EE128

Clinical and Economic Burden Among Patients Requiring Long-term Intermittent Catheter Use in England: A Real-world Retrospective Observational Cohort Study

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BACKGROUND

- Intermittent catheterisation (IC) involves periodic insertion of a single-use catheter to mimic natural bladder emptying for people unable to void normally.
- Compared with indwelling catheters, IC lowers the risk of urinary complications and supports personal independence to help improve quality of life.[1,2]
- IC is the gold-standard catheterisation method in the United Kingdom (UK),[3] but without proper management, long-term IC use can be associated with urinary tract infections (UTIs), sepsis, and other complications.[4]
- Catheter-associated UTIs are associated with increased hospitalisations, longer hospital stays, and reduced quality of life.[4,5]
- Healthcare resource utilisation (HCRU) and costs have been reported to be higher among IC users compared with matched controls, mainly related to hospitalisations;[6] however, UK-specific clinical and economic outcomes related to long-term IC use are limited.
- **This study aimed to characterise HCRU and costs associated with long-term IC use in England.**

METHODS

- This was a retrospective cohort study using general practice (GP) data from the Clinical Practice Research Datalink database linked to Hospital Episode Statistics accident & emergency (A&E), outpatient, and inpatient data from across England.[7,8]

Study cohorts

- Eligible adults (≥18 years) had long-term IC use and ≥1 year of follow-up after the index date (date of the first IC prescription during the study period).
  - Long-term IC use was defined as ≥3 consecutive IC prescriptions within 4 months of each other and ≥6 months' total duration of catheterisation between 1 January 2011 and 31 December 2020.
  - IC users were followed until interruption of IC use, end of follow-up, or death, whichever occurred first.
- IC users were propensity-score matched 1:5 with non-catheterising controls based on age, sex, and calendar year of the index date, where the matched control index date was based on the first eligible primary care visit.
  - Matched controls had ≥6 months of continuous enrolment before the index date and no record of catheterisation during the study period.
  - Controls were followed from first eligible primary care visit until end of the study period or death.

Variables, outcomes and statistical analysis

- Patient characteristics, including age, race/ethnicity, sex, and socioeconomic status, were analysed descriptively.
- Comorbidities were identified from read codes recorded in primary care or ICD-10 codes recorded in outpatient or inpatient secondary care (including both primary and secondary diagnoses).
- HCRU included use of catheter products and medications, hospitalisations, and GP, A&E, and outpatient healthcare visits.
  - Exploratory analyses of the diagnosis codes (Read/ICD-10) most frequently recorded in consultations were conducted to identify the most common reasons for GP visits and hospitalisations.
  - Costs were derived from published UK unit costs (2020/2021 cost year), including use of the Grouper software to cost inpatient admissions.[9-13]
- Clinical conditions, HCRU, and costs were compared between groups using Fisher's Exact Test or Wilcoxon Rank Sum Test, as appropriate.
  - Mean differences and relative risks (RR) with 95% confidence intervals (CIs) were reported.
  - All analyses were conducted using STATA (version 17.0 or later) and R (version 4.2.2 or later).
- Results are reported for the first year of follow-up unless noted otherwise.

RESULTS

Study population

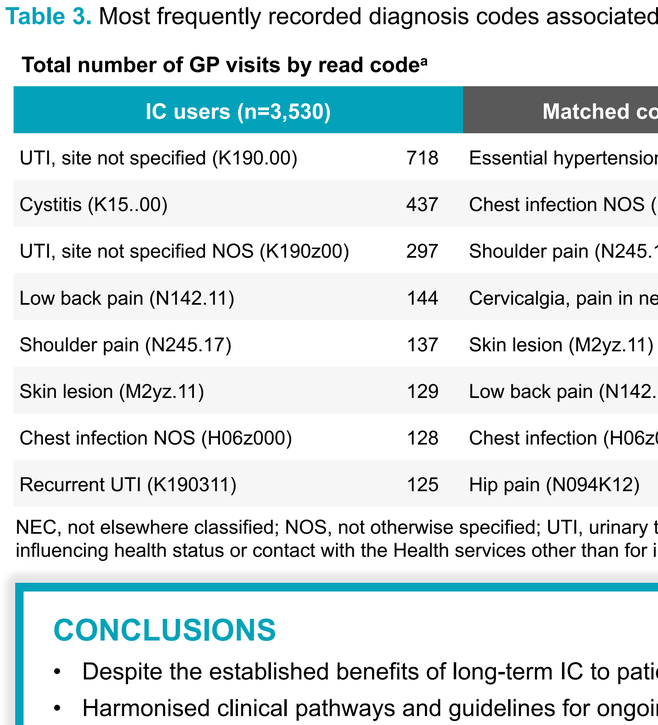
- A total of 3,520 IC users and 15,643 matched controls were included. Patient characteristics were generally similar between groups.
  - The mean age of each cohort was 61 years. IC and controls were 61% and 57% men, and 94% and 71% White, respectively (**Table 1**). Ethnicity was missing or unknown more frequently among controls (23%) than IC users (2%).
- In the first year of follow-up, urinary, bowel, and kidney-related comorbidities were expectedly more prevalent among IC users (**Figure 1**).
- Compared with controls, IC users had 15.3 (95% CI: 7.2, 32.1) times the risk of possible urosepsis, 12.0 (95% CI: 6.9, 20.9) times the risk of urinary obstruction, and 8.5 (95% CI: 7.7, 9.3) times the risk of UTI.

Table 1. Characteristics of the study population

	IC users (n=3,520)	Matched controls (n=15,643)
Age, mean (SD), years	61.0 (16.96)	60.9 (17.91)
Sex, male, n (%)	2,147 (61)	8,967 (57)
Race/ethnicity, n (%)		
White	3,311 (94)	11,153 (71)
Black[a]	27 (1)	176 (1)
Asian[b]	67 (2)	427 (3)
Other	31 (1)	178 (1)
Mixed	11 (<1)	54 (<1)
Unknown	47 (1)	3,030 (19)
Missing	26 (1)	625 (4)
Patient-level IMD deprivation score, quintile, n (%)		
Quintile 1 (most deprived)	843 (24)	3,788 (24)
Quintile 2	762 (22)	3,688 (24)
Quintile 3	715 (20)	3,353 (21)
Quintile 4	630 (18)	2,689 (17)
Quintile 5 (least deprived)	569 (16)	2,112 (14)
Not available	1 (<1)	13 (1)

[a]Includes race/ethnicity categories of Black African, Black Caribbean, and Other Black.
[b]Includes race/ethnicity categories of Bangladeshi, Chinese, Indian, Pakistani, and Other Asian.
IC, intermittent catheter; IMD, Index of Multiple Deprivation dataset; SD, standard deviation.

Figure 1. Prevalence of conditions in the first year of follow-up (% patients)



CI, confidence interval; IC, intermittent catheter; RR, relative risk; UTI, urinary tract infection.
P values calculated using Fisher's exact test.

HCRU and costs

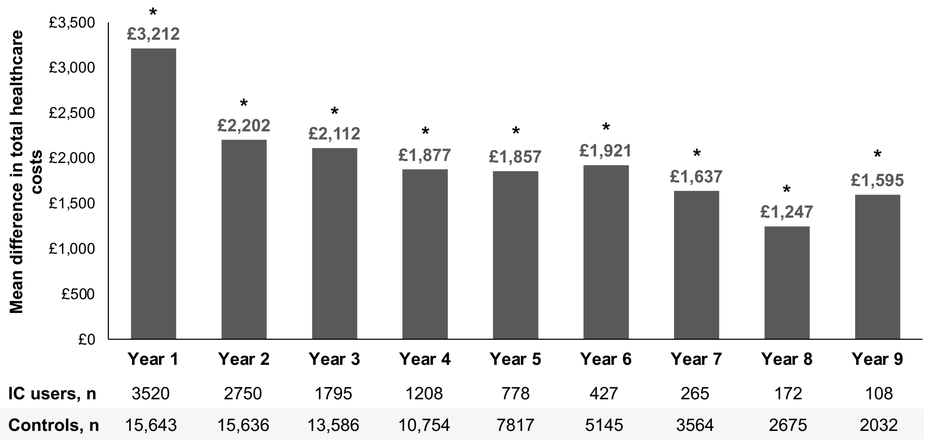
- Annual HCRU and costs were higher for IC users compared with matched controls in the first year of follow-up (all *P*<0.001; **Table 2**).
- More IC users received medications of interest compared with matched controls, including laxatives/bowel-related medications (23% vs 5%; *P*<0.001) and UTI-related antibiotics (70% vs 21%; *P*<0.001; **Table 2**)
- Among IC users, 70% had antibiotic prescriptions possibly used to treat UTIs (mean, 4.2), though only 30% had recorded UTI diagnoses (reason for prescriptions was not available in the dataset)
- In contrast, 21% of controls had UTI-related antibiotic prescriptions (mean, 0.40) of whom 4% had UTI diagnoses (**Table 2**).
- Mean annual medication costs were significantly higher among IC users in the first year of follow-up compared with matched controls, including UTI-related antibiotics (£24.78 vs £1.43)
- Mean all-cause healthcare costs were greater for IC users vs matched controls in the first year of follow-up (£4710 vs £1498; mean difference, £3211; *P*<0.001) and at Year 9 (mean difference, £1595; *P*<0.001) (**Figure 2**)

Table 2. Annual HCRU and costs in the first year of follow-up

	IC users (n=3,520)	Matched controls (n=15,643)	Cohort comparison	*P* value[a]
Medications				
Patients with ≥1 prescription, (%)			**Relative risk (95% CI)**	
Infections (antimicrobials)	2,651 (75)	4,872 (31)	2.4 (2.4, 2.5)	<0.001
UTIs (antibiotics)	2,457 (70)	3,296 (21)	3.3 (3.2, 3.4)	<0.001
Pain management	2,065 (59)	5,072 (32)	1.8 (1.7, 1.9)	<0.001
Mental health conditions	1,462 (42)	2,675 (17)	2.4 (2.3, 2.6)	<0.001
Urinary/incontinence issues	1,144 (33)	778 (5)	6.5 (6.0, 7.1)	<0.001
Bowel/constipation management	802 (23)	774 (5)	4.6 (4.2, 5.0)	<0.001
Infection prophylaxis (antibiotics)	747 (21)	88 (1)	37.7 (30.3, 46.9)	<0.001
Mean (SD) prescriptions				
Infections (antimicrobials)	5.1 (6.67)	0.7 (1.77)	4.4 (4.1, 4.6)	<0.001
UTIs (antibiotics)	4.2 (6.05)	0.4 (1.29)	3.8 (3.6, 4.0)	<0.001
Pain management	7.8 (18.38)	2.9 (7.61)	4.9 (4.3, 5.5)	<0.001
HCRU, mean (SD)			**Mean difference (95% CI)**	
GP visits				
Number of visits	30.95 (24.23)	13.57 (14.76)	17.37 (16.54, 18.21)	<0.001
Costs	£1,207 (£945)	£529 (£576)	£678 (£645, £710)	<0.001
A&E visits				
Number of visits	0.56 (1.62)	0.26 (0.78)	0.29 (0.24, 0.35)	<0.001
Costs	£107 (£302)	£47 (£165)	£60 (£50, £71)	<0.001
Outpatient visits				
Number of visits	7.14 (9.38)	1.93 (4.64)	5.21 (4.89, 5.52)	<0.001
Costs	£1,460 (£2,286)	£335 (£960)	£1,124 (£1,047, £1,201)	<0.001
Hospitalisations				
Number of visits	1.16 (5.08)	0.32 (1.96)	0.84 (0.67, 1.01)	<0.001
Costs	£1,936 (£4,394)	£587 (£2,335)	£1,349 (£1,200, £1,499)	<0.001

[a]*P* values calculated using Wilcoxon Rank Sum Test for mean differences and using Fisher's Exact Test for relative risk among patients with ≥1 medication (for which ≥5 patients in each group had a prescription).

Figure 2. Mean differences in total healthcare costs by year of post-index follow-up



*P<0.001
IC, intermittent catheter.
Total healthcare costs comprised those associated with GP visits, A&E visits, outpatient visits, and hospitalisations.

Diagnosis codes associated with HCRU

- Diagnosis codes related to UTIs and urinary system disorders were among the most frequently recorded individual diagnosis codes in the population of IC users, across both primary care and secondary inpatient visits (**Table 3**)

Table 3. Most frequently recorded diagnosis codes associated with GP visits and hospitalisations

Total number of GP visits by read code[a]

IC users (n=3,530)		Matched controls (n=15,643)	
UTI, site not specified (K190.00)	718	Essential hypertension (G20..00)	426
Cystitis (K15..00)	437	Chest infection NOS (H06z000)	411
UTI, site not specified NOS (K190z00)	297	Shoulder pain (N245.17)	389
Low back pain (N142.11)	144	Cervicalgia, pain in neck (N131.00)	353
Shoulder pain (N245.17)	137	Skin lesion (M2yz.11)	332
Skin lesion (M2yz.11)	129	Low back pain (N142.11)	282
Chest infection NOS (H06z000)	128	Chest infection (H06z011)	271
Recurrent UTI (K190311)	125	Hip pain (N094K12)	270

Total number of hospitalisations by ICD-10 diagnosis code[b]

IC users (n=3,530)		Matched controls (n=15,643)	
Chronic kidney disease (N18)	484	Chronic kidney disease (N18)	302
Multiple sclerosis (G35)	243	Other cataract (H26)	133
Other disorders of urinary system (N39)	193	Pain in throat and chest (R07)	108
Hypertensive renal disease (I12)	163	Chronic ischaemic heart disease (I25)	84
Urethral stricture (N35)	118	Other malignant neoplasms of skin (C44)	80
Other disorders of bladder (N32)	110	Senile cataract (H25)	79
Neuromuscular dysfunction of bladder, NEC (N31)	107	Pneumonia, organism unspecified (J18)	76
Dorsalgia (M54)	76	Other disorders of urinary system (N39)	76

NEC, not elsewhere classified; NOS, not otherwise specified; UTI, urinary tract infection. [a]Read codes starting with a number ("History, Examination, Procedures and Administration") or with Z ("Supplementary factors influencing health status or contact with the Health services other than for illness") were excluded to limit to diagnosis Read codes only. [b]Diagnosis codes only included primary diagnosis for admissions.

CONCLUSIONS

- Despite the established benefits of long-term IC to patients, this study highlights the substantial HCRU and costs for IC users compared with matched controls.
- Harmonised clinical pathways and guidelines for ongoing continence care are needed to help optimise outcomes alongside medical technology innovations for patients requiring long-term IC use.
- Further research to explore the burden directly attributable to long-term IC would be an important extension of this study, including how the burden of care varies between different types of catheters

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