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Perceptions and experiences of factors determining the inappropriate use and timely removal of indwelling urinary catheters in hospitals and nursing homes: a qualitative evidence synthesis

Christina Koscher-Kien [1], Marie-Therese Schultes [2,3], Sophie Gendolla [2], Julia Daxenbichler,[1] Irma Klerings [1], Rahel Naef [2,4], Lauren Clack,[2,5] Martin Fangmeyer [1], Isolde Sommer [1]

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For numbered affiliations see end of article.

Correspondence to
Christina Koscher-Kien;
Christina.Kien@donau-uni.ac.at

ABSTRACT

Objectives To synthesise the perspectives of healthcare professionals and patients/residents of hospitals/nursing homes about determinants of inappropriate indwelling urinary catheter (IUC) use and strategies for reduction.

Design Qualitative evidence synthesis.

Data sources We searched MEDLINE, Scopus and CINAHL for studies published between 1 January 2000 and 23 May 2025.

Eligibility criteria Studies were eligible if they used qualitative methods to explore the perceptions and experiences of healthcare professionals and patients/residents of hospitals/nursing homes or their family members regarding the determinants of IUC use and reduction. Included studies focused on behavioural drivers or strategies to reduce inappropriate IUC use.

Data extraction and synthesis Two independent authors reviewed the search results, extracted and coded data, and assessed methodological strengths and limitations of studies. We used a thematic synthesis approach following the Cochrane–Campbell Handbook for Qualitative Evidence Synthesis and applied the Grading of Recommendations Assessment, Development and Evaluation–Confidence in the Evidence from Reviews of Qualitative Research approach to assess confidence in the findings.

Results We synthesised 24 studies. Perceived determinants of inappropriate IUC use included non-adherence to guidelines due to vague indications for initial IUC insertion, differing perspectives on benefits and risks, low priority given to the topic, limited accessibility or perceived unsuitability of alternatives, high nurse workload and staff shortages (moderate confidence). Ineffective nurse–physician communication, documentation difficulties and lack of training were also assumed to be linked to inappropriate IUC use (low confidence). Mentioned strategies for the reduction of inappropriate IUC use included additional training for healthcare professionals, clinician reminders to review or remove catheters, improved electronic documentation systems, increased staffing and greater use of IUC alternatives.

Conclusion Key drivers of inappropriate IUC use are vague indications and routine decisions, lack of suitable and available alternatives, staff shortages and perceived lack of importance of the topic. Addressing these barriers is important for deimplementing inappropriate IUC use, and multifaceted strategies appear to be the most promising approach to address the multiple factors that drive current IUC misuse.

PROSPERO registration number CRD42024531522.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ We followed a thorough methodological approach in synthesising the identified qualitative studies on factors determining the inappropriate use and timely removal of indwelling urinary catheters.
⇒ Besides the perspectives of healthcare professionals, we included studies investigating perspectives of hospital patients and nursing home residents to gain a comprehensive understanding of indwelling urinary catheter use.
⇒ Most of the available evidence stems from hospital settings in English-speaking countries, impacting the confidence in the findings by affecting relevance.
⇒ We limited our search to studies published from 2000 onwards; therefore, some earlier evidence may not have been captured.

BACKGROUND

Indwelling urinary catheters (IUCs) are widely used in healthcare settings,[1] with prevalence rates ranging from 13% among hospitalised patients to 76% in intensive care units.[2 3] Older patients are slightly more likely to receive catheters than younger patients (20.8% vs 17.5%, p<0.001),[3] while nursing home residents have a median IUC prevalence of 7.3%.[4]

Overuse and prolonged placement pose significant risks to patient safety. A major concern is catheter-associated urinary tract infections (CAUTIs), which account for

70–80% of healthcare-associated urinary tract infections.[5] CAUTIs are associated with increased morbidity, antimicrobial resistance, prolonged hospital stays, higher healthcare costs and, in severe cases, sepsis and mortality.[6] For patients, non-infectious complications such as pain, discomfort and restrictions in daily activities are equally concerning.[7]

IUCs are, according to the European Association of Urology Nurses, indicated only in case of acute retention, voiding difficulties, measurement of urinary output in critically ill patients, in selected perioperative and postoperative surgeries, healing of open sacral or perineal wounds in incontinent patients, prolonged immobilisation and treatment of critically ill patients.[8] Despite clinical guidelines addressing appropriate IUC use and timely removal,[9 10] non-indicated IUC use remains prevalent, with studies showing rates between 32.4% and 52.8% in Dutch and Taiwanese older patients[11 12] and between 54% and 66% in hospitalised Japanese adult patients.[2 13] Determinants (ie, factors that influence a practice or its implementation)[14] of inappropriate IUC use are manifold. Determinants related to IUC placement include, for example, a lack of knowledge about alternatives or ease of monitoring patients' urine output, while those influencing IUC removal involve issues such as poor documentation or ineffective communication between healthcare professionals. These factors arise within organisational contexts shaped by the attitudes and behaviours of healthcare providers, patients or residents and family members.[9]

To enhance the safety and quality of treatment and to ensure an evidence-based practice, particularly for older patients or residents, developing and improving initiatives to reduce non-indicated IUC use is essential. By gaining a better understanding of determinants contributing to inappropriate IUC use and its delayed discontinuation, deimplementation strategies to reduce inappropriate IUC use can be more effectively tailored and implemented.[15 16] This can be achieved via a qualitative evidence synthesis of the published qualitative literature. While other qualitative or mixed-methods evidence syntheses have examined related topics, such as female incontinence products[17] or healthcare providers' perspectives on CAUTI determinants,[18 19] to our knowledge, no qualitative evidence synthesis has yet addressed the full spectrum of determinants of inappropriate IUC use and deimplementation strategies to inform evidence-based practice in this area.

The investigation of determinants and actual strategies for implementing or deimplementing a practice is best guided by implementation science frameworks or taxonomies. Implementation or deimplementation strategies encompass methods used to facilitate implementation or deimplementation of clinical practices.[20 21] Implementation science frameworks can help to conceptualise the findings of relevant determinants in a structured and systematic way, enabling comparisons with other studies. The Consolidated Framework for Implementation Research (CFIR) is an established framework permitting the systematic assessment of factors influencing the implementation of interventions within complex healthcare settings.[22 23] It contains 48 distinct constructs and 19 subconstructs grouped into five domains: *Innovation/intervention* (characteristics of the intervention affecting adoption), *outer setting* (external influences like policies and community needs), *inner setting* (the setting in which the intervention/innovation is implemented), *roles and characteristics of the individuals* (roles and characteristics of people affected by the intervention) and *implementation process* (activities and strategies used to implement and sustain the innovation; see https://cfirguide.org/constructs/). The Expert Recommendations for Implementing Change (ERIC)[20 21 24] is a taxonomy to categorise implementation strategies. It includes 73 distinct strategies organised into nine thematic clusters such as *Train and Educate Stakeholders*, *Use Evaluative and Iterative Strategies and Support Clinicians*. It is complementary to CFIR in that it provides a more detailed compilation of strategies used to implement the intervention than the CFIR *implementation process* domain. Applying CFIR and ERIC provides a comprehensive and evidence-based foundation for studying implementation processes.[25]

Using CFIR and ERIC as guiding framework and taxonomy, we aimed to synthesise qualitative literature examining determinants of inappropriate IUC use as perceived by healthcare providers, managers, patients, long-term care residents and family members. Furthermore, we aimed to identify strategies suggested in the included literature to address inappropriate IUC use.

METHODS

We conducted a qualitative evidence synthesis following the Cochrane-Campbell Handbook for Qualitative Evidence Synthesis, and applied a thematic synthesis approach.[26 27] Our protocol was registered a priori on PROSPERO (CRD42024531522), and we adhered to the Enhancing transparency in reporting the synthesis of qualitative research statement for reporting the findings of this qualitative evidence synthesis (online supplemental file 1).[28]

Eligibility criteria

We included studies published from the year 2000 onwards reporting perceptions about determinants of IUC use and IUC reduction or suggesting implementation strategies to address these determinants in hospitals and nursing homes. We focused on studies using qualitative methods for both data collection and analysis, with no restrictions on context or language. The list of full eligibility criteria can be found in eTable1 online supplemental file 2.

Information sources and literature search

An information specialist conducted a comprehensive search for this review and a related systematic review on IUC reduction interventions (CRD42024521830). We

applied an iterative search process based on the tailored approach of Cooper *et al*.[29] Searches were conducted in MEDLINE, Scopus and CINAHL for studies published between 1 January 2000 and 11 March 2024 with an update search on 23 May 2025, using a combination of free text and controlled vocabulary (eg, Medical Subject Headings (MeSH)) without restrictions on language or study design. Another team member proofread the used keywords and MeSH terms. We conducted supplementary searches in May 2024, including reference list screening, expert consultations and citation-based searches, along with similar article searches. All search strategies are documented in online supplemental file 2 (eTable2, eTable3, eTable4, eTable5, eTable6, eTable7 and eTable8).

Literature selection

We developed abstract and full-text screening forms based on our eligibility criteria and piloted these forms with 50 abstracts and five full texts. Two independent reviewers screened abstracts and full texts against eligibility criteria using DistillerSR (DistillerSR. V.2.35.). Conflicts were resolved through discussion or by consulting a third reviewer. We assessed eligible studies for data richness[30] and sampled those with sufficient relevant data.

Assessment of methodological limitations

Two reviewers independently assessed the methodological strengths and limitations of each study using the beta version of the CochrAne qualitative MEthodological LimitatiOns Tool.[31] This tool categorises studies based on their methodological strengths and limitations across 12 domains based on having (1) no or minimal concerns, (2) minor concerns, (3) moderate concerns or (4) serious concerns. We resolved disagreements through discussion or consultation with a third reviewer. We piloted its application with five included studies to ensure consistency across reviewers. We did not exclude studies based on their methodological limitations.

Data extraction, data analysis and synthesis

We extracted key study characteristics (eg, author, country, setting) into a spreadsheet and conducted a thematic synthesis following three steps[27]: (1) line-by-line coding, (2) developing descriptive themes and (3) mapping themes to frameworks. We mapped determinants to the updated CFIR[22 23] and strategies to the ERIC compilation[20] and its amendments.[21 24] Sampled studies were included as PDF files in MAXQDA 2024.[32]

Line-by-line coding

For eligible and sampled papers, four authors were involved in inductively coding the participant data extracts, the study results sections and the interpretations of these data by the study authors. We focused on data related to determinants of using or reducing IUC use and strategies to reduce the IUC use, as suggested by study participants or authors.

We also extracted information on mechanisms reported in the included studies to better understand the underlying processes through which implementation strategies produce change—that is, how and why specific outcomes occur.[33 34] Therefore, we additionally extracted information on the specific expected outcomes (ie, changes in determinants) and the reasoning provided about why particular strategies were likely to be effective. Following a pilot test with three selected top-tier papers, our team convened to discuss the coding categories and make necessary adjustments, as warranted. Data extraction and coding were carried out by one reviewer, while a second reviewer checked the extractions and coding for completeness and accuracy.

Developing descriptive themes

After coding all the data, four authors discussed the coding and developed a first collection of descriptive themes related to determinants using a mind map. Afterwards, one author started grouping the codes into descriptive themes and checking that the codes were homogenous and coherent within their respective themes. Further refinements were then discussed within the team.

Mapping descriptive themes to frameworks

In this last synthesis step, we mapped the developed themes to corresponding subdomains of the updated CFIR framework.[23] To avoid splitting the identified descriptive themes, we sometimes allocated one theme to two CFIR domains. Because we did not identify relevant differences, we collapsed the determinants regarding the insertion and removal of IUCs; however, we highlighted in the results' descriptions whether one determinant was more relevant to the insertion or removal phase. Mentioned strategies applied to reducing (the length of) IUC use were mapped solely onto the ERIC compilation.[20 21 24] These mapping activities were checked by a second person. At this stage, the identified mechanisms were also discussed within the team of reviewers.

Grading certainty of evidence

One reviewer used the Grading of Recommendations Assessment, Development and Evaluation–Confidence in the Evidence from Reviews of Qualitative research (GRADE–CERQual) approach to assess our confidence in each finding related to the determinants of IUC use and removal.[35] This assessment evaluated methodological limitations, coherence, data adequacy and relevance of included studies, with final assessments based on reviewer consensus (online supplemental file 2, eTable 12). A second reviewer verified this assessment. We did not develop any findings related to the suggested strategies but rather identified and mapped them onto the ERIC compilation.[20 21 24] Hence, we felt that the GRADE–CERQual approach to assess our confidence in findings was not appropriate.

Changes to the protocol

During the development of the search strategy, we broadened the inclusion criteria to encompass all adult patients, as only a limited number of studies focused exclusively on

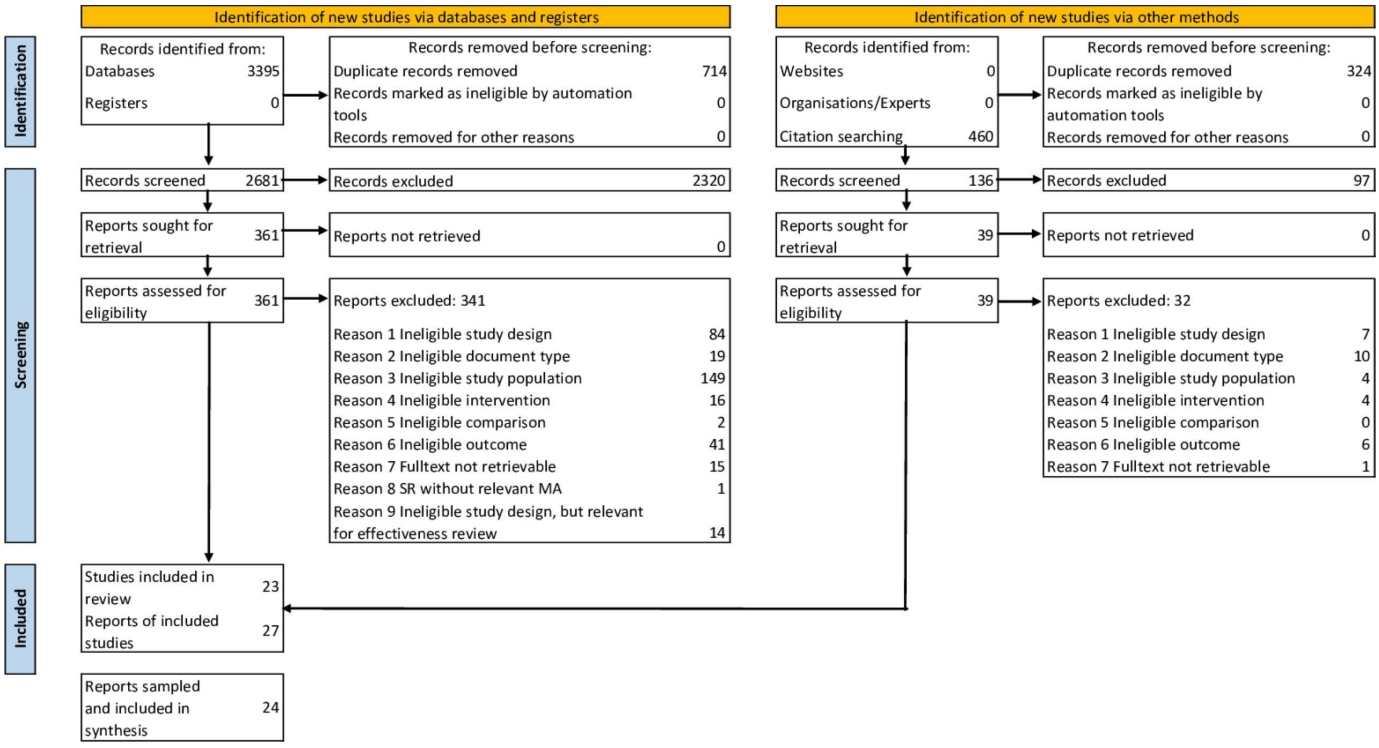

Figure 1 PRISMA flowchart of searching and selecting literature. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; MA, meta-analysis; SR, systematic review.

the originally planned population group (adults over 65 years old).

RESULTS

Search results

We identified 3395 studies via database searches and 460 additional studies through other sources. After deduplication, we screened 2817 abstracts and titles and 400 full texts against our predefined eligibility criteria. After screening, we included 27 studies,[36–62] with three studies reporting results in two separate articles (ie, companion studies).[38 39 42 56 58 59] Three studies were rated as 'thin', including very little relevant data, and therefore not sampled for analysis.[44 50 62] Figure 1 displays the flow of included studies and excluded studies with reasons listed in online supplemental file 2.

Characteristics of included studies

Most included studies were from English-speaking countries—with 17 from the USA, five from the UK, two from Australia and one from Canada—and one study each from Denmark and China published between 2012 and 2025 (table 1). Two studies focused on nursing homes,[53 54] while the remaining studies examined hospital settings. 13 studies collected data from single organisations, while 13 included three or more organisations; 1 study did not report this information. Nurses and physicians were interviewed in 13 studies, healthcare managers in 1, a combination of healthcare providers and managers appeared in 6 studies and patients in 3.[37 48 50] Most studies used semistructured interviews or focus groups; one study employed field observations in combination with semistructured interviews,[49] and two studies comprised case note reviews alongside interviews.[46 55] The number of qualitative interview participants ranged from 5 to 449.

Patient age was not reported in 19 studies, including both studies conducted in long-term care facilities. Among the remaining studies, the mean patient age was ≥60 years, with three studies explicitly focusing on patients aged ≥65 years.[55 58 59] The assessment of methodological limitations revealed that two studies had no or very minor limitations, seven had minor limitations, nine had moderate limitations and six had serious limitations. The identified limitations included an unclear relationship between researchers and participants, particularly when researchers were affiliated with the same hospital, which potentially influenced the data collection process. Additionally, some studies lacked detailed information on data collection methods (eg, potential sampling bias) and provided insufficient transparency regarding data analysis procedures. Further details regarding study context, interventions, methodologies and interview participants are provided in online supplemental file 2 (eTable 9, eTable 10 and eTable 11).

Perceived determinants of catheter placement and removal

Review findings are structured into themes according to CFIR domains[23] (figure 2) and are further presented in the summary of qualitative findings (online supplemental file 2, eTable 12) and exemplary citations are provided in table 2. We identified 10 findings: 2 related to the CFIR

Table 1 Characteristics of included studies

First author METHODOLOGICAL LIMITATIONS (companion studies)	Study aim	Country, setting	Group of interview partners (n)	Age of patients receiving urinary tract catheters
Backman *et al*[36] MODERATE	Evaluate an intervention to reduce unnecessary UC use and prevent CAUTI.	Canada: 1 large academic health science centre, 4 inpatient wards	HCPs and HCMs (n=18)	Preintervention and postintervention group: Mean: 64, SD: 17
Bhardwaj *et al*[37] SERIOUS	1. Explore patients' perceptions of the care process relating to perioperative catheterisation. 2. Identify patient factors that encourage early removal.	UK: 1 large regional hospital, 1 single neurosurgical ward	Patients (n=10)	NR
Carter *et al*[39] MINOR	1. Better understand CAUTI prevention efforts. 2. Investigate programme motivations, perceived CAUTI risk factors and strategies to address CAUTI risk.	USA: 6 EDs, 1 ward at each	HCPs and HCMs (n=102)	NR
Carter *et al*[38] MINOR	Explore the actions of nurse leaders that facilitated active involvement of clinical nurses in CAUTI prevention programmes.	USA: 6 EDs, 1 ward at each	HCPs and HCMs (n=102)	NR
Chrouser *et al*[62] NA	Develop an algorithm for screening and management of UR among adult inpatients.	USA: 5 hospitals, wards: NA	HCPs (n=33)	NR
Conner *et al*[40] SERIOUS	Identify factors associated with RN adoption of an EBP to reduce the duration of IUCs in hospitalised adults.	USA: 1 acute care hospital, 2 telemetry units	HCPs (n=11)	NR
Cowey *et al*[55] MODERATE	Determine what influences the decision to insert an IUC in patients who had an acute stroke.	UK: 3 teaching hospitals, acute stroke unit or medical receiving units at each site	HCPs (n=50)	Mean: 74.5, SD: 15.3
DePuccio *et al*[41] MINOR	Examine barriers to and facilitators of UCNDP implementation and use.	USA: 17 hospitals, wards: NR	HCPs and HCMs (n=449)	NR
Harrod *et al*[56] NO OR VERY MINOR (Krein *et al*[42])	1. Examine an initiative to prevent CAUTI. 2. Better understand how healthcare providers' perceptions of risk influenced their use of prevention practices and impacted patient care decisions.	USA: 12 hospitals in Michigan involved in the Bladder Bundle, wards: NR	HCPs (n=38)	NR

Continued

Table 1 Continued

First author METHODOLOGICAL LIMITATIONS (companion studies)	Study aim	Country, setting	Group of interview partners (n)	Age of patients receiving urinary tract catheters
Jones *et al*[53] MODERATE	Assess IPC resources and practices related to CAUTI and other UTI prevention among nursing homes.	USA: nursing homes, wards: NA	HCPs and HCMs (n=13)	NR
Krein *et al*[42] NO OR VERY MINOR (Harrod *et al*[56])	Examine key challenges of implementing the Keystone Bladder Bundle from the perspective of participating hospitals.	USA: 12 hospitals in Michigan, wards: NR	HCPs (n=38)	NR
Krein *et al*[54] MODERATE	Understand implementation successes, challenges and experiences of participants involved in a CAUTI prevention programme.	USA: nursing homes in different US states, wards: NA	HCMs (n=16)	NR
Manojlovich *et al*[43] MINOR (Quinn *et al*[49])	1. Characterise communication-related barriers between physicians and nurses. 2. Understand how these barriers affect appropriate use and/or removal of IUC and vascular catheters.	USA: 1 large academic medical centre, single progressive care unit	HCPs (n=19)	NR
Mitchell *et al*[44] SERIOUS	Determine the effectiveness and ease of use of an electronic reminder device for reducing urinary catheterisation duration.	AUT: 1 large principal referral hospital; medical and surgical wards and intensive care unit	HCPs (n=5)	Intervention phase: Median 63, IQR: 49.73 Control phase: Median 66, IQR: 54.75
Mizerek and Wolf*[57] NA	Obtain information about individual and environmental factors that affect clinical decision-making regarding UC placement and maintenance.	USA: tertiary care/academic teaching hospitals, community hospitals, freestanding or satellite EDs, wards: NR	HCPs (n=23)	NR
Mulcare *et al*[45] MODERATE	1. Explore provider knowledge, attitudes and practice patterns surrounding the use of IUCs in older adult patients. 2. Better guide the development of a clinical protocol.	USA: 1 large urban academic medical centre, ED	HCPs (n=38)	NR
Murphy *et al*[46] MODERATE	Explore why clinicians decide to place IUCs in acute medical care.	UK: 1 hospital within NHS; ED, medical assessment unit, cardiology wards and older people's acute medicine wards	HCPs (n=30)	All patients aged over 60, except two women, one in her 20s and one in her 50s

Continued

Table 1 Continued

First author METHODOLOGICAL LIMITATIONS (companion studies)	Study aim	Country, setting	Group of interview partners (n)	Age of patients receiving urinary tract catheters
Nollen *et al*[61] MODERATE	Explore health professionals' perspectives on IDUC management following pituitary surgery.	Denmark: 1 hospital, 1 neurosurgical ward	HCPs (n=15)	NR
Parker *et al*[47] MODERATE	Provide insights into the experiences of clinicians implementing multifaceted bundled UC care intervention.	AUT: 1 acute care hospital, all adult inpatient wards, EDs and operation theatres	HCPs (n=35)	NR
Percival *et al*[59] MINOR (Percival *et al*[58])	Identify factors that help or hinder good continence care for patients aged 65 years and over.	UK: 2 large teaching hospitals and 1 smaller non-teaching centre, acute inpatient wards (mostly, though not exclusively, for care of the elderly)	HCPs (n=27)	Patients aged 65 and over
Percival *et al*[58] MINOR (Percival *et al*[59])	Explore practitioners' experiences and perspectives on continence training to understand its relevance to practice and how take-up of and engagement with such training may be improved.	UK: 2 large teaching hospitals and 1 smaller non-teaching centre, acute inpatient wards (mostly, though not exclusively, for care of the elderly)	HCPs (n=27)	Patients aged 65 and over
Quast *et al*[48] SERIOUS (Safdar *et al*[50])	Uncover themes related to UC use and CAUTI in inpatients.	USA: University of Wisconsin hospital, wards: NR	Patients (n=30)	53%>60
Quinn *et al*[49] MINOR (Manojlovich *et al*[43])	Identify common barriers to timely and appropriate catheter removal, with the goal of developing potential interventions.	USA: 1 large academically affiliated tertiary care hospital, 1 unit providing intermediate or progressive care for various patients	HCPs (n=19)	NR
Safdar *et al**[50] (Quast *et al*[48]) NA	Assess patient perspectives of IUC.	USA: University of Wisconsin Hospital, ward: NR	Patients (n=20)	Mean: 59.6, SD: NR
Saint *et al*[51] MODERATE	Understand better how US hospitals approach the prevention of hospital-acquired UTIs.	USA: 14 hospitals (veteran and non-veteran affairs); various departments	HCPs and HCMs (n=77)	NR
Scott *et al*[52] SERIOUS	Evaluate the effectiveness of implementing multidisciplinary education and deploying utilisation tools aimed at reducing the inappropriate insertion of IUCs.	USA: University of Colorado Hospital, 1 ED	HCPs (n=25–35)	NR

Continued

Table 1 Continued

First author METHODOLOGICAL LIMITATIONS (companion studies)	Study aim	Country, setting	Group of interview partners (n)	Age of patients receiving urinary tract catheters
Wu *et al*[60] SERIOUS	Explore the facilitators of and barriers to early catheter removal in postoperative patients by spine surgery nurses.	China: 1 hospital, 1 ward	HCPs (n=18)	NR

*Studies have not been sampled, and methodological strengths and limitations have not been assessed.
CAUTI, catheter-associated urinary tract infection; EBP, evidence-based practice; ED, Emergency department; HCMs, healthcare managers; HCPs, healthcare professionals; IDUC, indwelling urinary catheter; IPC, infection prevention and control; IUC, indwelling urinary catheter; NA, not applicable; NHS, National Health Service; NR, not reported; RN, registered nurses; UC, urinary catheter; UCNDP, urinary catheter nurse-driven protocol; UR, urinary retention; UTI, urinary tract infection.

domain *intervention*, 7 to the *inner setting* and 1 to the *outer setting*.

Intervention characteristics domain

The intervention, 'the thing' being implemented, relates to protocols guiding the appropriate use of IUCs in our qualitative evidence synthesis. When describing the results, we used healthcare professionals (HCPs) to refer to physicians and nurses, specifying other professions when involved.

Vague indications of initial catheter insertion and routine decisions hampered adherence to guidelines/protocols (Finding 1 (F1), moderate confidence)

HCPs reported that available guidelines or protocols directed IUC decisions, including indications such as relieving urinary retention, preventing or treating moisture lesions or incontinence-associated dermatitis and monitoring urine output. Although guidelines existed, HCPs mentioned that reasons for non-adherence included clinical judgement on IUC use (ie, combining two or more indications with additional plausible arguments for IUC insertion, such as fostering patient comfort), routine decisions as the standard practice (eg, IUC for fluid balance measurement as part of a routine patient assessment)[36 38 45 46 49 52 55–57 60 61] and non-indicated IUC use as part of a bundle of care, for example, for the management of sepsis or trauma patients.[46] Furthermore, HCPs highlighted that indications for IUC placement must be tailored to specific patient characteristics or certain diseases,[56] and IUC indications were therefore open to interpretation.[45 52 55] In only one study did HCPs state that protocols were clear enough to follow.[36] Furthermore, regarding the timely removal of IUCs, there was a lack of awareness and agreement regarding standard removal protocols regulating timing and indications for IUCs.[49 60 61] Details regarding the CERQual Assessment can be found in online supplemental material 2 (eTable12).

Different perspectives on benefits and risks associated with IUC use were important for IUC use decision (F2, moderate confidence)

Besides indications, HCPs and patients weighed the positive and negative consequences when deciding on IUC use, focusing on patient safety and dignity.[36 37 42 45 46 48 51 52 55 56 59–61] Safety concerns included the potential for falls among frail patients when an IUC was not inserted and patients needed to visit a toilet versus the risk of inducing agitation and catheter-related injury associated with IUC use.[42 45 52 56] Further safety concerns relate to the risk of missing a postoperative complication or the risk of reinsertion when a catheter is removed too early following surgery.[60 61] Few HCPs in the included studies perceived IUC use as an unacceptable infection risk, with CAUTI risks often being underestimated because infections develop after the patient has left care.[36 42 55 56] Consequently, nurses suggested emphasising other points in HCP team discussions, including

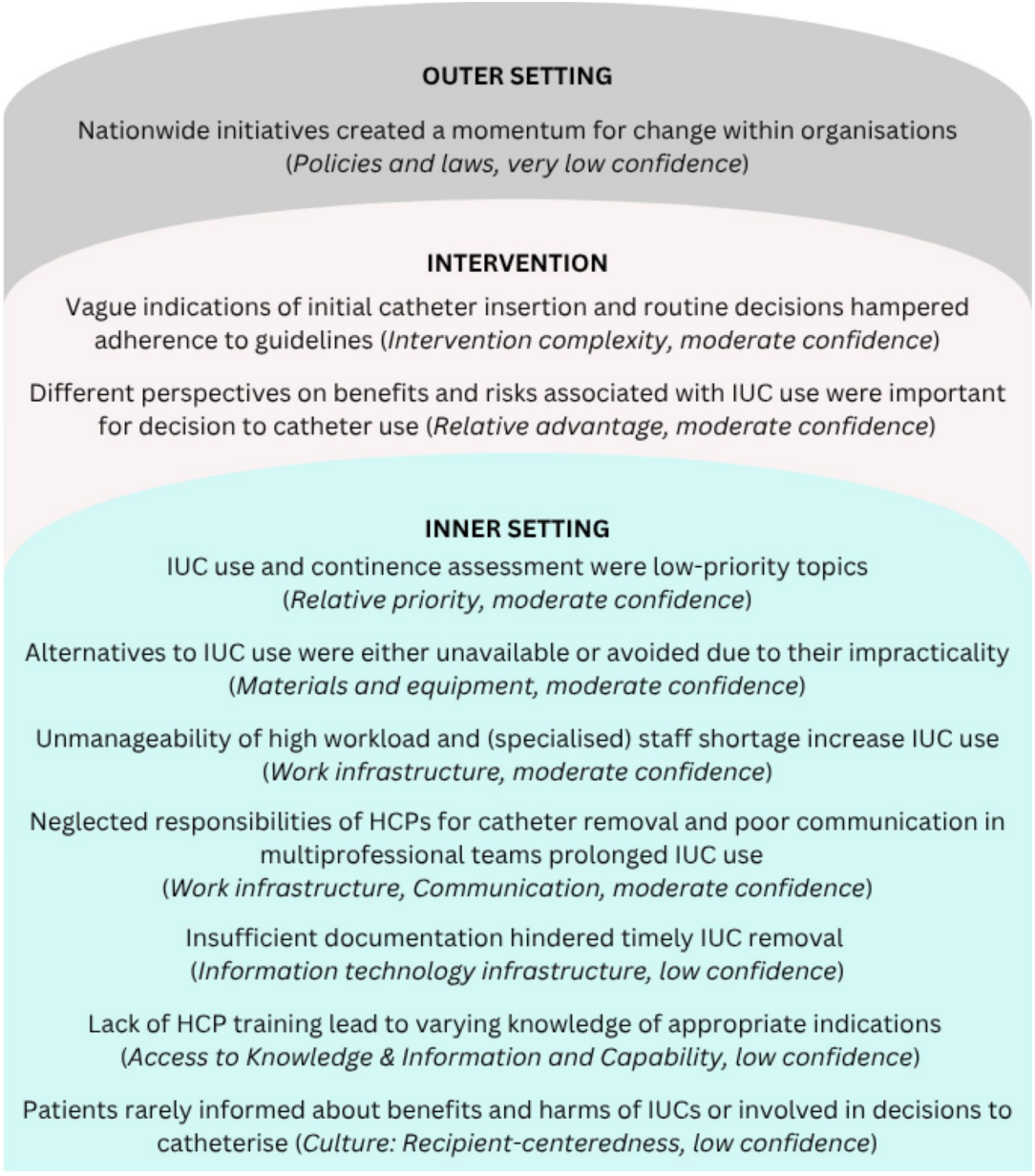

Figure 2 Overview of findings mapped onto CFIR. CFIR, Consolidated Framework for Implementation Research; HCP, healthcare professional; IUC, indwelling urinary catheter.

the benefits of increased patient mobility and shorter hospital stays when IUC use is reduced.[42 51] The latter argument was also cited by patients.[37]

HCPs perceived positive associations with IUC use, such as limiting patient embarrassment, discomfort and loss of dignity due to potential urinary leakage.[36 40 46] From a patient perspective, incontinence—regardless of the strategy used to treat it (eg, catheter, urinary pads)—can lead to a general feeling of loss of dignity.[37 59]

Inner setting domain

We identified nine findings related to the setting in which the intervention was implemented. These findings were mapped to CFIR infrastructure aspects such as *organisation of tasks and responsibilities* and *communication practices*. Additionally, they address the *cultural context* of the setting (ie, shared values, beliefs and norms). Specific to the planned intervention, the findings also highlight factors such as *relative priority*, *access to knowledge and information* and *availability of materials and equipment*.

IUC use and continence assessment were low-priority topics (F3, moderate confidence)

Several HCPs noted that IUC use was often considered to be of low priority due to perceived lower relevance compared with other patient safety concerns.[51 52 55 56 60] Timely removal could be overshadowed by competing tasks or complex patient conditions.[36 49] In general, this perception is supported by the lack of systematic monitoring of catheter use and the absence of its discussion in routine nursing handoffs.[55] The topic typically only becomes relevant when a patient exhibits signs of

Table 2 Title of findings and quotes

Title of review findings		Quote (role), citation, CS
F1	Vague indications of initial catheter insertion and routine decisions hampered adherence to guidelines/protocols	'I think that the issue is that a lot of these indications are very, very soft. You can make soft indications for a lot of convenience-type interventions'. (Physician)[45] CS:[36 38 39 45 46 49 52 55–57 60 61]
F2	Different perspectives on benefits and risks associated with IUC use were important for IUC use decision	'Well do I really want this person hopping out of bed, and can I really be sure that they're going to call me to help them?' (Infection preventionist, hospital 5)[56] 'In my experience goes [sic], you save a lot of clinical time, dignity, and potential other risks beyond just a UTI by just putting the catheter in'. (Nurse)[36] CS:[36 37 42 45 46 48 51 52 55 56 59–61]
F3	IUC use and continence assessment were low-priority topics	'I would say there's a general perception in the field that urinary tract infections don't cause a lot of morbidity and mortality compared to the quote, sexy topic such as blood stream infection or surgical site infection or VAP (ventilator-associated pneumonia)'. (Infection control practitioner)[51] CS:[36 49 51 52 55 56 58–60]
F4	Alternatives to IUC use were either unavailable or avoided due to impracticality	'We don't get full pads down here. We did get them once, but we used too many of them, so that's a bit of a problem'. (ED nurse).[46] CS:[37–39 45–47 52 60 61]
F5	Unmanageability of high workload and (specialised) staff shortage increases IUC use	'Sometimes we've had people, usually elderly, with incontinence urinate on the bed several times, and the nurses [say], 'We don't have time or the resources and [sic] keep doing that, can we just put in a Foley [IUC]?" (Medical resident)[45] CS:[36–39 42 45 49 51–53 56 58–61]
F6	Neglected responsibilities of HCPs for IUC removal and poor communication in multiprofessional teams prolonged IUC use	'I have to be honest I still think a lot of our nurses—we still check with our provider…I do think they need a little encouragement sometimes. I don't think we are perfect yet'. (Assistant nurse manager)[41] 'We will just pre-emptively say, oh, the patient doesn't need a Foley, get the Foley out. That happens frequently and, usually, that order is obeyed—but sometimes it's not and there's a reason and it didn't get communicated, and that creates a problem.' (Physician assistant)[43] CS:[36 38 39 41 43 47 55 57 60]
F7	Insufficient documentation hindered timely IUC removal	'You have to learn how to find that information, and that's another barrier to getting that information you need to actually make the [clinical] decision'. (Physician)[49] CS:[36 43 49 56 58]
F8	Lack of HCP training leads to varying knowledge of appropriate indications	'I just hired an Assistant Director of Nursing, so she's gonna be taking over my infection control. So, I anticipate it to be, being way better because it'll be one person doing it vs, I'm the DON [Director of Nursing] doing infection control. Infection control is a huge job, so we are not 100% proficient and always up to date on everything, because I just can't put the time in that needs to happen'. (DON)[53] CS:[47 53–55 57]
F9	Patients rarely informed about benefits and harms of IUCs or involved in decisions to catheterise	'If they said 'right, we're putting this catheter in to relieve you, but it might give you an infection', then straight away it rings alarm bells and makes you think…is the pain that bad that I can't get out of bed and use that bottle without getting an infection?' (Male patient, age 65)[37] CS:[36 37 42 48 55 57 60 61]
F10	Nationwide initiatives created momentum for change within organisations	'Eventually, there's going to be reimbursement considerations because reimbursement is (going to) be tied to the number of hospital-acquired infections and we think that infections from Foley catheters is going to be high on the list'. (Attending and resident physician)[45] CS:[45 51 59]

CS, contributing studies; ED, emergency department; HCP, healthcare professional; IUC, indwelling urinary catheter; UTI, urinary tract infection.

infection.[49] HCPs noted that a lack of systematic monitoring of catheter use and insufficiently planned continence care results in neglecting alternative strategies, such as pelvic floor muscle training or toilet training.[55 58 59]

In some studies, however, HCPs emphasised the importance of patient-centred care that takes patient incontinence seriously and enables patients to regain autonomy.[58 59] In another study, a few HCPs emphasised the importance of removing IUCs as early as possible to reduce patient discomfort and length of stay.[51]

Alternatives to IUC use were either unavailable or avoided due to impracticality (F4, moderate confidence)

HCPs saw the appropriateness of IUC use as problematic due to the limited availability of options such as bedpans, urinals, bladder scanners for assessing urinary retention or other incontinence management products.[45–47 60 61] Both patients and HCPs noted that the lack of easily accessible toilets without nursing assistance delayed IUC removal.[37 52] Some HCPs also found alternatives impractical, citing the increased nursing time required for tasks such as emptying urinals and managing spills or conducting accurate fluid balance monitoring.[45 52 56 60 61] However, in one study, HCPs mentioned the successful reduction of IUC use after training in bladder ultrasound technique and increased use of alternatives when applying reminders to use cups in urine specimen collection.[38]

Unmanageability of high workload and (specialised) staff shortage increases IUC use (F5, moderate confidence)

HCPs reported that the ability to manage high nursing workloads and staff shortages can also influence IUC use, which is in some studies also framed as 'enhancing convenience' for nursing and physician staff.[38 42 45 49 51 52 56 59–61] This high workload of nurses was also perceived by patients who agreed to use IUCs or incontinence pads to ease the workload for nurses.[37 59] HCPs mentioned that the placement of IUCs in emergency departments (EDs) at hospitals is further influenced by the expectation of enhancing the 'convenience' for nurses in other wards.[42] Nurses and physicians also elaborated that IUC use could be prolonged to reduce nursing workload. This situation may be exacerbated in very challenging environments, such as EDs or wards with bedbound patients.[45 59]

HCPs and managers also highlighted that a lack of nursing aides to assist patients with toileting, as well as a shortage of qualified urology nurses or continence care consultants in hospitals, can contribute to non-indicated practices.[42 53 58] However, joining forces with physiotherapy was seen as a potential facilitator for mobilising patients to autonomously visit the toilet, thereby reducing IUC use.[36]

Neglected responsibilities of HCPs for catheter removal and poor communication in multiprofessional teams prolonged IUC use (F6, moderate confidence)

While protocols outline responsibilities for IUC placement and removal, HCPs stated that practice often deviated from these guidelines.[38 43 55] Changes granting nurses increased responsibilities and enabling them to conduct catheter removal without physician order brought both opportunities and challenges. Some studies have demonstrated the successful empowerment of nurses on implementation of nurse-led catheter removal protocols that enabled them to advocate for appropriate catheter use and emphasise timely removal, while other nurses were still seeking physician orders.[36 39 41 47 57]

Given the division of tasks and responsibilities, effective communication between nurses and physicians was deemed essential for the timely removal of IUCs.[41 43 45 47 49 60] HCPs mentioned that although direct communication and interprofessional discussions about the requirements of IUCs are essential, nurses are not able to join physicians during morning rounds due to other pressing patient care activities. Therefore, information about the necessity of catheter use is entered into electronic medical records (EMRs), which disrupts focus or leads to misunderstandings.[43 47 49] The use of a variety of communication channels and different preferences for communication adds complexity. HCPs further highlighted that communication barriers can stem from hierarchical structures and strained social relationships, which generally require nurses to follow physicians' orders unless patient safety is at risk. Both nurses and physicians acknowledged that hierarchical dynamics hindered the articulation of concerns about appropriate IUC use.[41 43 45 49]

Insufficient documentation hindered timely IUC removal (F7, low confidence)

In five of the included studies, HCPs mentioned issues related to documentation,[36 43 49 56 58] which can hinder the timely removal of IUCs. First, HCPs noted that information such as the date of insertion, date of planned removal and the indication for IUC use was occasionally absent or not updated.[49 56 58] This can result in HCPs developing a lack of trust in the information.[49] Second, HCPs reported challenges with documentation usability, whether in an EMR or on paper. These challenges included the time-consuming nature of the documentation process, complexity of forms and the difficulty of locating specific information in documentation systems.[36 43] These issues were further exacerbated when EMR and paper documentation methods were used concurrently.[43] Third, the concealment of catheters under blankets further complicated matters, as physicians had no visual reminder that an IUC was present.[49]

Lack of HCP training leads to varying knowledge of appropriate indications (F8, low confidence)

HCPs emphasised the importance of training to address gaps in knowledge about continence management and infection prevention.[53 55] HCPs identified barriers to training, such as nurse educators and infection preventionists being overburdened with organising sessions and staff struggling to attend due to insufficient time or

resources,[47 53 54 57] as well as varying competence due to training quality.[57]

Patients rarely informed about the benefits and harms of IUCs or involved in decisions to catheterise (F9, low confidence)

Patients highlighted the importance of informed decision-making to balance risks, autonomy and comfort.[37 48] Surgical patients receiving a catheter under anaesthesia reported feeling a loss of dignity[37] and also felt insufficiently informed about the benefits and harms of IUC use.[37 48] HCPs confirmed that patients are rarely involved in catheterisation decisions[36 55 61] but suggested that education could sometimes (but not in all instances) reduce unnecessary requests from patients or family members.[42 57 60]

Outer setting domain

The outer setting domain describes the setting in which the inner setting exists. The identified findings can be mapped to CFIR subdomain *policies and laws* (figure 2).

Nationwide initiatives created momentum for change within organisations (F10, very low confidence)

HCPs mentioned that organisational change could be driven by nationwide protocols and quality-improvement initiatives to reduce CAUTI or improve incontinence care,[59] offering further incentives for healthcare improvement activities (ie, mitigating reduced reimbursement rates for catheter-associated infections for the hospitals)[45] and monitoring and public reporting on CAUTI.[51] HCPs reported that industry involvement focused on specific types of catheters or incontinence products[51 58] but lacked guidance on broader CAUTI prevention and incontinence management.

Mentioned strategies for reducing (length of) IUC use

Overall, HCPs, healthcare managers and study authors suggested several strategies for reducing IUC use or length of IUC use. Based on the mechanisms of change described in the included studies, the mentioned strategies were linked to determinants of IUC use (figure 3). To recap, mechanisms are defined as the processes through which a strategy is intended to operate.[33 34]

Strategies categorised under the ERIC clusters *Train and Educate Stakeholders*, *Support Clinicians* and *Change Infrastructure (and Workflow)* were most prominent. Providing *training* to nurses and physicians included a variety of topics, such as redesigned tasks and responsibilities for IUC placement and timely removal, adequate indications and continence management. HCPs, HC managers and study authors suggested training as a relevant strategy to tackle varying levels of knowledge across HCPs, to initiate a process to reevaluate the benefits and risks of IUC use and to clarify vague indications and routine decisions.[36 39–41 46 47 49 54 58–61] These training sessions can be supported by strategies mentioned in the *Support Clinicians* cluster and include posters that clearly illustrate

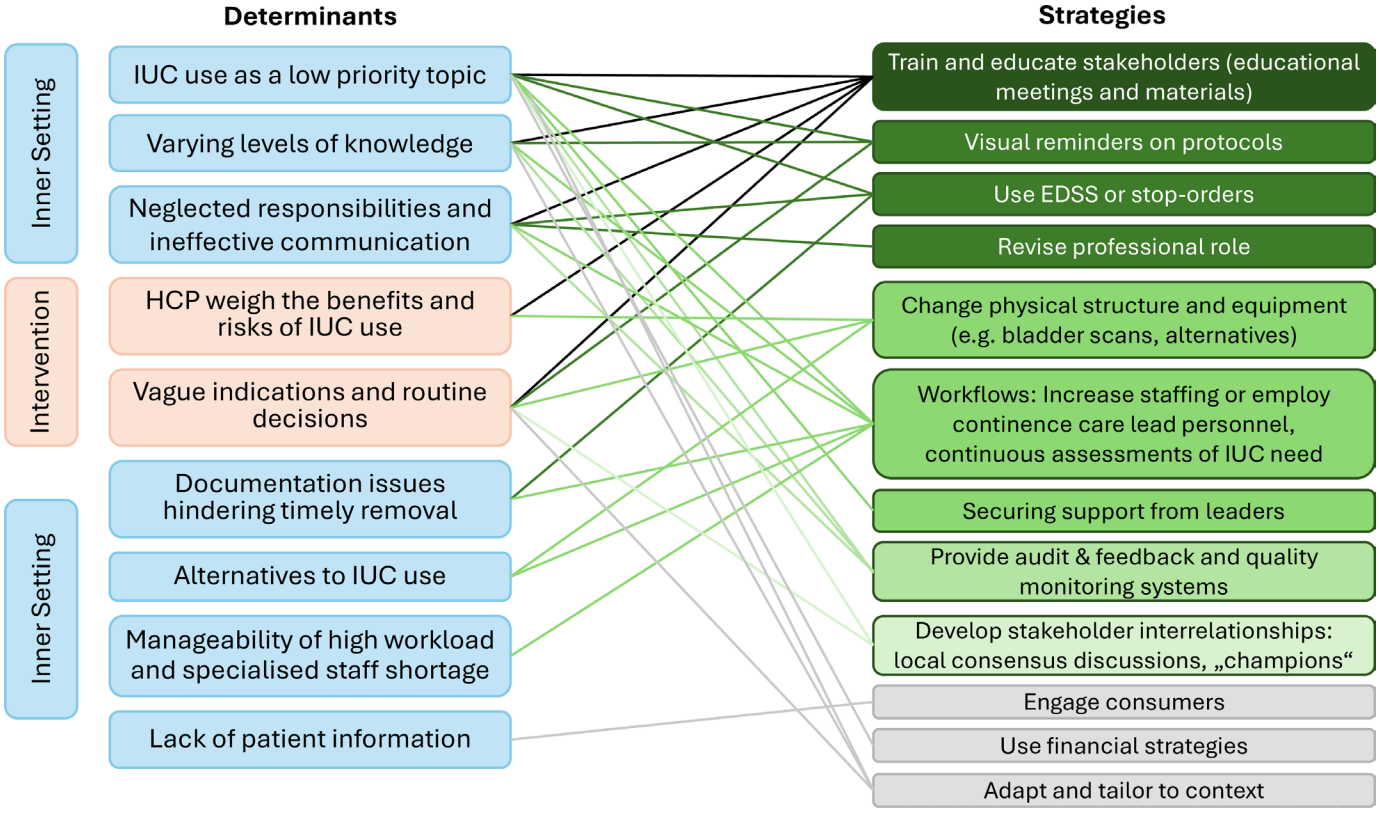

Figure 3 Mentioned strategies for reduction of IUC use grouped according to the ERIC cluster of strategies. EDSS, electronic decision support systems; ERIC, Expert Recommendations for Implementing Change; HCP, healthcare professional; IUC, indwelling urinary catheter.

the catheter protocol.[36 40 45] Both study participants and authors suggested further supporting HCPs through decision support systems in the electronic record that emphasise the need for appropriate indications for IUC use and an easy-to-use documentation system.[36 41 43 45 56] Additionally, HCPs and study authors recommended implementing reminders to regularly reassess the necessity of IUCs in patients and to use stop orders (ie, IUC orders expire automatically if not actively renewed).[41 45 49]

The suggested strategies within the *Change Infrastructure and Workflow* cluster included employing continence care personnel to facilitate continence assessments.[58 59] Additionally, increasing staffing for nursing aides was recommended to support the use of alternative urine collection methods.[45 59] Securing support from leaders and managers was seen by the study participants as central to ensuring management support for changes in workflow organisation and increasing the priority of the topic.[41 54] Furthermore, study participants suggested reorganising morning rounds with multidisciplinary teams, including continence care planning, nursing and physicians, to enable discussion about catheter utilisation.[41 43 59] In addition, study participants and authors mentioned the necessity of having alternatives to urine collection available, such as bedpans or urinals or assistance with toileting.[45 59–61] A detailed table outlining the key determinants to be addressed, suggested strategies and data on mechanisms of change described in the included studies can be found in eTable 13 (online supplemental file 2).

DISCUSSION

We synthesised 24 studies on determinants of IUC use and strategies to address non-indicated usage in hospitals and nursing homes. Identified key determinants for inappropriate insertion included non-adherence to guidelines with reliance on vague indications or routine practice, inconsistent views about benefits and risks, low perceived importance of the topic, limited accessibility of alternatives and perceived high workload leading to 'convenience' catheterisation. Furthermore, HCPs linked prolonged IUC use to poor documentation (such as not requesting the re-evaluation or indicating a removal date), along with a low sense of responsibility for catheter removal and a low prioritisation of catheter discontinuation.

The 'convenience of care' was frequently cited by HCPs as a reason for catheterisation, reflecting the tension between workload management and adherence to best practice. This phenomenon can be interpreted through the street-level bureaucracy framework, which highlights how frontline staff exercise discretion when implementing guidelines.[63 64] Under pressure from staff shortages and competing demands, HCPs may develop coping mechanisms such as routinised care or simplified decision-making.[65] While these strategies help manage workload, they risk reinforcing non-evidence-based practices, including unnecessary or prolonged catheter use. However, resource limitations cannot ethically justify compromising care quality, underscoring the need for organisational support and accountability to sustain safe and patient-centred practice.[66 67]

Within the CFIR framework, perceived *relative advantage of an intervention* is essential for effective implementation.[68] Avoiding IUCs necessitates alternative methods for urine collection or fluid balance monitoring.[69] Several practices, such as toilet training or the use of external urine collection devices, have been demonstrated to be effective.[5 70] However, our results indicate that the application of these alternatives is often hindered by physical unavailability and perceived impracticality. This perception may also be changed by installing nursing champions, which has been identified as one of the single most effective strategies employed in all included studies of a systematic review of quality-improvement initiatives in nursing home settings.[71] Implementation champions are individuals within an organisation who are well-respected by their colleagues and help to ensure the success of an intervention by motivating others, removing barriers and sustaining momentum during the change process. Furthermore, it may be essential to collaborate with HCPs to develop the necessary conditions and tailor strategies to ensure the successful integration of these alternatives within healthcare and nursing home settings.

Other evidence syntheses revealed similar determinants of CAUTI prevention.[18 19] In addition, Atkins *et al* also identified family requests as influencing factors. Our findings highlighted that patients recognised both advantages and disadvantages of IUCs but consistently desired involvement in decisions, underscoring the need for research into patient perspectives to promote shared decision-making. This points to a gap in current knowledge about patient perspectives, values and preferences regarding IUCs. Understanding how patients perceive catheter use, their tolerance of associated discomforts and their awareness of CAUTI risks is essential for fostering informed and shared decision-making.

Our study highlights important deimplementation strategies for IUC use. Suggested strategies included training on redesigned responsibilities, adequate clinical indications and continence management. Figure 3 shows that training is not just provided to address a lack of knowledge on IUC use but also to raise awareness and increase the priority of the topic in general. Further identified strategies were electronic reminders to reevaluate the indications for IUC use, stop orders to limit the length of IUC use, documentation improvements and infrastructure changes such as reorganising workflows. Additional suggested strategies related to infrastructure changes include increasing staffing levels to enable adequate continence management methods, deployment of continence and stoma care specialists for assessments and enabling greater use of alternatives. For example, female external urinary catheters have the potential to improve patient quality of life and reduce IUC use.[17]

Our qualitative evidence synthesis identified strategies that align with findings from previous reviews on CAUTI prevention[5 18 19] and recommendations issued by different USA and European professional organisations. In addition, our review also identified other approaches, including local consensus discussions to challenge routine practices, leveraging champions to raise awareness and promote adherence to appropriate IUC use guidelines and employing management buy-in. After insertion, it is essential to highlight the need for strategies that prompt nurses and physicians to reassess IUC indications. These strategies may include electronic alerts, stop orders and scope of practices, such as enabling nurses to remove IUCs in a timely manner or engaging in shared decision-making with physicians by reviewing and confirming appropriate indications. The newly identified strategies underscore the importance of addressing not only the determinants of practice but also the suggestions made by HCPs and study authors for potential improvements. Our analysis of mechanisms of suggested strategies targeting determinants of practice revealed that many strategies address multiple determinants simultaneously, with 'IUC use considered a low priority' being most frequently targeted. Reframing clinical practices as problematic may be central to organisational change.[72] In future studies, it may be important to examine whether increased awareness and prioritisation of this topic should be considered critical prerequisites for initiating change.

Strengths and limitations

The strengths of our study lie in its rigour in conducting our qualitative evidence synthesis in combination with the use of well-established frameworks[20 21 23] and newer approaches within implementation science[33 34] to create generalisable knowledge. The information generated from the included studies on mechanisms can further stimulate reflections on what may work for whom and under which circumstances. These mechanisms can be explored in greater depth through further qualitative research and ultimately tested in implementation studies.

Our study also had several limitations. We limited our search to studies published from the year 2000 onwards. As the earliest included study was published in 2012, it is unlikely that we missed relevant studies published earlier. In our synthesis, we included studies with different aims; some assessed the determinants of IUC use and others focused on process evaluations, such as implementing nurse-led protocols for catheter removal or other quality-improvement initiatives. These studies provided complementary insights. While all study types informed the core of the synthesis, the latter helped to explain why certain strategies were effective by shedding light on the mechanisms of change. Most included studies were conducted in English-speaking countries, primarily in hospital settings, with a focus on the general adult population and CAUTI prevention. We included studies on CAUTI prevention only if they also discussed the determinants of IUC use. These characteristics limit the generalisability of our results to other countries, nursing home settings and hospital settings, with a focus on elderly patients. In addition to methodological concerns, the lack of generalisability contributed to our rating of the findings as having moderate or low confidence.

CONCLUSIONS

Key contributors to inappropriate IUC use include vague indications for IUC insertion, routine-based decisions as the standard practice without appropriate indications, limited availability or perceived impracticability of alternatives, staffing shortages and low awareness of the issue. Effectively addressing these barriers requires comprehensive and multifaceted deimplementation strategies. Our analysis highlighted the need to place greater emphasis on improving both the availability and perceived suitability of alternatives to IUCs. Potential yet underexplored solutions include involving local champions to initiate and sustain change, deploying continence and stoma care specialists for assessments and changes in clinical decision-making processes. Additionally, our study identified a significant gap in the literature regarding research conducted in non-English-speaking countries and on determinants specific to nursing home settings. These areas warrant further investigation to ensure more inclusive and context-sensitive insights.

Author affiliations
[1]Department for Evidence-based Medicine and Evaluation, University for Continuing Education Krems, Krems an der Donau, Austria
[2]Institute for Implementation Science in Health Care, University of Zurich, Zürich, Switzerland
[3]Chair of Public Health and Health Services Research, IBE, LMU Munich, Munich, Germany
[4]Centre of Clinical Nursing Science, University Hospital Zurich, Zürich, Switzerland
[5]Department of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, Zürich, Switzerland

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ORCID iDs
Christina Koscher-Kien https://orcid.org/0000-0003-2158-962X
Marie-Therese Schultes https://orcid.org/0000-0002-1593-3247
Sophie Gendolla https://orcid.org/0009-0002-7615-4025
Irma Klerings https://orcid.org/0000-0001-6644-9845
Rahel Naef https://orcid.org/0000-0002-5872-076X
Martin Fangmeyer https://orcid.org/0000-0002-2514-9325
Isolde Sommer https://orcid.org/0000-0003-3592-1507

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