

# Reducing catheter-associated urinary tract infections through best practice: Sherwood Forest Hospitals' experience

Sally Palmer and Rosie Dixon

**E**ssential to the prevention of catheter-associated urinary tract infections (CAUTIs) is adherence to best catheterisation practice (Royal College of Nursing, 2012; Loveday et al, 2014) across a healthcare setting, which must be continually monitored and reinforced. Owing to time constraints in secondary care, individualised instances of suboptimal catheterisation practice may occur. When staff are continually working in a high-pressure environment with limited time resources, such instances of suboptimal practice may become increasingly frequent, leading to poor patient outcomes.

Sherwood Forest Hospitals NHS Foundation Trust covers three hospitals sites at King's Mill, Newark and Mansfield. In 2014, the Trust's senior teams became aware that catheterisation outcomes within the Trust were suboptimal. This was identified after a locally applied Commissioning for Quality and Innovation (CQUIN) was put in place to aid the reduction of CAUTI-related bloodstream infections (BSIs). The themes identified from this work informed the senior teams that catheter management was suboptimal.

The infection prevention and control (IPC) team subsequently carried out an internal assessment to evaluate current catheter practices across the Trust. The results showed that these were not meeting the required standard and there was an evident lack of consistency between catheterisations. Specifically, in certain instances, the procedures were being performed without adhering fully to all necessary aseptic procedures, they were taking place without the use of the full range of recommended products and, occasionally, large bore catheters were being used when not required.

These factors were all potentially contributing to the high rate of CAUTIs within the Trust. Across the Trust, a CAUTI is defined as a UTI that occurs in a patient who has had an indwelling urinary catheter in place for 48 hours before the onset of the UTI. The description of a BSI associated with UTI is when a blood culture detects the presence of the same organism as in a patient's urine.

To improve catheterisation practice, the IPC team introduced a strategy to ensure that the process of catheterisation occurred with minimal variation and was easier to perform for individual nurses. The aim was to standardise the procedure, to make adherence to it easier. Through the standardisation of practice,

## ABSTRACT

A programme to standardise catheterisation practice was introduced in Sherwood Forest Hospitals NHS Trust in 2016, with the aim of reducing the incidence of catheter-associated urinary tract infections (CAUTIs). The initiative involved the use of a catheterisation pack (Bard® Tray). Within the first year following its introduction, the CAUTI rate had been reduced from 13.3% to 2.1% (between July 2016 and June 2017), which is a reduction of more than 80%. Standardisation has also brought cost savings for the Trust of about £33 000 a year. The Trust has maintained its standardisation approach and CAUTI rates remain at around 2%.

**Key words:** Catheterisation ■ Catheter ■ Infection ■ Catheter tray

the Trust also aimed to achieve a reduction in harm, as shown by a reduction in the incidence of CAUTIs. Standardisation aimed to reduce the risk of infection from urinary catheters; the Trust recognised that due to the inconsistent practices applied during the insertion of urinary catheters, it was partly responsible for the increasing numbers of Gram-negative BSIs.

Since the introduction of the Bard® Tray (known at the time of the evaluation as the Bard Comprehensive Care Foley Tray) there has been a reduction in these infections. The initiative pre-empted the NHS Improvement (2017) drive to reduce Gram-negative BSIs by 50% before March 2021, 45% of which are caused by UTIs. This article outlines the Trust's approach to standardising catheterisation and the benefits that this can bring.

## Methods

### Updating the catheterisation procedure

Once the IPC team had identified that catheterisation practice across the Trust was failing to achieve the required standards, the Trust established a health economic working group to examine

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the problem and provide a solution.

The group included an IPC nurse from the Trust and IPC nurses from primary care services (whose remit covered commissioning and provider services, and all areas of health care, including mental health), urology outreach nurses and continence advisers. They examined possible options to improve catheter practice and decided to trial the introduction of a catheter tray that would contain within a single unit all the necessary components for catheterisation.

- The Trust tested two trays: the Cathi-it Acute Plus Tray (Richardson Healthcare Ltd) and the Bard Tray (CR Bard Inc, now part of BD) for one month each. Following the trials, the Trust decided to proceed with the Bard catheterisation pack, which included all the equipment required: a Foley catheter, lubricating gel, cleansing solution, apron and Statlock® Foley Stabilisation Device. The choice was made because staff undertaking catheterisation (i.e. nurses, healthcare support workers and operating department practitioners) expressed a distinct preference for having a bag preconnected to the Foley catheter. The catheter and bag come as a sterile, sealed unit, which means that it is a fully-maintained closed drainage system that eliminates the risk of accidental contamination.

### Procurement input

The Trust's procurement team set stringent guidelines for the introduction of the packs, requiring a full understanding of the costs of introducing Bard catheter packs in the Trust before giving the go-ahead. To provide a fair comparison of costs the team also required the submission of three options, with estimated costs based on current catheter usage. This was equivalent to the insertion of 10700 indwelling catheters per annum (all the costs detailed included value added tax). The three options for comparison were as follows:

#### Option 1

The cost of the procedure that was currently in use: this did not comply with Trust policies and national guidelines, and omitted key pieces of equipment. However, this process was in use across most hospital areas. The annual cost of this option was £105405.

#### Option 2

The costs of the hospital fully complying with policies and guidelines, and using equipment based on the present ordering process. To achieve full compliance, additional equipment would need to be purchased. Based on the Trust's supplies data, this included increasing the number of fenestrated drapes and securing devices ordered to match the number of catheterisations performed.

This would improve the sterility of insertion and increase the use of stabilisation devices from 17% to 100%. Both sterility and stabilisation were themes identified from a root cause analysis (RCA) that was carried out to review BSIs associated with CAUTIs. The annual cost for this was calculated at £123786, of which £18381 were costs additional to the Trust's current catheter expenditure.

#### Option 3

The cost of implementing the Bard Tray in its entirety, which

includes all the necessary equipment required for catheterisation, was identified as being a higher cost than our present system at £110845, which meant the Trust would have to pay an additional £5440 a year to implement it.

### Comparison

When direct cost comparisons were made between the three alternatives, the least expensive was option 1, which reflected the current non-compliant procedures and processes followed by most staff. Option 2 was the most expensive, but it would provide every area with all the correct equipment required to complete a safe catheterisation.

Option 3 (the Bard Tray), in comparison with option 1, would result in a potential additional annual cost of £5440 but, in comparison with option 2, would bring a cost saving of around £13000.

Both options 2 and 3 would enable staff to be fully compliant with policies and guidelines when inserting a urinary catheter. The case for each option was presented to the senior management teams to obtain acceptance and, ultimately, agreement from the clinical division that it would accept the potential costs to ensure that safe practice was promoted. Agreement to accept the additional costs of £5440 for introducing option 3 was successfully obtained.

### Implementation process

Training across all adult inpatient areas for all staff carrying out catheterisation who would be using the Bard Trays began 2 months ahead of their introduction. The training consisted of showing staff the tray and its components and explaining how to use the equipment. Staff did not receive any updated training on how to catheterise a patient due to the lack of training resources available at the time. Following training in how to use the packs and approval from the procurement department, the trays were introduced on the wards.

The switchover was made floor by floor, on a one floor a week basis; individual urinary catheters were swapped for trays and the full implementation process took place over 3 months. The process started on the top floor of the hospital and ended in the emergency department and emergency admissions unit. The rationale for this approach was to ensure that all staff were aware of the new catheters and the other equipment that the packs contained before they admitted a patient to their ward. This is especially important because the majority of the catheterisations in the Trust take place in the emergency admissions areas.

Carrying out the process floor by floor enabled the procurement team to manage the removal and redistribution of old equipment that was no longer required in each area more efficiently. This strategy also allowed the IPC team to work with each area individually to ensure that the changeover was as seamless as possible. At the time of introduction, the trays were available in two catheter sizes: 12 Ch and 14 Ch. The provision of catheters that are supported by Trust policy aimed to minimise the risk of an incorrect catheter size being used and ensuring that staff were able to comply with Trust policy.

**Root cause analysis: process and themes**

To monitor hospital-acquired bloodstream infections related to urinary catheters, the IPC team implemented the RCA process prior to the introduction of the Bard Tray. Any area found to have a BSI was requested to complete an RCA and present this at the monthly feedback meeting to demonstrate good practice or learning points to enable the hospital teams to improve practice across the organisation.

As part of the RCA process, ward areas investigated all aspects of the patient’s care relating to their urinary catheter, including the process used to insert it, catheter daily maintenance and the continued need to have it in situ. The RCA document included a timeline of a patient’s care, a summary of the findings, and the proposed action plan following on from the RCA. The document is then monitored at the ward’s divisional governance meetings to ensure that the actions are completed.

**Results**

**Benefits of using the Bard Tray**

The pack was introduced in July 2016. At the time, the Trust CAUTI rate was 13.3%. Before the introduction of the trays, the Trust carried out a prevalence survey of all adult inpatients over a single day. The survey looked at all patients with catheters and recorded the following information:

- Reason for insertion
- Date of insertion
- How long the catheter had been in place
- If the patient was being treated for a CAUTI
- Whether this was a community-acquired or Trust-acquired infection.

The data were gathered using an electronic audit tool: the software chosen was Medical Audits Software Systems (Medical Audits Limited, Dublin, Ireland) due to its ability to provide real-time audit data, track non-compliance through to closure of any actions and its ease of use in the clinical setting. The prevalence survey reviewed 600 patients, who were spread over 26 ward areas across 3 hospital sites. The number of patients who had a catheter during the survey shown in *Table 1*. Within the first year of introducing the tray, the CAUTI rate had been cut from 13.3% to 2.1% (between July 2016 and June 2017), which was a reduction of more than 80%. This is illustrated in *Figure 1*. *Table 1* shows the value changes between March 2016 and March 2018.

Concurrent with the reduction in CAUTI incidence was a reduction in the number of BSIs secondary to CAUTIs. In 2015-16, there were 11 BSIs related to CAUTI, in 2016-17, this was again 11, while in 2017-18 the figure fell to 9.

Throughout this period, the only change in practice that had occurred across the Trust had been the introduction of the Bard Trays (and the associated initial introductory training provided by the manufacturer). Since June 2017, the reduction in CAUTIs has been maintained across the Trust. The last audit (a point prevalence survey) from March 2018 indicated that the CAUTI rate in the Trust on that day was 2%). Nottingham University Hospitals have also introduced the use of the Bard Trays and have reported similar results to the findings in this Trust (Cartwright, 2018).

**Table 1. Change in catheter-associated urinary tract infections (CAUTI) rates over time following the introduction of the Bard® Tray**

Date	Catheters in situ	CAUTI
March 2016	143	19
June 2016	69	9
March 2017	105	7
June 2017	96	2
March 2018	115	2

**Root cause analysis**

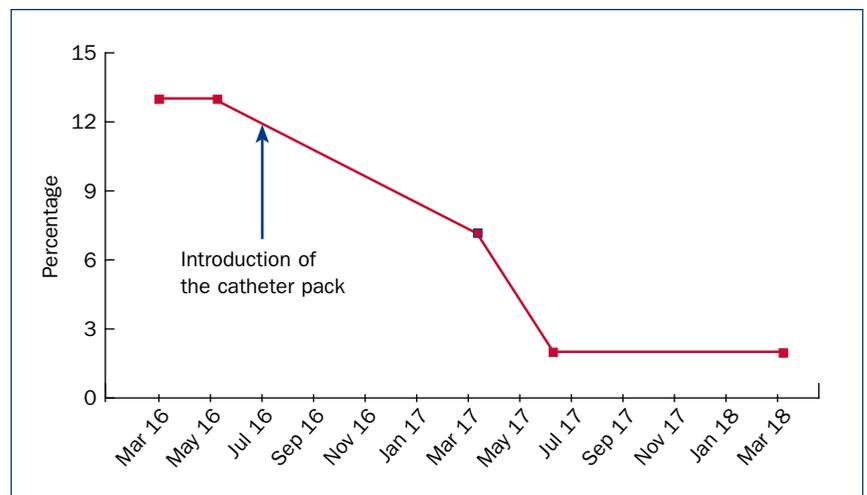
The IPC team carried out an RCA before the introduction of the tray to ascertain the causative factors that were contributing to the high incidence of CAUTIs. This had found that:

- The wrong sizes of urinary catheter were being used
- The devices were being left in situ for extended periods when they were not required
- Stabilisation devices were not being used
- Catheters were not changed in a timely manner
- Staff were not following policy/guidance at the time of urinary catheterisation.

The RCAs continued to be undertaken after the implementation of the Bard Trays and analysis of the RCA results after introduction of the tray showed that the rate of CAUTI BSI was now attributable more to patient compliance rather than to care-related factors.

**Financial impact**

From a financial perspective, the introduction of the Bard Tray has brought a significant benefit by reducing the incidence of CAUTIs. The initial introduction of the tray incurred additional costs of £5440 for the Trust. However, the introduction of the trays have led to significant cost savings, as their use has led to a reduction in CAUTIs. The cost savings equate to about £33000 over a year, which were calculated according to National Institute for Health and Care Excellence (2011) attributable costs of healthcare-associated infections data.



**Figure 1. Reduction in catheter-associated urinary tract infections after the introduction of the Bard Tray**

## KEY POINTS

- The Bard Tray was introduced in Sherwood Forest Hospitals NHS Trust with the aim of standardising catheterisation practice and reducing catheter-associated urinary tract infection (CAUTI)
- Within the first year following the introduction of the tray, CAUTI incidence had been reduced by more than 80%
- Ongoing use of the tray has helped to maintain reductions in CAUTI rates
- The reduction in CAUTI rates had enabled the Trust to achieve significant cost savings of about £33 000 a year

## Challenges

The introduction of the trays required a change in practice across the Trust. However, some staff were initially reluctant to alter their long-standing method of catheterisation, because they were reluctant to use lubricating gel instead of anaesthetic gel and to switch to using the new equipment. However, there was a gradual shift in perception among reluctant staff. One month following the introduction of the trays anecdotal evidence showed that the staff who were carrying out catheterisation had a positive opinion of the tray and its impact on catheterisation processes.

Following the introduction of the standardised approach to catheterisation, some staff highlighted the absence of anaesthetic gel within the Bard pack as a potential issue for patients. However, investigation by the IPC team found that a few staff were using anaesthetic gel, but they were not allowing sufficient time for it to take effect before catheterising the patient. Although anaesthetic gel is not included in the Bard Tray, lubricating gel is part of the pack. However, if an individual practitioner prefers to use anaesthetic gel, the Trust retains a supply of this, which can be requested. In addition, the Bard Tray comes in two catheter sizes and the Trust provides specialised catheters in defined locations for individual catheterisation requirements.

One other potential concern raised by staff was regarding the potential effect of the Statlock Foley Stabilisation Device on elderly skin. However, with the introduction of the Bard Tray, to prevent any potential impact on vulnerable skin, nurses

received training on establishing the correct position for the Statlock device and its subsequent correct removal.

## Conclusion

The introduction of standardised catheterisation practice in Sherwood Forest Hospitals NHS Trust has led to a significant reduction in the rate of CAUTIs. Prior to the introduction of the Bard Tray, staff (including those who may catheterise patients infrequently) may have used slightly different equipment, such as different sized catheters, or used different catheterisation techniques.

However, since the introduction of the tray, all the components needed for catheterisation are now included in a single pack with a choice of two catheter sizes. The benefits to the Trust in terms of reduced CAUTI rates have been significant. Within the first year of the tray's introduction, CAUTI incidence fell from 13.3% to 2.1%, between July 2016 and June 2017. This reduction has been maintained into 2018, as the results of the last audit confirmed.

The reduction in CAUTIs has enabled the Trust to make significant savings, estimated to be about £33 000 a year. Most staff were happy with the introduction of the trays from the start and any initial concerns were allayed once staff started using them. **BJN**

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## CPD reflective questions

- Reflect on current catheterisation practice in your area
- How can improving catheter management reduce the use of antibiotics?
- Consider why inadequate stabilisation of catheters may increase the risk of catheter-associated urinary tract infections
- Why would you use smaller size catheters to reduce infections?
- Reflect on why catheters need to be removed at the earliest opportunity