
46 is a need to investigate how these findings apply in the UK context and elsewhere, as the
47 implications of unnecessarily prolonged catheterisation, both for patients and those involved in their
48 care, signifies an important safety and quality of life imperative.
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55 **Conclusion**

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57 The management of patients with an indwelling urinary catheter represents a significant component
58 of district nursing caseloads yet little is known about the appropriateness of catheter use or the
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3 potential to reduce use in this population. Given the high proportion of newly-catheterised patients
4 discharged from hospital without an active plan for removal of the catheter, the establishment of an
5 optimal management pathway, including improved provision of information and support to district
6 nurses, should be the focus of future prevention efforts. Further research is needed to determine
7 the potential to reduce catheter use and the essential components of a successful pathway.
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14 **Acknowledgements**

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16 The authors thank the infection prevention and control practitioners and district nursing teams who
17 participated in this research and the Infection Prevention Society for support with recruitment and
18 funding.
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22 **Declaration of conflicting interests**

23
24 The authors declared no potential conflicts of interest with respect to the research, authorship
25 and/or publication of this article.
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30 **Funding**

31
32 This study was partially funded by the Infection Prevention Society.
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36 **Peer review statement**

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38 Not commissioned; blind peer-reviewed.
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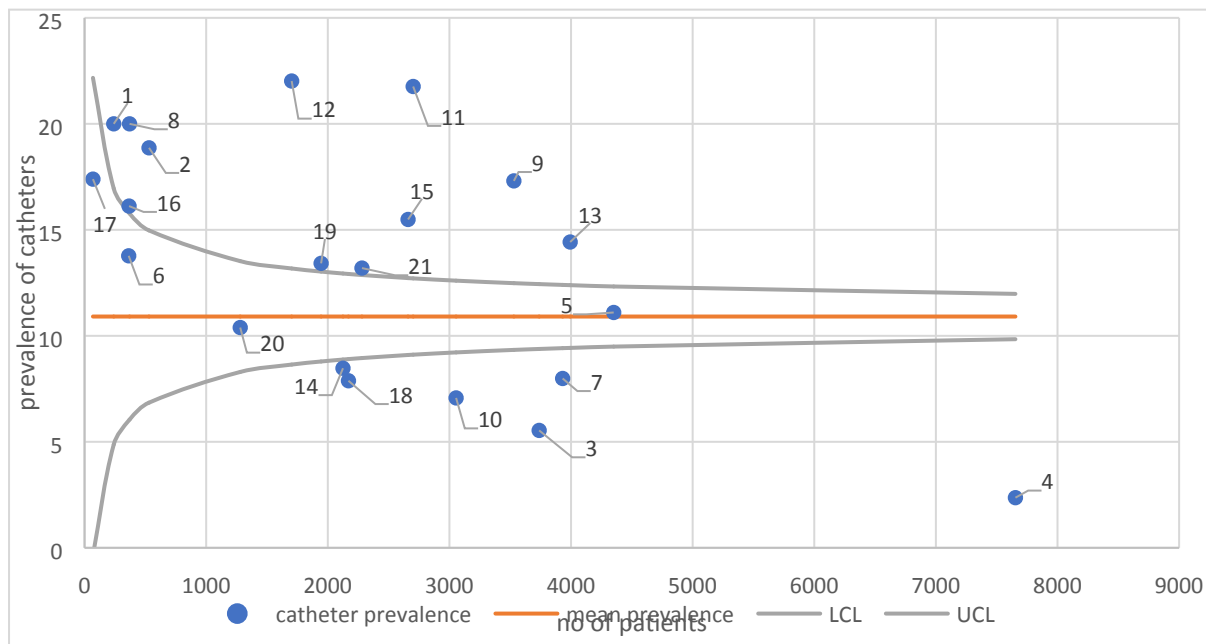


Figure 1: Funnel plot showing catheter prevalence for all organisations.

Table 1: Indication for the insertion of the catheter.

Indication	Number of patients (%)
<i>Urinary retention</i>	137 (51.3%)
<i>Urological problem</i>	17 (6.4%)
Bladder outlet obstruction	10 (3.7%)
Prostate cancer	3 (1.1%)
Hydrocele/hydronephrosis	2 (0.8%)
Stricture	1 (0.4%)
Bladder prolapse	1 (0.4%)
<i>Surgery/biopsy</i>	15 (5.6%)
Following surgery/biopsy - urological	8 (3.0%)
Following surgery/biopsy - non-urological	3 (1.1%)
Following surgery/biopsy - unknown	4 (1.5%)
<i>End of life comfort</i>	14 (5.2%)
<i>Neurological</i>	7 (2.6%)
<i>Other clinical indication</i>	17 (6.4%)
Sacral/perineal wound in an incontinent patient	5 (1.9%)
Failed TWOC	2 (0.8%)
<i>Non-clinical indication</i>	10 (3.7%)
Patient choice	4 (1.5%)
Decreased mobility	3 (1.1%)
Generally unwell	2 (0.8%)
Incontinence	1 (0.4%)
<i>No indication recorded</i>	60 (22.5%)
Total	267 (100%)

This figure is to be included as online supplementary material

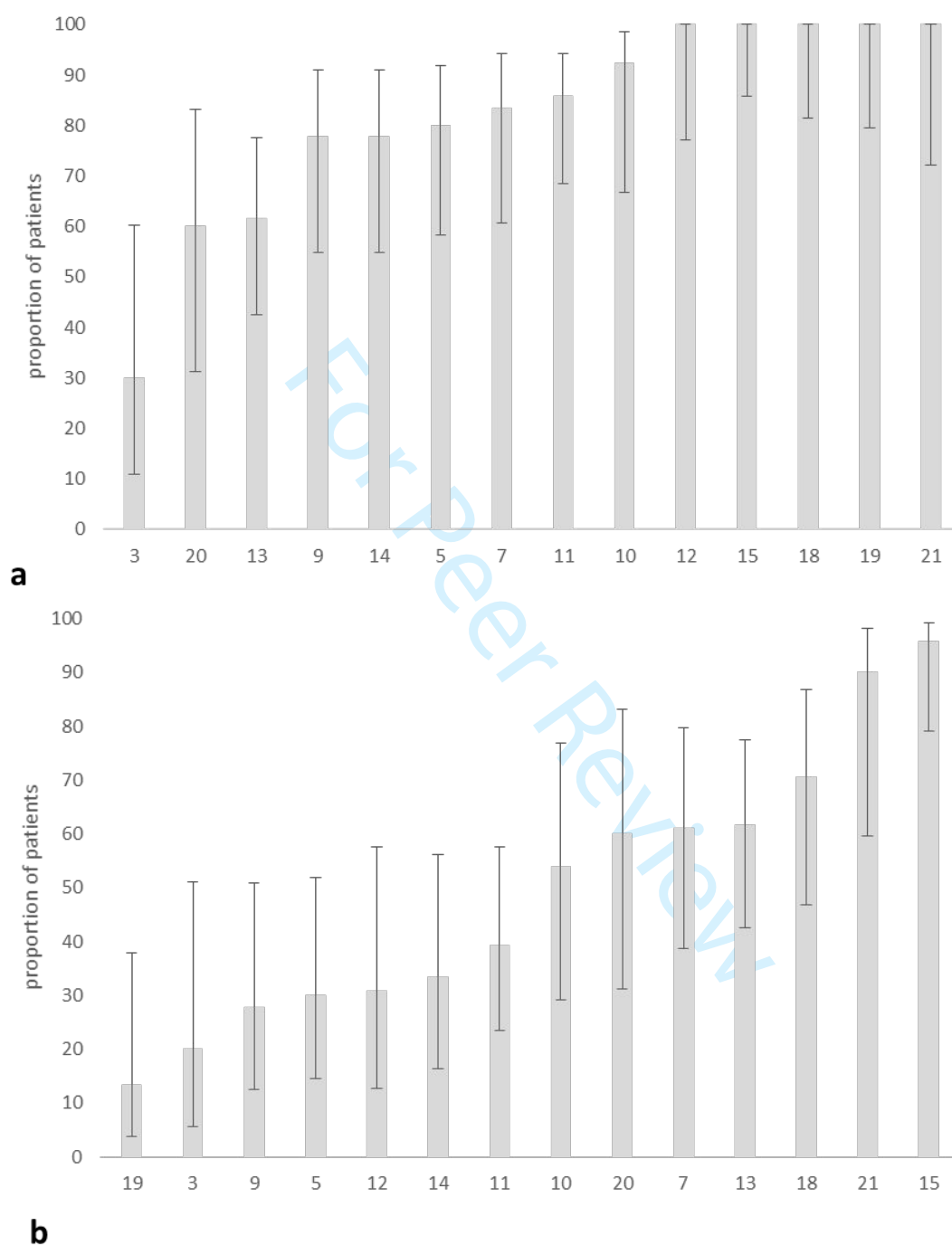


Figure 2: Proportion of patients [95% CI] with a) indication for catheter insertion, b) active plan for catheter removal. Significant differences were not observed due to small number of cases within the organisations. Confidence limits were calculated using Wilson (1927) binominal proportion confidence interval.