Minimizing CAUTI Risk Through Implementation of a Team-generated Nurse-directed Protocol

The Problem
- Catheter-associated urinary tract infections (CAUTIs) are the most common healthcare-associated infection.
- Patients with an indwelling urinary catheter (IUC) have a 5-7% risk of acquiring CAUTI each day the catheter is in place.
- At BIDMC, CAUTI rates and the IUC device utilization ratio (DUR, a measure of how frequently IUCs are used) in intensive care units (ICUs) are both worse than national benchmarks, despite interventions to date.
- Past interventions including education regarding aseptic catheter insertion, evaluating appropriate catheter maintenance, and daily order for IUCs have not significantly impacted the DUR or CAUTI rate.

Aim
In the selected intervention ICU, we aim to achieve a 25% reduction in the baseline DUR within the first two fiscal quarters of protocol implementation.

The Team
ICU RN Local Champions: Christine Joyce, Lisa Mirabella, Susan Kitchen, Lauren Schmitz
ICU Clinical RN Specialists/Managers: Sharon O'Donoghue, Marjorie Serrano
MDs (multidisciplinary): Peter Steinberg, Andrew Hale, Deborah Nagle
Infection Control/Hospital Epidemiology: Robin Kalaidjian, Aleah Holyoak, Payal Patel
Critical Care Quality: Michael Cocchi, Kristin O'Reilly, Kathryn Zieja
Center for Resuscitation Science: Michael Donnino, Parth Patel, Mary MacDonald
Co-Investigators: Susan Holland, Peter Clardy, Sharon Wright, Graham Snyder
And many other nurses, physicians and staff providing input and oversight.

The Interventions
Intervention: Employ a team-generated, nurse-directed protocol to reduce the duration of IUCs, specifically through facilitating prompt removal of IUCs.

Methods:
- Develop criteria classifying catheters into high-, intermediate-, low-justification:
  - high-justification catheters have an evidence-based indication or likely complication with removal and are retained
  - intermediate-justification catheters have a relative indication or contraindication, and team is encouraged to consider removal
  - low-justification catheters have no compelling indication or contraindication to removal, and are removed by RN
- Compare DUR during 3-month baseline and implementation periods.

The Results
DUR and CAUTI did not improve with the intervention:

<table>
<thead>
<tr>
<th>METRIC</th>
<th>BASELINE</th>
<th>WASH-IN</th>
<th>IMPLEMENTATION</th>
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<tbody>
<tr>
<td>DUR</td>
<td>0.71</td>
<td>0.73</td>
<td>0.74</td>
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<tr>
<td>CAUTI/month</td>
<td>1.33</td>
<td>1.40</td>
<td>2.00</td>
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<tr>
<td>CAUTI rate, per 1000 catheter-days</td>
<td>7.81</td>
<td>7.06</td>
<td>9.57</td>
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</tbody>
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Most catheters were classified as high-justification:

<table>
<thead>
<tr>
<th>CATHETER CLASSIFICATION</th>
<th>BASELINE (%)</th>
<th>IMPLEMENTATION (%)</th>
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<tbody>
<tr>
<td>High</td>
<td>638 (88.9)</td>
<td>682 (89.7)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>45 (6.3)</td>
<td>42 (5.5)</td>
</tr>
<tr>
<td>Low</td>
<td>35 (4.9)</td>
<td>37 (4.7)</td>
</tr>
</tbody>
</table>

- The most common High indication was urine output monitoring, accounting for 619 (97.0%) and 649 (95.2%) of high-justification catheter days during baseline and implementation periods, respectively.
- Common intermediate-justification catheter indications were: sedation, regional wounds with urinary incontinence, post-operative status, chronic intermittent catheterization, and comfort measures only.
- Low-justification catheters were removed infrequently: 4 of 35 (11.4%) in the baseline period, and 4 of 37 (10.8%) in the implementation period.

Lessons Learned
- Future interventions should consider when urine output monitoring is indicated, and how documentation and ordering this indication takes place.
- Misperceptions of catheter risk and indication persist; without ongoing education, barrier to reducing catheter use through prompt removal of catheters may persist.
- Catheters are placed in a variety of settings; assessing the appropriateness of indication at the time of insertion in addition to reassessing catheter indication daily may be an important intervention.

Next Steps
- ICU CAUTI Task Force: Multi-disciplinary team led by Critical Care nursing and physician leadership; using data from this project, prior interventions, and published guidelines to improve DUR and CAUTI across all BIDMC ICUs
- Infection Control/Hospital Epidemiology is working with Nursing and Information Systems to capture and report CAUTI and DUR non-ICU medical/surgical units; information on catheter use will help minimize catheter use in non-ICU units.

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