Reducing Harm from Urinary Catheters: A Collaborative Approach in South London

‘No Catheter, No CAUTI’

Final Report
Background

The Health Innovation Network (HIN) is the Academic Health Science Network (AHSN) for south London. There are 15 AHSNs in England and they are all mandated by NHS England to deliver four core objectives:

1. Focus on the needs of patients and local populations: support and work in partnership with commissioners and public health bodies to identify and address unmet medical needs, whilst promoting health equality and best practice.
2. Build a culture of partnership and collaboration: promote inclusivity, partnership and collaboration to consider and address local, regional and national priorities.
3. Speed up adoption of innovation into practice to improve clinical outcomes and patient experience – support the identification and more rapid spread of research and innovation at pace and scale to improve patient care and local population health.
4. Create wealth through co-development, testing, evaluation and early adoption and spread of new products and services.

Each AHSN hosts a Patient Safety Collaborative (PSC) aimed at working across boundaries to tackle leading causes of patient-harm and improve patient safety and well-being.
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Executive summary

Catheter-associated urinary tract infections (CAUTIs) are infections occurring in patients who use urinary catheters. They are common, can cause significant patient-harm and may lead to serious bloodstream infections and prolonged hospitalisation, which can significantly increase healthcare costs. In many cases, these problems are preventable.

We delivered a two-year catheter quality improvement programme across south London that successfully achieved our aim of reducing CAUTI by 30%. We aimed to raise awareness of urinary catheter risks using multiple approaches, including a social media campaign and a series of face-to-face collaborative events.

Our programme used Institute for Health Improvement (IHI) Breakthrough Collaborative methodology to drive improvements in catheter care. We co-designed and co-produced new patient and staff educational materials with patients and Age UK including an animated video showing good catheter care. These resources are freely available. We implemented a catheter-care bundle with nine acute hospitals and eight community services across south London. Our Catheter Care Awareness week-long campaign had over 13 million Twitter impressions and face-to-face contact with over 1000 patients and healthcare professionals.

In this report, we share our methods, learning and our resources. We describe how the Collaborative enabled shared learning across organisational boundaries and how examples of best-practice were spread and adopted across south London. We summarise how we are sustaining changes through supporting a catheter care community of practice, to ensure improvements are consolidated and a culture of learning and development continues for both healthcare staff and patients with catheters. The NHS plan to reduce gram negative bloodstream infection will give particular importance to this work as the majority are caused by CAUTI or urinary infection.
Introduction

A urinary catheter is a flexible tube inserted into the bladder either through the urethra (urethral catheterisation) or through a small hole in the abdomen (suprapubic catheterisation) aiding a person to pass urine. Most urinary catheters are inserted on a temporary basis in hospital to assist patients recovering from surgery or acute illness. However, some people require long-term catheters because of their inability to pass urine without assistance. A common, and sometimes serious, complication from a urinary catheter is infection of the urinary tract. This is called a catheter-associated urinary tract infection (CAUTI). CAUTI is diagnosed by the combination of the presence of significant concentrations of bacteria in the urine and symptoms of infection.

Defining and diagnosing a catheter associated urinary tract infection (CAUTI)

Defining a CAUTI is complex. We drew on a previously published definition from The Scottish Intercollegiate Guidelines Network (SIGN)\(^{(1)}\), but modified the definition to include atypical symptoms of infection (e.g. delirium) often found in older people (see Figure 1).

Figure 1: Health Innovation Network adapted CAUTI definition

How common are CAUTIs and what is their impact?

Infections caused by catheters are one of the most common types of healthcare-associated infections\(^{(2)}\). Survey data from hospitals in England, Wales, Northern Ireland and the Republic of Ireland found that 56% of all hospital UTIs are associated with the presence of an indwelling urinary catheter\(^{(3)}\). CAUTIs can cause serious harm, and are a common cause of bloodstream infections, with up to 20% of hospital-associated bacteraemia linked to urinary catheterisation\(^{(4)}\).
The duration of catheterisation is a major risk factor for infections and complications: CAUTI risk increases significantly after 2 days of catheterisation\(^5\). Additionally, the risk of developing bacteriuria (presence of bacteria in the urine) in acute care facilities increases by 5% for each day of catheterisation\(^5\). Approximately 24% of bacteriuric patients will develop CAUTI, and of these, up to 4% develop a severe secondary infection\(^6\). CAUTIs can contribute to other problems, particularly among older adults, such as falls\(^7\) and delirium; which put people at higher risk of hospital re-admission\(^8\). Catheters can lead to physical and psychological discomfort\(^9\) and may lead to pressure-ulcer formation\(^10\). Accidental dislodgement, pain and genital injury may result from catheterisation\(^11\). However, CAUTI can be prevented in patients by only using short-term catheters, avoiding unnecessary catheterisation, ensuring prompt removal (<2 days) and reviewing the need for long-term catheterisation.

In England, at least 90,000 community-dwelling people use long-term urinary catheters, most of who are older adults and/or affected by neurological conditions\(^12\). Long-term catheter use is associated with a wide range of urological complications including recurrent CAUTIs\(^5\); biofilm formation, leading to catheter blockages, which increases the risk of CAUTI, stone disease and acute kidney injury\(^13\). These complications and the high morbidity of long-term catheters cause a considerable demand on Emergency Departments\(^14\). Furthermore, fragmented catheter care and inadequate district nurse resources may contribute to this demand.

Little is known about CAUTI prevalence outside of hospital settings. However, a study carried out as part of this project, highlighted CAUTI rates of up to 34% in patients presenting to an Emergency Department with catheter problems over a month\(^15\). Our Emergency Department service review highlighted that 3 (21%) of 14 patients diagnosed with a CAUTI were also diagnosed with urosepsis\(^15\). These patients presented to the Emergency Department feeling generally unwell and infection was confirmed from both urinary and blood cultures of the same pathogen. Our findings indicate that both CAUTI and blood-borne infections contracted in the community can result from long-term catheterisation.

**Counting the cost of CAUTIs in south London**

In total, healthcare-associated infections cost the NHS in excess of £1 billion per year\(^16\). UTIs have been described as the most costly single-site infection and total treatment cost is estimated at £124 million per year\(^17\).

In 2015, the Health Innovation Network estimated the costs of CAUTIs\(^*\) in five acute south London hospitals (see **Figure 2**). From 152,000 inpatients that were catheterised annually (18.8% of inpatient admissions), 9,000 patients may go on to develop CAUTIs.

Figure 2 – Potential cost savings associated with improving catheter care in 5 Acute NHS Trusts in south London

Our goal

The overall aim of the south London Catheter Care Collaborative programme was to improve catheter care and **reduce CAUTIs by 30% in participating south London organisations, over 2 years, by March 2017**.

Our approach

The catheter care programme of work was undertaken using the **Institute for Healthcare Improvement (IHI) Breakthrough Series Collaborative Model**

We chose this approach as it brings together a large number of teams from different settings. The teams meet for a series of face-to-face multidisciplinary collaborative learning meetings interspersed by periods of action during which changes are tested and implemented. The Collaborative followed key elements of the Institute for Healthcare Improvement ‘Model for Improvement’

What we did

Planning began in December 2014. We brought together a group of experts, consistent with IHI methods and developed our Faculty. This group included experts with specific knowledge of optimal catheter care and clinical guidance: doctors; nurses; Institute for Healthcare Improvement methodologists; Project Managers and; Quality Improvement experts.

We developed a strategy, a project plan and stakeholder mapping was undertaken to ensure a wide range of key people and organisations were involved. This included members of our Catheter Care Collaborative and additional people from their organisations, patients and carers, charities and industry.

Participating organisations

Multiple NHS organisations, including acute hospitals and community service providers across 17 sites in south London participated in the Catheter Care Collaborative (Figure 3).
Programme drivers and interventions

In line with the IHI Breakthrough Series Collaborative Model, we developed a driver diagram to articulate the primary and secondary drivers contributing to the overall aim (See Appendix 1). A set of specific interventions were established, implemented and tested using plan, do, study, act (PDSA) cycles.

The interventions were divided into three categories:

1. IHI Breakthrough Series methodology
2. Insertion, maintenance and infrastructure to support catheter care
3. Measurement for change and demonstrating outcomes
4. Social marketing and the patient voice

1. IHI Breakthrough Series Methodology

Using the approach with local data to target and drive improvement

The IHI developed their Breakthrough Series Collaborative Model to support organisations in achieving breakthrough improvements in quality. The approach provides a structure to help organisations come together to share and learn from one another and experts in topic areas. The collaborative is a learning system typically running from 6 to 15 months, in which, through repeated cycles of testing, ideas on how to improve care can be refined and implemented. Our Catheter Care Collaborative programme was developed with key IHI elements (see Figure 4) to provide us with a sound model for improvement. Our Collaborative programme raised awareness and practical experience of quality improvement tools and methods amongst the participants.
Figure 4: Our Catheter Care Collaborative

Our Catheter Care Collaborative

- Stakeholders mapping
- Visiting sites
- Engaging with senior management and front line staff
- Project plan, initiation document, draft overarching

Prework
E.g.: bring catheter materials, 'Plan, Do, Study, Act' cycles, measurements

Developing programme framework

Health Innovation Network catheter programme faculty

No Catheter, No CAUTI programme (small group of experts)

Invite participants

Learning Session 1
June 2015

Planning learning sessions, liaising with Institute for Healthcare Improvement

Learning Session 2
November 2015

Action Period

Participating sites work on testing,

Learning Session 3
March 2016

Action Period

Learning Session 4
September 2016

Action Period

Conferences, publications, communities of practice, other spread strategies

Telephone conferences, visits, reports, WhatsApp, e-mails
2. Insertion, maintenance and infrastructure to support catheter care

Improving clinical practice through evidence-based catheter care bundles

A care bundle is a group of evidence-based care practices that improve the quality of care when consistently applied to patients. Catheter care bundles have been shown to be effective in reducing CAUTI rates\(^{(20)}\). One of the hospitals participating in our catheter programme had an established catheter care bundle. This was adapted within the collaborative to meet the outcome needs of the programme (see Figure 8).

![Figure 8 – Catheter care bundle](image)

Our catheter care bundle covered the following 11 interventions which varied across our participating sites:

1. Participate in the development, approval and/or sharing of **evidence-based documentation and tools** such as policies, procedures, guidelines and flowcharts.

2. Encourage the appropriate **choice of catheter materials**. To date, few studies have explored the cost-benefits of using expensive coated catheters have been inconclusive\(^{(5)}\). We worked with local clinicians and procurement departments to ensure there was an adequate choice of catheter materials and products to suit the needs of patients. An example of products and their approximate costs are reported in Table 4.

**Table 4 – Example of catheter product costings**

<table>
<thead>
<tr>
<th>Catheters</th>
<th>Average hospital cost</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver-alloy-coated latex catheters</td>
<td>£8 each/£40 per box of 5</td>
<td>Max 30 day use</td>
</tr>
<tr>
<td>Hydrogel-coated latex catheter</td>
<td>£3.50 each/£17.50 box of 5</td>
<td>Max 84 day use</td>
</tr>
<tr>
<td>100% silicone catheter</td>
<td>£3 each/£15 per box of 5</td>
<td>Max 84 day use</td>
</tr>
<tr>
<td>PTFE-coated latex catheter</td>
<td>£2.40 each/£12 box of 5</td>
<td>Max 28 day use</td>
</tr>
<tr>
<td><strong>Drainage bags</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>350mls chamber, 2.5l urine-meter</td>
<td>£6.20 each</td>
<td>Heavy, can cause trauma, pain &amp; reduce mobility/recovery</td>
</tr>
<tr>
<td>2-litre standard bag</td>
<td>£0.95 each</td>
<td></td>
</tr>
</tbody>
</table>
3. Introduce **catheter passports**. See Section 3.

4. **Improve catheter care documentation**, including the implementation of strategies to prompt catheter removal. Using reminders and stop orders to prompt catheter removal can result in large numbers of CAUTIs being avoided(21). We worked with individual sites to identify suitable strategies to encourage the prompt removal of catheters. These included reminder stickers and proactive planning of trial without a catheter.

5. Encourage the adoption of **reality rounds** to involve senior leaders in catheter quality improvement initiatives. Reinertsen and Johnson (2010) describe ‘rounding to influence’ as one element of an evidence-based bundle of leadership methods used in highly reliable organisations. The authors explain how applying rounding principles to managers’ ward rounds can lead to the identification and removal of barriers to catheter bundle implementation, staff enhanced sense of accountability and improvement in the use of the CAUTI bundle. Our programme encouraged individual acute sites to work with their senior managers on the testing of rounding methods, although there was limited success with this intervention.

6. Introducing or improving **catheter securement**. Catheter securement (also called catheter retainer, stabilising or strap devices) is advised to promote comfort and safe catheter use(23). Securing a catheter may also reduce CAUTIs as a result of reduced trauma.

7. **Ensure drainage bags are off floor surfaces**. The EPIC guidelines(5) suggest that urinary bags should be positioned in such a way to prevent contact with the floor thus decreasing infection risk and reducing the associated trip hazard.

8. **Ensure appropriate care of the drainage system**. The European Association of Urological Nurses makes a number of recommendations related to drainage care: keep urine collecting tubes free from kinking, keep the collection bag below the level of the bladder, avoid unnecessary disconnections and ensure the drainage system is appropriately supported with straps, leg-bag nets or other support systems. Adequate care of the drainage system will prevent physical trauma and discomfort for the patient. Promoting free urine drainage minimises the risk of blockages and potentially reduces infection risks from urine stagnating in the bladder.(9)

9. Introduce **trial without catheter** to patients with long-term catheters.

10. **Develop, test and implement post infection reviews** in patients experiencing e-coli bacteraemia. Two acute organisations and one community organisation developed their own post-infection review tools.

11. **Develop alternatives to A+E attendance** for response to catheter emergencies such as blockage or haemorrhage which could involve the commissioning of new services for out of hours response.
Educational activities to enhance catheter care

Our Collaborative programme provided healthcare professionals across south London with the opportunity to connect and participate in a wide range of catheter care educational activities to promote learning and encourage a culture of safe catheter care practice. Interventions are summarised in Table 5.

Table 5 – Summary of educational activities and sharing learning

<table>
<thead>
<tr>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery of catheter training (e.g. to continence link nurses)</td>
</tr>
<tr>
<td>One-to-one training sessions</td>
</tr>
<tr>
<td>One-to-one and small group supervision sessions</td>
</tr>
<tr>
<td>Review of incidents and group reflection</td>
</tr>
<tr>
<td>Small training sessions (e.g. when visiting wards)</td>
</tr>
<tr>
<td>Large catheter workshops (e.g. during collaborative learning sessions)</td>
</tr>
<tr>
<td>Simulation education (e.g. in partnership with Simulation and interactive learning (SaIL) centre at Guy’s and St Thomas’ NHS foundation Trust)</td>
</tr>
<tr>
<td>Telephone Conference discussions</td>
</tr>
<tr>
<td>Patient safety e-mail alerts</td>
</tr>
<tr>
<td>Publications in a variety of media</td>
</tr>
<tr>
<td>Sharing of service reviews, tables and reports between organisations</td>
</tr>
</tbody>
</table>

Improve infrastructure and culture to support good catheter care

We supported a number of individual organisations with improvement projects identified either through their baseline audits or the small teams. These projects are outlined in Table 6. We also worked in partnership with procurement departments and industry to review existing product lists, promote cost-effective prescribing and facilitate access to ordering codes (e.g. through the implementation of prescribing guidance).

Table 6 – Example of projects undertaken within the Collaborative

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Organisations that undertook this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design, testing and implementation of a catheter passport</td>
<td>A + local community services</td>
</tr>
<tr>
<td></td>
<td>B + C + local community services</td>
</tr>
<tr>
<td>Electronic post-infection reviews</td>
<td>B + C + local community services</td>
</tr>
<tr>
<td>Improvement of electronic catheter documentation and TWOC planning</td>
<td></td>
</tr>
<tr>
<td>Full review of acute hospital procurement</td>
<td></td>
</tr>
<tr>
<td>Implementation of new maintenance solutions guidelines</td>
<td></td>
</tr>
<tr>
<td>Implementation of new catheter prescribing guidance for community services</td>
<td></td>
</tr>
<tr>
<td>Improving community catheter pathways through ‘@home’</td>
<td></td>
</tr>
<tr>
<td>services</td>
<td>D + E + community services</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Testing of Age UK information material</td>
<td></td>
</tr>
<tr>
<td>Improving catheter care and TWOCs in nursing homes</td>
<td></td>
</tr>
<tr>
<td>Using ‘rapid response’ services to reduce ED admissions and improve community catheter services</td>
<td></td>
</tr>
<tr>
<td>Implement TWOC flowcharts in community services</td>
<td></td>
</tr>
<tr>
<td>Newly combined simulation and catheter training</td>
<td></td>
</tr>
<tr>
<td>Working with commissioners to design new outpatient urology pathways to bypass the Emergency Department</td>
<td></td>
</tr>
<tr>
<td>TWOCs of patients from community, care homes and acute</td>
<td></td>
</tr>
<tr>
<td>Catheter training for RGNs and HCAs</td>
<td></td>
</tr>
<tr>
<td>Full review of hospital procurement</td>
<td></td>
</tr>
<tr>
<td>Night time palliative care services to reduce catheter admissions</td>
<td></td>
</tr>
<tr>
<td>Campaigning catheter care in nursing homes and community services</td>
<td></td>
</tr>
<tr>
<td>Monitoring catheterised patients in community services via ED monthly reports</td>
<td></td>
</tr>
</tbody>
</table>

| Catheter flowcharts, policies and procedures                            |                            |                              |                     |

3. Measurement for change and demonstrating outcomes

Baseline measurements

At the start of the Collaborative, between November 2015 and March 2016, we worked with nine acute hospitals to establish hospital-wide baseline measurements of CAUTI rates, catheter practice and to enable individual organisations to prioritise their catheter interventions based on local needs.

We designed, PDSA-tested and introduced a new catheter audit and quality improvement (QI) tool that was adopted for data collection across these hospitals (see Appendix 2). We used the tool to collect data and to identify immediate and long-term quality improvement priorities. Data was collected by case review of inpatient wards and departments for each hospital. Variations in local processes and contextual differences resulted in significant variations in catheter care practice. For example, variations in the number of intensive care beds versus other services, information technology platforms, procurement variations, variations in specialist input (e.g. availability of continence nurse specialists) and...
training and education structures and arrangements. A summary of main findings from eight hospitals with varied data are reported in Table 1.

Table 1 – Summary table of baseline measurements in eight hospitals from hospital-wide case review

<table>
<thead>
<tr>
<th>Measurements</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheterisation rate</td>
<td>27%</td>
<td>17%</td>
<td>17%</td>
<td>23%</td>
<td>23%</td>
<td>20%</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
<td>Patients admitted with catheter from the community</td>
<td>11%</td>
<td>3%</td>
<td>5%</td>
<td>8%</td>
<td>9%</td>
<td>14%</td>
<td>31%</td>
<td>13%</td>
</tr>
<tr>
<td>Patients with positive microbiology (infection)</td>
<td>60%</td>
<td>67%</td>
<td>100%</td>
<td>44%</td>
<td>50%</td>
<td>90%</td>
<td>100%</td>
<td>60%</td>
</tr>
<tr>
<td>Catheters secured</td>
<td>45%</td>
<td>0.0%</td>
<td>27%</td>
<td>0.0%</td>
<td>2%</td>
<td>36%</td>
<td>55%</td>
<td>17%</td>
</tr>
<tr>
<td>Urine meter use</td>
<td>81%</td>
<td>74%</td>
<td>81%</td>
<td>41%</td>
<td>47%</td>
<td>44%</td>
<td>42%</td>
<td>45%</td>
</tr>
<tr>
<td>Bags above floor level</td>
<td>91%</td>
<td>61%</td>
<td>67%</td>
<td>88%</td>
<td>77%</td>
<td>92%</td>
<td>N/A</td>
<td>96%</td>
</tr>
<tr>
<td>Plan for trial without a catheter</td>
<td>41%</td>
<td>0.0%</td>
<td>7%</td>
<td>18%</td>
<td>16%</td>
<td>11%</td>
<td>26%</td>
<td>29%</td>
</tr>
</tbody>
</table>

*Only 10 wards were audited in hospital H

Measuring improvements made in catheter care at each site

We supported participating sites to develop skills in collecting continuous measurements of improvement using time series (run charts). A number of approaches were adopted, including formal tutorials, coaching, peer visits and tool sharing.

Measurements were brought back to the collaborative learning sessions for review and learning. We experienced significant challenges with collecting enough data points to enable interpretation of run charts. This was due mainly to the conflicting demands on front-line staff, the lack of IT systems able to capture key data and the identification of CAUTI requiring both laboratory data and clinical review.

Only one site managed to collect any data in the form of a run chart, but unfortunately data collection was unreliable.

Looking at improvement across sites over time

To overcome the lack of run charts, the collaborative agreed to carry out single-point measurements (re-audit) of a sample of 20-25% of the number of patients measured at baseline in each participating hospital one year following the baseline data collection.

It was agreed that data collection would concentrate on the three main interventions from our project:

- Use of catheter securement
- Use of information material (e.g. passport/Age UK materials)
- Implementation of Trial Without Catheter plans for catheterised patients

Wards were selected on the basis of those having the highest catheterisation rate at baseline, but excluded intensive care units and high dependency units.
We compared data collected at baseline from specific wards with the re-audit data collected from those same wards a year later. Use of catheter securement increased from 12% (range 0-23) to 39% (6-69) and a clear plan for trial without catheter increased from 12% (0-19) to 24% (14-31). A summary of the main findings can be found in Table 2.

**Table 2 – Data comparison over one year audit period in four hospitals**

<table>
<thead>
<tr>
<th>Measurements</th>
<th>A Baseline</th>
<th>A Re-audit</th>
<th>B Baseline</th>
<th>B Re-audit</th>
<th>C Baseline</th>
<th>C Re-audit</th>
<th>H Baseline</th>
<th>H Re-audit</th>
<th>Mean Baseline</th>
<th>Mean Re-audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheter secured (%)</td>
<td>23%</td>
<td>69%</td>
<td>0%</td>
<td>43%</td>
<td>20%</td>
<td>38%</td>
<td>6%</td>
<td>6%</td>
<td>12%</td>
<td>39%</td>
</tr>
<tr>
<td>Patients that underwent TWOC (%)</td>
<td>4%</td>
<td>0%</td>
<td>5%</td>
<td>12%</td>
<td>16%</td>
<td>5%</td>
<td>12%</td>
<td>13%</td>
<td>9%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Patients with planned TWOC</td>
<td>0%</td>
<td>24%</td>
<td>18%</td>
<td>31%</td>
<td>19%</td>
<td>14%</td>
<td>12%</td>
<td>25%</td>
<td>12%</td>
<td>24%</td>
</tr>
<tr>
<td>Patients admitted with catheter from community</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>26%</td>
<td>14%</td>
<td>41%</td>
<td>19%</td>
<td>33%</td>
<td>16%</td>
</tr>
</tbody>
</table>

**Emergency Department measurements**

During the Collaborative programme we worked with four large acute hospitals to conduct service reviews of catheterised patients attending the emergency department with catheter problems. The aim was to gain a better understanding of the reasons leading to emergency department attendance, review local catheter pathways and consider future options to promote catheter care in community settings.

Variations in information technology platforms and methodologies for data collection limited comparable data (see Table 3).

**Table 3 – People attending emergency departments with catheters in situ: data from four hospitals over one month**

<table>
<thead>
<tr>
<th>Measurements/1 month</th>
<th>A Attendees (n)</th>
<th>C Attendees (n)</th>
<th>G Attendees (n)</th>
<th>H Attendees (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (Y)</td>
<td>No data</td>
<td>62</td>
<td>79</td>
<td>76</td>
</tr>
<tr>
<td>Male gender (%)</td>
<td>No data</td>
<td>76%</td>
<td>89%</td>
<td>82%</td>
</tr>
<tr>
<td>Arrival by ambulance</td>
<td>No data</td>
<td>56%</td>
<td>54%</td>
<td>35%</td>
</tr>
<tr>
<td>Admission rate (%)</td>
<td>43%</td>
<td>39%</td>
<td>34%</td>
<td>28%</td>
</tr>
</tbody>
</table>

In one hospital we carried out a further in-depth review of catheterised patients attending the emergency department to include data on CAUTI rates, urosepsis and antibiotic prescribing practice. During one month, 41 community-dwelling patients attended the emergency department with catheter-related complaints. Of these, 34% (n=14) were diagnosed with a CAUTI confirmed by urine culture. Patient records did not enable us to establish if all infections were symptomatic. However, all patients had bacterial growth at concentrations of $10^5$CFU/mls with individually isolated pathogens likely to indicate...
the presence of true infection. The most prevalent organisms were coliform, proteus and pseudomonas species at urine concentrations of at least \(10^5\)CFU/mls.

3/14 (21%) of patients with a CAUTI diagnosis were systemically unwell and were diagnosed with urosepsis. All three patients had this diagnosis confirmed by blood culture cross-referenced to the same pathogen found in their infected urine.

5/14 (36%) of patients with urinary infections had a history of recurrent urinary infections, multi-resistant organisms and/or allergic reactions to antibiotic therapy requiring antibiotic sensitivity testing, access to prescribing advice, multidisciplinary decision-making and IV antibiotic treatment.

Of all the patients attending the emergency department with catheter problems, 16/41 (39%) were admitted, mostly for short-term intravenous antibiotic, rehydration and monitoring. Five patients had lengths of stay in excess of 7 days (see Figure 5).

![Figure 5 – Length of stay of all admitted patients](image)

**Length of stay of admitted patients**

<table>
<thead>
<tr>
<th>No. days admitted</th>
<th>No. Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>&gt;7</td>
<td>2</td>
</tr>
</tbody>
</table>

**Data from the National Patient Safety Thermometer**

We worked in partnership with Haelo (Salford Royal NHS Trust) and used patient safety thermometer data to obtain continuous measurements of CAUTI rates for south London, filtered to participating sites. The period between June 2014 – August 2016 was selected to obtain a two-year view of CAUTI and catheter use. Our change project started in January 2015 with some early adopters of quality improvement initiatives. Most sites joined the programme between Spring and Summer 2015 with a couple more joining in 2016. Key findings from the patient safety thermometer data include:
• Over the 12 month period from September 2015 and August 2016 CAUTI rates in south London dropped from 0.9% to just under 0.6%, indicating an overall CAUTI rate drop of just over 30% (Figure 6)
• The proportion of patients with a new CAUTI decreased from just over 0.3% to 0.2% as of December 2016 indicating an overall reduction in new CAUTIs of just over 30% (Figure 6)
• During this period, the national proportion of patients with a catheter in-situ had a slight but statistically significant increase from 12.8% to 13.0% (Figure 7)
• Over the same time in the south London region catheterisation rates dropped from 15.4% to 13.5% (Figure 7)

**Figure 6 – Patient safety thermometer CAUTI rates**

**Figure 7 – Proportion of patients with a catheter in-situ**

4. Social marketing and the patient voice

Empowering patients and their carers and co-producing educational materials

We worked with Age UK on the co-production of catheter care materials to reduce social stigma, increase catheter knowledge and understanding and increase awareness of local services to improve access. Qualitative research with patients and healthcare professionals was undertaken by Britain Thinks using in-depth interviews and small focus groups (n=4) with people with catheters and those at risk of catheterisation but no personal experience of using a catheter and an interactive debrief workshop with healthcare professionals (n=7). Key findings from this work included:
- There was low catheter knowledge among older people who were at risk, but do not currently have a catheter.
- Older people with catheters want to minimise the impact of their catheter on their day-to-day lives and don’t view it as a means to improve their lives.
- Healthcare professionals described that there was no one clearly accountable for tackling the problems associated with unnecessary catheterisation and CAUTIs. This work informed the production of a series of resources aimed at both patients and healthcare professionals, to provide information and raise awareness around catheter safety.

Resources include:

- Catheter care materials: advice for older people and patient catheter record booklets.
- An animation to raise awareness about the potential harms of catheterisation and the importance of removing catheters whenever possible. View it here: https://vimeo.com/156234954
- Information posters available to be freely downloaded for use in healthcare settings.

Catheter passports have been advocated as a strategy to improve communication, encourage catheter removal and improve patient adherence to best practice(24). Passports are small booklets that include general information about: the catheter, caring for the catheter, useful contact numbers, and multidisciplinary record keeping (e.g. they often contain the contact details of district nurses, Emergency Department staff, specialist nurses, palliative care teams, ambulance services). We developed and tested the Age UK information materials in two boroughs, including 26 care homes. We also worked with two large hospitals to implement their locally developed catheter passport. We supported other sites to implement catheter passports (see Figure 9).

**Figure 9** – Age UK materials and locally developed catheter passport.
Catheter Care Awareness Week

The HIN created a Catheter Care Awareness Week campaign in June 2016, which ran in conjunction with World Continence Week. Its aim was to empower both patients and professionals to question current practices, improve knowledge and reduce stigma associated with catheters. The objectives of Catheter Care Awareness Week were to:

- Reduce unnecessary patient-harm resulting from urinary catheters
- Raise awareness about catheter problems
- Empower patients and encourage self-care
- Enhance clinicians’ knowledge

Twenty events and promotional activities took place at our collaborating organisations, as well as a social media campaign that we developed with our Academic Health Science Network communications team.

Development of digital pack and merchandise

With our communications team, we developed a digital pack which is freely available on the Health Innovation Network website. The Digital pack consisted of:

- Age UK animation
- Patient stories
- Tweetsheet – user guide for Twitter and a template of suggested tweets
- Template pledge cards
- Poster templates
- Template article for Trusts newsletters and publications
- Films and vlogs of collaborative members talking about various aspects of catheter care in their organisations
- FAQs sheet

Additionally, we developed some designs that were printed onto mugs, hard-copy posters, pens, badges and t-shirts. These merchandise packs were sent to sites that were running events during the week.

Twitter campaign

We actively used Twitter in the lead up to and during Catheter Care Awareness Week. Our team designed a ‘Twitter schedule’ to regularly send out tweets using a hash tag we developed; #cathetercare. We also held a TweetChat with @WeNurses during Catheter Care Awareness Week (Tuesday- one hour duration 8-9pm), and a full transcript of the tweet chat can be found here. Twitter raised the reach of the social media campaign. There with over 13 million Twitter impressions during the week.
Working with industry

Industry partners were approached to co-host events with our providers across south London during the week. Ten companies were involved, providing hospitality and product support. Please see our acknowledgements section for all the companies involved.

Face-to-face events, pledges and providing financial incentives

In addition to the merchandise packs and overall coordination of events, the Health Innovation Network offered our participating collaborative sites (n=17) the opportunity to apply for £500 small grants (n=8 applied) to support any events and activities during Catheter Care Awareness Week. Twenty face-to-face events were held across south London over the five days and 966 healthcare professionals and 256 patients or carers were reached. We asked people to make pledges towards improving catheter care, and 561 individual pledges were made.

See appendix 3 for our post-campaign summary. Our digital pack can be found on our website here.

Patient stories

These are anonymised patient stories collected by our Continence Nurse Specialists during their day to day contact with patients:
1. John is 83, rarely leaves his house and needs to use a catheter to pass urine. John has had to attend the Emergency Department several times with catheter problems, because he did not know who to contact. Since introducing the catheter passport anyone involved with John’s care can read his catheter history and obtain enough information to solve most catheter problems in his own home. John is much happier, communication across boundaries has improved and so has his catheter care. He rarely goes to the emergency department.

2. Bob is in his 50s and he cannot have a prostate operation or use intermittent catheters. He needs to use an indwelling catheter at all times. He is still young and works in a large warehouse. He uses a leg bag but this is uncomfortable and it causes him great embarrassment. A catheter nurse recently suggested that Bob trial a catheter valve. Bob says that the catheter valve has changed his life. He can now pass urine like other men - in the urinal, he feels normal and it does not pull on his bladder causing discomfort.

3. Mary has limited mobility and was catheterised to manage urinary incontinence. She has been using catheters for 6 years and has had many catheter-associated infections and problems. Recently, a continence nurse decided to attempt a trial without a catheter. Mary remains incontinent but she can empty her bladder well. She was given pads and further continence advice. She has not had any infections since and her quality of life and comfort has improved.

4. Sophie is in hospital. She had a complex operation and a trial without a catheter failed. She says it feels as if her insides are being pulled out. Her catheter is not secured and a heavy urine-meter pulls on her bladder neck. The urine-meter was considered unnecessary and a 2 litre bag was connected instead. The catheter was secured to ensure there is no pulling onto Sophie’s bladder neck. Sophie is more comfortable and she feels it was much easier to participate in her rehabilitation with the physiotherapists.

Sustaining Improvements

Developing a community of practice (CoP)

The risk of many quality improvement projects is a lack of sustainability. We have put strategies in place to ensure sustainability.

Communities of practice are groups of people that share a concern, set of problems, or a passion about a topic and who deepen their knowledge and expertise in the area by interacting on an on-going basis(25).
Communities of practice provide opportunities to share, learn and reflect and at the same time design and implement solutions that are relevant to individuals and/or their workplace.

A Catheter Care Community of Practice was established at the end of the Collaborative. Many people in catheter care in south London continue to share knowledge, learning and improvements in catheter care through the community which meets regularly and communicates and shares best practice. If you would like to find out more about CoP please contact the HIN PSC or access our webpage.

**Spreading the word and sharing resources to improve catheter care**

A key factor in reducing variation in practice is the ability of health care organisations to rapidly spread innovations and new ideas. Pockets of excellence exist in our health care systems but knowledge of these better ideas and practices often remains isolated and unknown to others\(^{(26)}\). The Academic Health Science Network, through the National Patient Safety Collaborative is well placed to spread innovations across England. The AHSN [Atlas of Solutions](#) contains further information on the Programme.

Our website contains useful materials and a toolkit of interventions and ideas that can be easily replicated in other organisations and setting. See Table 7 for detail of the available resources.

**Table 7 – Additional resources available via HIN catheter web page**

<table>
<thead>
<tr>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality improvement catheter audit tool</td>
</tr>
<tr>
<td>Examples of completed PDSA cycle record sheets</td>
</tr>
<tr>
<td>HOUDINI tools</td>
</tr>
<tr>
<td>Catheterisation guidelines</td>
</tr>
<tr>
<td>TWOC flowcharts and guidelines</td>
</tr>
<tr>
<td>Prescribing formularies</td>
</tr>
<tr>
<td>Reality rounds question form</td>
</tr>
<tr>
<td>Age UK catheter information material (passport)</td>
</tr>
<tr>
<td>Catheter passport- King’s Health Partners</td>
</tr>
<tr>
<td>Post-infection review forms</td>
</tr>
<tr>
<td>Catheter Awareness Campaign digital information pack</td>
</tr>
<tr>
<td>Catheter Care Animation</td>
</tr>
<tr>
<td>Britain Thinks report</td>
</tr>
</tbody>
</table>

**Our outputs**

- Association for Continence Advice (ACA) Edinburgh, May 2016: two posters accepted for display and one podium presentation. Best free-paper oral presentation winner 2016.
- Safety Connections Conference, King’s Health Partners, June 2016: podium presentation and breakout group
- Patient Safety Congress, Manchester, July 2016: two posters accepted for display and shortlisted for the ‘over 65’ award
- Value-Based Healthcare seminar, King’s Health Partners, September 2016, presentation
- International Forum on Quality and Safety in Healthcare, London June 2017: three posters accepted for display
Conclusion

Urinary catheters are an important cause of avoidable harm due both to infection (CAUTI), catheter blockage and haemorrhage as well as causing discomfort and injury. Our collaborative aimed to improve catheter care across multiple pathways both in acute hospitals and out of hospital for a broad range of patients, from frail patients with multimorbidity to patients who are self-caring. We worked with a range of healthcare providers from acute general hospitals, integrated trusts that included both acute hospital and community healthcare and just community healthcare organisations.

In some contexts, awareness of the risks of urinary catheterisation were low so that awareness raising had a significant impact (e.g. early removal of catheters post hospital admission, use of catheter securement). In other contexts there was a lack of clarity around a pathway, or new arrangements had to be organised or commissioned (e.g. out of hours response to acute catheter problems as an alternative to attendance at an emergency department). There was local diversity in managing key interventions such as Trial without Catheter (TWOC) so that the collaborative took a diverse approach to change developing from local practice rather than trying to impose a standardised solution. In some cases, where there was a requirement for funding or commissioning of new services there was slow implementation. However the principles of effective and safe catheter care were shared, support on the details of procurement or commissioning were shared so that very significant progress was made in supporting improvement in infrastructure for safe catheter care.

Measurement was difficult. CAUTI can only be identified through a combination of laboratory (microbiological) data and clinical assessment of the patient; therefore CAUTI rates are not available from a routine data source. However, the sampling measurement of catheter use and CAUTI using the Safety Thermometer allowed consistent assessment of hospital practice. This was used for a time-series analysis and showed significant improvement in our hospitals. There was no equivalent data source for patients treated out of hospital and no simple database to identify patients with long term catheters so that measurement of change in practice out of hospital remained problematical. However, new clinical pathways plus use of interventions such as the catheter passport showed marked benefit from individual case review.

Many of our patients at high risk of catheter complications are frail with multimorbidities including dementia. In some of our providers there was very poor information transfer to support out of hospital care when patients were sent home with a new urinary catheter and a lack of clarity about who was responsible for both routine support and emergency response. As a result of this situation, it was...
essential that patients and carers should be central to any developments around catheter safety, including innovations such as the catheter passport. As catheter safety was seen as a low priority by providers despite the very poor “value” of current practice, raising awareness through campaigning including use of social media both for staff and patients was essential to support change. We achieved very significant change with most of our partners but whether this is sustained through a community of practice and future catheter care awareness weeks will need to be monitored.

We have created 6 packages of intervention on the core themes of safe catheter care both in and out of hospital, which we hope will be spread beyond our initial network in South London. This remains one of the most important challenges for patient safety.

References


# Appendix 2: Catheter Quality Improvement and Audit Tool

## CATHETER QUALITY IMPROVEMENT AND AUDIT TOOL

This tool aims to improve current care and the safety of patients with urinary catheters, use data for local service improvements and benchmark practice and CAUTI rate against other sites. For further information contact HIN: sally.lawton2@nhs.net

<table>
<thead>
<tr>
<th>Hospital:</th>
<th>Tot. No. beds occupied p/ward:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Survey:</td>
<td>Ward:</td>
</tr>
<tr>
<td>Surname:</td>
<td>Forename:</td>
</tr>
<tr>
<td>Hospital Number:</td>
<td>NHS number:</td>
</tr>
<tr>
<td>DOB:</td>
<td>Gender: Male □ Female □</td>
</tr>
</tbody>
</table>

1. Insertion site:
   - Urethral □ Suprapubic □ Removed □ Optional audit (fill-in Q 4.9,10,11 only)

2. How is the catheter secured?
   - Catheter securement device □ Velcro bag straps □ Bag stand or hanger □ (E.g. Stat-lock; Clinifix; Ugo fix etc.)
   - No catheter securement device □ Alert team if securement is needed

3. Drainage system:
   - 2L bag □ Urine meter □ Leg bag □ Valve □
   - Is bag above floor level? YES □ NO □ Is it dated (bag or valve)? YES □ NO □
   - Is tubing positioned to avoid kinking and pressure areas? YES □ NO □

4. Is the patient reporting any CAUTI (Catheter-associated urinary tract infection) symptoms?
   - Urgency □ Frequency □ Dysuria □ Loin Pain □ Delirium □
   - Loin or suprapubic tenderness □ Fever (≥38°C skin temp) □
   - Pyuria (≥104 WBC per ml.) □ Other □
   - Asymptomatic □ Unable to assess □ Alert team if symptomatic

5. Catheter insertion:
   - If date/ reason for insertion unclear: consider a trial without catheter
   - Date hospital insertion: Number days incl. today:
     - Up to 48 hour □ Over 28 days □ Hospital insertion not documented □
   - Admitted with catheter □ Date admission .................
   - Where was catheter first inserted:
     - Community □ ED □ Theatre □ Surgical Ward □ CCU/ITU/HDU □ Medical ward □ Other □ Not documented □

6a Is Rationale for Insertion documented?
   - Not Documented □ Verbally reported only □
   - Gross haematuria □ Retention □
   - Output measurement □ Post-childbirth □
   - Neurogenic bladder □ Immobilization □
   - (To preserve renal function) □ (traumatic injury) □ (Grade 3 and >)
### Inappropriate Rationales

<table>
<thead>
<tr>
<th>Other</th>
<th>□</th>
<th>Incontinence</th>
<th>□</th>
<th>Moisture lesions</th>
<th>□</th>
<th>Constipation</th>
<th>□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immobility (physiological decline)</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Alert team to consider TWOC**

6b. Is rationale still up-to-date?

| Yes | □ | No | □ | Unsure | □ |

7. Does the patient require long-term catheterisation?

| Yes | □ | No | □ |

If answered “yes”, has the patient got a passport? Yes □ No □ Unable to assess □

8. TWOC (Trial without Catheter)

Did the patient undergo a TWOC?

| Yes | □ | No | □ | N/A | □ |

If No, is there evidence of a planned TWOC?

| Yes | □ | No | □ | N/A | □ |

*If No - Alert team to consider a TWOC asap unless there is an up-to-date documented indication for catheter to stay in*

Is there an available handheld bladder scanner?

| Yes | □ | No | □ |

9. CAUTI microbiology:

(Criterion 2 is optional)

Not indicated □ Negative □ Unable to assess □

C1: Catheter in-situ and a positive sample ≥10^4 CFU/ml □

Comment……………………

C2: Catheter removed in the last 72 hours and a positive sample of ≥10^5 CFU/ml □

10. Is patient on AB for CAUTI or urosepsis?

| Yes | □ | No | □ | Recommended but not started | □ | Other | □ |

11. Culture-confirmed blood stream infection (urosepsis)

Not indicated □ Yes □ No □ If “YES” answer the following:

Present on admission □

Same type of pathogen for blood stream infection and UTI/CAUTI □

Other type of pathogen/no link with UTI/CAUTI □

Unable to establish □

Is there any quality statement from patient?

(One line statement only please)

Prior to intervention (during audit):

After audit/QI intervention:

**COMMENTS**

**QUALITY IMPROVEMENT INDICATORS**

- Tick if a passport was given during audit/QI interventions □
- Tick if TWOC reminder stickers were given during audit/QI interventions □

List identified quality improvement interventions:

- E.G. catheter-securement device required
- 
- 
- 

**Site-Specific questions**

Is the ward compliant with

<p>| Yes | □ | No | □ |</p>
<table>
<thead>
<tr>
<th>the &quot;catheter device&quot; documentation?</th>
<th>Yes ☐</th>
<th>No ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has this been filled appropriately?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 3: Summary of Catheter Care Awareness Week 2016

Catheter care
Awareness Week
20 - 24 June 2016
Post-Campaign Summary

Event Attendees & Coordinators:
966 healthcare professionals
256 patients
10 urology industry partners

Activities & Social Media:
20 formal face-to-face events
CAUTI animation viewed 500 times
Catheter Care HIN webpage viewed 550 times
14 million & 475 Twitter impressions and participants

Main Themes:
- Fully documented catheter history
- Re-assessment & prompt removal
- Securing catheters
- Patient, staff & student education
- Alternatives to catheters
- Improved discharge & passports
- Aseptic non-touch technique

Future Recommendations:
1) Focus on 3 main themes:
   i. Securing
   ii. Removing
   iii. Catheter Passport
2) Link themes to interventions, measurements & spread
3) Produce patient stories to share
4) Collectively learn from campaign reflection

*Some images used in this infographic have been adapted from Shutterstock
www.hin-southlondon.org @HINSouthLondon