This report is a summary of Device-Associated (DA) and Procedure-Associated (PA) module data collected and reported by hospitals and ambulatory surgical centers participating in the National Healthcare Safety Network (NHSN) from January 2006 through December 2008 as reported to the Centers for Disease Control and Prevention (CDC) by July 6, 2009. This report updates previously published DA and PA module data from the NHSN.1

The NHSN was established in 2005 to integrate and supersede 5 legacy surveillance systems at the CDC: the National Nosocomial Infections Surveillance (NNIS) system, the Dialysis Surveillance Network (DSN), and the National Surveillance System for Healthcare Workers (NaSH). Similar to the NNIS system, NHSN facilities voluntarily report their health care–associated infection (HAI) surveillance data for aggregation into a single national database for the following purposes:

- Estimation of the magnitude of HAIs
- Monitoring of HAI trends
- Facilitation of interfacility and intrafacility comparisons with risk-adjusted data that can be used for local quality improvement activities
- Assistance to facilities in developing surveillance and analysis methods that permit timely recognition of patient safety problems and prompt intervention with appropriate measures.

In addition, many facilities use these same data to comply with state reporting mandates. Identity of all NHSN facilities is kept confidential by the CDC in accordance with Sections 304, 306, and 308(d) of the Public Health Service Act [42 USC 242b, 242k, and 242m(d)].

METHODS

NHSN data collection, reporting, and analysis are organized into 4 components: Patient Safety, Healthcare Personnel Safety, Biovigilance, and Research and Development. Data for the Patient Safety Component are collected using standardized methods and definitions2,3 and in accordance with specific module protocols.4 The modules may be used singly or simultaneously, but once selected, they must be used for a minimum of 1 calendar month. All infections are categorized using standard CDC definitions that include laboratory and clinical criteria.3 The DA module may be used by facilities other than hospitals, including long-term care facilities and outpatient dialysis centers. A report of data from this module for outpatient dialysis centers was published separately.5

Device-Associated module

Infection preventionists (IPs) may choose to collect data on central line-associated primary bloodstream
infections (BSIs), ventilator-associated pneumonias, or urinary catheter-associated urinary tract infections (UTIs) that occur in patients staying in a patient care location such as a critical care or intensive care unit (ICU), specialty care area (SCA), or ward. In NHSN, these locations are further characterized according to patient population: adults, children, or infants (in tables, pediatric and nursery locations are so noted). In neonatal intensive care unit (NICU) locations (level III or level II/III), IPs collect data on central line-associated and umbilical catheter–associated primary bloodstream infections or ventilator-associated pneumonia for each of 5 birth-weight categories (≤750 g, 751-1000 g, 1001-1500 g, 1501-2500 g, and >2500 g). Corresponding location-specific denominator data consisting of patient-days and specific device-days are also collected by IPs or other trained personnel.

Twenty-one new locations—pediatric cardiothoracic ICU, respiratory ICU, behavioral health ward, genitourinary ward, gerontology ward, gynecology ward, labor and delivery ward, labor, delivery, recovery, postpartum ward, neurology ward, neurosurgical ward, orthopedic ward, pediatric medical/surgical ward, pediatric medical ward, postpartum ward, vascular surgery ward, level I nursery, level II nursery, long-term care unit, long-term acute care SCA, solid organ transplant SCA and pediatric hematology/oncology SCA—had sufficient data to be included in this report. Among these new locations only pediatric medical/surgical ward comprised sufficient data to provide key percentiles of the distributions of central line-associated bloodstream and catheter-associated UTI rate and DU ratios.

The data for adult combined medical/surgical ICUs were split into two groups by type of hospital: “major teaching” and “all others.” Major teaching status was defined as a hospital that is an important part of the teaching program of a medical school and the majority of medical students rotate through multiple clinical services. The “all others” group of adult combined medical/surgical ICUs were further split into 2 groups by unit bed size: ≤15 beds and >15 beds. In addition, the data for adult medical ICUs were split into 2 groups by type of hospital as defined above.

In non-NICU locations, the device-days consisted of the total number of central line-days, urinary catheter-days, or ventilator-days. The DU of a location is one measure of invasive practices in that location and constitutes an extrinsic risk factor for health care-associated infection. DU also may serve as a marker for severity of illness of patients, that is, patients’ intrinsic susceptibility to infection.

### Procedure-Associated module

IPs select from the NHSN operative procedure category list those inpatient and/or outpatient procedures for which they decide to monitor surgical patients for SSIs or postprocedure pneumonias (PPPs). During the month chosen for surveillance, data are collected on every patient undergoing procedures within the selected procedure category, including information on risk factors for SSI such as duration of procedure in minutes.

### Table 1. NHSN hospitals contributing data used in this report

<table>
<thead>
<tr>
<th>Hospital type</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children’s</td>
<td>38 (2.5)</td>
</tr>
<tr>
<td>General, including acute, trauma, and teaching</td>
<td>1389 (89.9)</td>
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<tr>
<td>Long-term acute care</td>
<td>27 (1.7)</td>
</tr>
<tr>
<td>Military</td>
<td>9 (0.6)</td>
</tr>
<tr>
<td>Oncology</td>
<td>8 (0.5)</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>8 (0.5)</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>8 (0.5)</td>
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<td>Rehabilitation</td>
<td>17 (1.1)</td>
</tr>
<tr>
<td>Surgical</td>
<td>1 (0.1)</td>
</tr>
<tr>
<td>Veterans Affairs</td>
<td>31 (2.0)</td>
</tr>
<tr>
<td>Women’s</td>
<td>4 (0.3)</td>
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<tr>
<td>Women’s and children’s</td>
<td>5 (0.3)</td>
</tr>
<tr>
<td>Total</td>
<td>1545 (100)</td>
</tr>
</tbody>
</table>

NOTE. Major: Hospital is an important part of the teaching program of a medical school, and the majority of medical students rotate through multiple clinical services. Graduate: Hospital is used by the medical school for graduate training programs only (ie, residency and/or fellowships). Limited: Hospital is used in the medical school’s teaching program to only a limited extent.

### Table 2. NHSN hospitals contributing data used in this report by hospital type and bed size

<table>
<thead>
<tr>
<th>Bed size category</th>
<th>Hospital type</th>
<th>N (%)</th>
<th>N (%)</th>
<th>N (%)</th>
<th>N (%)</th>
<th>Total</th>
</tr>
</thead>
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<td>≤200</td>
<td>Major teaching</td>
<td>83 (5.4)</td>
<td>110 (7.1)</td>
<td>73 (4.7)</td>
<td>3 (0.2)</td>
<td>269 (17.4)</td>
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<td></td>
<td>Graduate teaching</td>
<td>73 (4.7)</td>
<td>60 (3.8)</td>
<td>22 (1.4)</td>
<td>0 (0.0)</td>
<td>155 (10.0)</td>
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<td></td>
<td>Limited teaching</td>
<td>96 (6.2)</td>
<td>59 (3.8)</td>
<td>7 (0.5)</td>
<td>0 (0.0)</td>
<td>162 (10.5)</td>
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<tr>
<td></td>
<td>Nonteaching</td>
<td>730 (47.2)</td>
<td>211 (13.7)</td>
<td>17 (1.1)</td>
<td>1 (0.1)</td>
<td>959 (62.1)</td>
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<td></td>
<td>Total</td>
<td>982 (63.6)</td>
<td>440 (28.5)</td>
<td>119 (7.6)</td>
<td>4 (0.3)</td>
<td>1545 (100)</td>
</tr>
</tbody>
</table>

NOTE. Major: Hospital is an important part of the teaching program of a medical school, and the majority of medical students rotate through multiple clinical services. Graduate: Hospital is used by the medical school for graduate training programs only (ie, residency and/or fellowships). Limited: Hospital is used in the medical school’s teaching program to only a limited extent.
Table 3. Pooled means and key percentiles of the distribution of laboratory-confirmed central line–associated BSI rates and central line utilization ratios, by type of location, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Type of location</th>
<th>No. of locationsa</th>
<th>No. of CLABSI</th>
<th>Central line-days</th>
<th>Central line-utilization ratio§</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
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<tbody>
<tr>
<td>Critical care units</td>
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<tr>
<td>Burn</td>
<td>35</td>
<td>390</td>
<td>70,932</td>
<td>5.5</td>
<td>0.0</td>
<td>1.2</td>
<td>3.1</td>
<td>7.5</td>
<td>11.8</td>
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<tr>
<td>Medical cardiac</td>
<td>228 (221)</td>
<td>876</td>
<td>436,409</td>
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<td>0.0</td>
<td>0.0</td>
<td>1.3</td>
<td>2.5</td>
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<td>Medical major teaching</td>
<td>125</td>
<td>1410</td>
<td>549,088</td>
<td>2.6</td>
<td>0.1</td>
<td>1.1</td>
<td>2.3</td>
<td>3.7</td>
<td>5.2</td>
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<tr>
<td>Medical all others</td>
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<td>687</td>
<td>362,388</td>
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<td>1.0</td>
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<td>4.3</td>
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<tr>
<td>Medical/surgical major teaching</td>
<td>182 (181)</td>
<td>1474</td>
<td>699,300</td>
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<td>0.0</td>
<td>0.6</td>
<td>1.7</td>
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<td>4.6</td>
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<tr>
<td>Medical/surgical all others ≤15 beds</td>
<td>718 (650)</td>
<td>1130</td>
<td>755,437</td>
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<td>1.8</td>
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<tr>
<td>Medical/surgical all others &gt;15 beds</td>
<td>280 (277)</td>
<td>1449</td>
<td>986,982</td>
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<td>1.1</td>
<td>2.0</td>
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<tr>
<td>Neurologic</td>
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<td>45,153</td>
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<td>160,879</td>
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<tr>
<td>Pediatric cardiothoracic</td>
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<td>195</td>
<td>58,626</td>
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<td>16 (15)</td>
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<tr>
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<td>Inpatient wards</td>
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<td>Adult step-down unit (postcritical care)</td>
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<td>Level II nursery</td>
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<tr>
<td>Medical</td>
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<td>Neurosurgical</td>
<td>15 (14)</td>
<td>12</td>
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<td>Orthopedic</td>
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<tr>
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<td>Vascular surgery</td>
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<td>Inpatient long-term care units</td>
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<td>Long-term care</td>
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<td>6030</td>
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(Continued)
Table 3. (Continued)

<table>
<thead>
<tr>
<th>Type of location</th>
<th>No. of locations</th>
<th>Central line-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
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<tbody>
<tr>
<td>Neurosurgical</td>
<td>72</td>
<td>160,879</td>
<td>362,881</td>
<td>0.44</td>
<td>0.28</td>
<td>0.36</td>
<td>0.44</td>
<td>0.57</td>
<td>0.66</td>
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<td>58,626</td>
<td>95,130</td>
<td>0.62</td>
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<td>17,321</td>
<td>43,797</td>
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<td>Surgical</td>
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<td>729,989</td>
<td>1,230,430</td>
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<td>0.51</td>
<td>0.62</td>
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<td>893,084</td>
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<td>0.58</td>
<td>0.73</td>
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<td>Trauma</td>
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<td>224,864</td>
<td>354,494</td>
<td>0.63</td>
<td>0.41</td>
<td>0.54</td>
<td>0.62</td>
<td>0.69</td>
<td>0.77</td>
</tr>
</tbody>
</table>

Inpatient wards

Adult step-down unit (postcritical care) | 145 (144) | 141,374 | 793,149 | 0.18 | 0.05 | 0.08 | 0.13 | 0.26 | 0.39 |
Behavioral health/psychiatric | 37 (35) | 1803 | 83,545 | 0.02 | 0.01 | 0.01 | 0.02 | 0.04 | 0.05 |
Genitourinary | 5 | 16,902 | 57,237 | 0.30 |     |     |     |     |     |
Gerontology | 5 | 2674 | 18,567 | 0.14 |     |     |     |     |     |
Gynecology | 11 (10) | 5694 | 60,466 | 0.09 |     |     |     |     |     |
Labor and delivery | 20 (19) | 255 | 9546 | 0.03 |     |     |     |     |     |
Labor, delivery, recovery, postpartum suite | 32 (30) | 555 | 16,346 | 0.03 | 0.00 | 0.01 | 0.02 | 0.03 | 0.12 |
Level I nursery | 10 (8) | 537 | 5225 | 0.10 |     |     |     |     |     |
Level II nursery | 5 | 979 | 3972 | 0.25 |     |     |     |     |     |
Medical | 201 (200) | 278,221 | 1,408,507 | 0.20 | 0.06 | 0.09 | 0.17 | 0.24 | 0.34 |
Medical/surgical | 617 (613) | 618,196 | 3,839,045 | 0.16 | 0.04 | 0.07 | 0.11 | 0.18 | 0.26 |
Neurologic | 12 | 10,723 | 69,343 | 0.15 |     |     |     |     |     |
Neurosurgical | 15 | 13,866 | 83,780 | 0.17 |     |     |     |     |     |
Orthopedic | 56 (54) | 40,425 | 343,273 | 0.12 | 0.03 | 0.05 | 0.06 | 0.10 | 0.17 |
Pediatric medical | 12 | 10,232 | 59,826 | 0.20 | 0.02 | 0.03 | 0.06 | 0.14 | 0.26 |
Pediatric medical/surgical | 61 (58) | 32,581 | 165,571 | 0.17 |     |     |     |     |     |
Postpartum | 36 (35) | 943 | 67,780 | 0.01 | 0.00 | 0.01 | 0.01 | 0.02 | 0.03 |
Rehabilitation | 121 (120) | 47,052 | 570,671 | 0.08 | 0.03 | 0.05 | 0.08 | 0.11 | 0.17 |
Surgical | 93 | 132,336 | 664,399 | 0.20 | 0.05 | 0.10 | 0.16 | 0.24 | 0.32 |
Vascular surgery | 8 | 11,345 | 50,079 | 0.23 |     |     |     |     |     |

Inpatient long-term care units

Long-term care | 9 | 6030 | 63,417 | 0.10 |     |     |     |     |     |

BSI, bloodstream infection; CLABSI, central line-associated BSI.

* Number of locations meeting minimum requirements for percentile distributions if less than the total number of locations. If this number < 20, then percentile distributions are not calculated.

1 Number of CLABSIs (number of central line-days) × 1000

2 Includes 6 clinical sepsis BSIIs.

3 Number of CLABSI

4 Number of central line-days

wound class, and American Society of Anesthesiology (ASA) score. Unlike the NNIS system, the NHSN operative procedure list does not include “catchall” procedure categories, such as “OCVS, other cardiovascular.” Eleven new inpatient procedures—AMP, HTP, KTP, LTP, NECK, NEPH, OVRY, PRST, SPLE, THOR, and THYR—and 6 outpatient procedures—APPY, BRST, CHOL, FX, KPRO, and VHYS—had sufficient data to be included in this report (see Table 2 for description and data).

Medication-Associated module

For certain locations, facilities choose to report susceptibility data for selected organisms and/or antimicrobial use data for selected agents. Data from this module were reported separately.

RESULTS

There were 2027 facilities eligible to report to NHSN at the end of 2008, of which 1665 had filed monthly reporting plans signaling their intent to follow one or more of the Patient Safety Component modules for at least 1 month. From this group, a total of 1545 hospitals and 20 outpatient surgery centers had reported at least denominator data for some patient cohorts under surveillance during 2006 to 2008. These 1545 hospitals are located in 48 states and the District of Columbia and are predominantly general acute care hospitals with a mix of bed sizes and medical school affiliations (Tables 1 and 2). For the DA module where data volume was sufficient for this report, we tabulated device-associated infection rates and device utilization (DU) ratios for January
Table 4. Pooled means and key percentiles of the distribution of laboratory-confirmed permanent and temporary central line–associated BSI rates and central line utilization ratios, by type of location, DA module, 2006 through 2008

### Permanent central line–associated BSI rate*

<table>
<thead>
<tr>
<th>Type of location</th>
<th>No. of locations (^1)</th>
<th>No. of PCLABS</th>
<th>Permanent central line-days</th>
<th>Pooled mean 10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty care areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone marrow transplant</td>
<td>21</td>
<td>235</td>
<td>60,546</td>
<td>3.9</td>
<td>0.0</td>
<td>0.5</td>
<td>1.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Hematology/oncology</td>
<td>41</td>
<td>158</td>
<td>95,535</td>
<td>1.7</td>
<td>0.0</td>
<td>0.1</td>
<td>0.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Long-term acute care</td>
<td>43 (33)</td>
<td>38</td>
<td>23,278</td>
<td>1.6</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.3</td>
</tr>
<tr>
<td>Pediatric hematology/oncology</td>
<td>7</td>
<td>75</td>
<td>32,255</td>
<td>2.3</td>
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<td></td>
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<tr>
<td>Solid organ transplant</td>
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<td>11</td>
<td>3,953</td>
<td>2.8</td>
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### Temporary central line–associated BSI rate\(^2\)

<table>
<thead>
<tr>
<th>Type of location</th>
<th>No. of locations (^1)</th>
<th>No. of TCLABS</th>
<th>Temporary central line-days</th>
<th>Pooled mean 10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
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<td>Specialty care areas</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone marrow transplant</td>
<td>18 (17)</td>
<td>96</td>
<td>27,290</td>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hematology/oncology</td>
<td>33 (31)</td>
<td>117</td>
<td>51,950</td>
<td>2.3</td>
<td>0.0</td>
<td>0.0</td>
<td>1.3</td>
<td>2.8</td>
</tr>
<tr>
<td>Long-term acute care</td>
<td>67 (64)</td>
<td>260</td>
<td>149,298</td>
<td>1.7</td>
<td>0.0</td>
<td>0.3</td>
<td>1.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Pediatric hematology/oncology</td>
<td>5</td>
<td>47</td>
<td>10,287</td>
<td>4.6</td>
<td></td>
<td></td>
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<tr>
<td>Solid organ transplant</td>
<td>12</td>
<td>66</td>
<td>32,591</td>
<td>2.0</td>
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<td></td>
<td></td>
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</tbody>
</table>

### Permanent central line utilization ratio§

<table>
<thead>
<tr>
<th>Type of location</th>
<th>No. of locations (^1)</th>
<th>Permanent central line-days</th>
<th>Patient-days</th>
<th>Pooled mean 10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty care areas</td>
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<tr>
<td>Bone marrow transplant</td>
<td>21</td>
<td>60,546</td>
<td>100,520</td>
<td>0.60</td>
<td>0.18</td>
<td>0.41</td>
<td>0.57</td>
<td>0.83</td>
</tr>
<tr>
<td>Hematology/oncology</td>
<td>41</td>
<td>95,535</td>
<td>258,892</td>
<td>0.37</td>
<td>0.11</td>
<td>0.25</td>
<td>0.37</td>
<td>0.61</td>
</tr>
<tr>
<td>Long-term acute care</td>
<td>43</td>
<td>23,279</td>
<td>194,796</td>
<td>0.12</td>
<td>0.02</td>
<td>0.04</td>
<td>0.07</td>
<td>0.13</td>
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<tr>
<td>Pediatric hematology/oncology</td>
<td>7</td>
<td>32,255</td>
<td>50,910</td>
<td>0.63</td>
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<td></td>
<td></td>
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<tr>
<td>Solid organ transplant</td>
<td>9</td>
<td>3953</td>
<td>41,263</td>
<td>0.10</td>
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</table>

### Temporary central line utilization ratio\(^6\)

<table>
<thead>
<tr>
<th>Type of location</th>
<th>No. of locations (^1)</th>
<th>Temporary central line-days</th>
<th>Patient-days</th>
<th>Pooled mean 10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
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<td>Specialty care areas</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Bone marrow transplant</td>
<td>18</td>
<td>27,290</td>
<td>96,096</td>
<td>0.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hematology/oncology</td>
<td>33</td>
<td>51,950</td>
<td>238,801</td>
<td>0.22</td>
<td>0.07</td>
<td>0.12</td>
<td>0.15</td>
<td>0.25</td>
</tr>
<tr>
<td>Long-term acute care</td>
<td>67</td>
<td>149,298</td>
<td>329,928</td>
<td>0.45</td>
<td>0.05</td>
<td>0.23</td>
<td>0.51</td>
<td>0.69</td>
</tr>
<tr>
<td>Pediatric hematology/oncology</td>
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<td>10,287</td>
<td>46,142</td>
<td>0.22</td>
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<tr>
<td>Solid organ transplant</td>
<td>12</td>
<td>32,591</td>
<td>65,694</td>
<td>0.50</td>
<td></td>
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</tbody>
</table>

BSI, bloodstream infection; PCLAB, permanent central line–associated BSI; TCLAB, temporary central line–associated BSI.

* Number of PCLAB \(\times 1000\).

\(^1\) Number of locations meeting minimum requirements for percentile distributions if less than the total number of locations. If this number is < \(20\), then percentile distributions are not calculated.

\(^2\) Number of TCLAB \(\times 1000\).

\(^3\) Number of permanent central line-days.

\(^4\) Number of temporary central line-days

\(^5\) Number of patient-days

\(^6\) Number of temporary central line-days

\(^6\) Number of patient-days
Table 5. Pooled means and key percentiles of the distribution of urinary catheter-associated UTI rates and urinary catheter utilization ratios, by type of location, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Type of location</th>
<th>No. of locations</th>
<th>No. of urinary catheter-days</th>
<th>Pooled mean</th>
<th>Percentile</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary catheter-associated UTI rate*</td>
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<td></td>
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</tr>
<tr>
<td><strong>Critical care units</strong></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Burn</td>
<td>22</td>
<td>351</td>
<td>47,584</td>
<td>7.4</td>
<td>2.6</td>
<td>3.8</td>
<td>6.2</td>
<td>11.6</td>
<td>12.3</td>
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<tr>
<td>Medical cardiac</td>
<td>108</td>
<td>1457</td>
<td>302,388</td>
<td>4.8</td>
<td>0.0</td>
<td>2.1</td>
<td>4.1</td>
<td>6.3</td>
<td>9.4</td>
</tr>
<tr>
<td>Medical major teaching</td>
<td>53</td>
<td>1531</td>
<td>324,082</td>
<td>4.7</td>
<td>1.0</td>
<td>2.3</td>
<td>3.8</td>
<td>6.5</td>
<td>8.9</td>
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<tr>
<td>Medical all others</td>
<td>59</td>
<td>1135</td>
<td>289,636</td>
<td>3.9</td>
<td>0.0</td>
<td>1.6</td>
<td>3.0</td>
<td>5.9</td>
<td>8.2</td>
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<tr>
<td>Medical/surgical major teaching</td>
<td>89</td>
<td>1853</td>
<td>546,824</td>
<td>3.4</td>
<td>0.4</td>
<td>1.6</td>
<td>3.1</td>
<td>4.7</td>
<td>6.6</td>
</tr>
<tr>
<td>Medical/surgical all others</td>
<td>235 (230)</td>
<td>1586</td>
<td>459,741</td>
<td>3.4</td>
<td>0.0</td>
<td>0.0</td>
<td>2.1</td>
<td>4.3</td>
<td>6.2</td>
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<td>≤15 beds</td>
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<tr>
<td>Medical/surgical all others</td>
<td>111 (110)</td>
<td>2104</td>
<td>675,759</td>
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<td>1.0</td>
<td>2.6</td>
<td>4.5</td>
<td>7.3</td>
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<tr>
<td>&gt;15 beds</td>
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<tr>
<td>Neurologic</td>
<td>15</td>
<td>369</td>
<td>49,681</td>
<td>7.4</td>
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<tr>
<td>Neurosurgical</td>
<td>32</td>
<td>938</td>
<td>135,006</td>
<td>6.9</td>
<td>1.6</td>
<td>4.4</td>
<td>7.3</td>
<td>9.0</td>
<td>10.8</td>
</tr>
<tr>
<td>Pediatric cardithoracic</td>
<td>6 (5)</td>
<td>27</td>
<td>6079</td>
<td>4.4</td>
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<tr>
<td>Pediatric medical</td>
<td>5 (4)</td>
<td>8</td>
<td>205</td>
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<tr>
<td>Pediatric medical/surgical</td>
<td>53 (51)</td>
<td>377</td>
<td>88,718</td>
<td>4.2</td>
<td>0.0</td>
<td>0.8</td>
<td>3.4</td>
<td>5.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Surgical</td>
<td>95</td>
<td>2033</td>
<td>474,506</td>
<td>4.3</td>
<td>0.7</td>
<td>1.7</td>
<td>3.4</td>
<td>5.5</td>
<td>9.1</td>
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<td>Surgical cardithoracic</td>
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<td>1094</td>
<td>307,988</td>
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<td>0.7</td>
<td>2.1</td>
<td>3.2</td>
<td>4.8</td>
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<td>Trauma</td>
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<td>1151</td>
<td>212,948</td>
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<td>3.6</td>
<td>5.7</td>
<td>7.1</td>
<td>8.1</td>
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<tr>
<td><strong>Specialty care areas</strong></td>
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<td></td>
</tr>
<tr>
<td>Bone marrow transplant</td>
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<td>25</td>
<td>6495</td>
<td>3.8</td>
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<td></td>
<td></td>
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</tr>
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<td>0.1</td>
<td>1.9</td>
<td>4.2</td>
<td>8.8</td>
<td>11.8</td>
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<td>1</td>
<td>869</td>
<td>1.2</td>
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<tr>
<td>Long-term acute care</td>
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<td>695</td>
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<td>1.7</td>
<td>4.0</td>
<td>9.1</td>
<td>14.3</td>
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<td>Solid organ transplant</td>
<td>6</td>
<td>51</td>
<td>8312</td>
<td>6.1</td>
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<tr>
<td><strong>Inpatient wards</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult step-down unit (postcritical care)</td>
<td>130 (124)</td>
<td>1295</td>
<td>189,265</td>
<td>6.8</td>
<td>0.2</td>
<td>2.6</td>
<td>5.6</td>
<td>10.3</td>
<td>13.2</td>
</tr>
<tr>
<td>Behavioral health/psychiatric</td>
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<td>0.0</td>
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<td>8.5</td>
<td>17.6</td>
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<td></td>
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<td>Gynecology</td>
<td>10 (9)</td>
<td>34</td>
<td>8356</td>
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<td>Labor and delivery</td>
<td>27 (22)</td>
<td>9</td>
<td>7539</td>
<td>1.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.8</td>
<td>6.2</td>
</tr>
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<td>Labor, delivery, recovery, postpartum suite</td>
<td>57 (51)</td>
<td>35</td>
<td>17,991</td>
<td>1.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.5</td>
<td>6.2</td>
</tr>
<tr>
<td><strong>Medical</strong></td>
<td></td>
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<td>74,481</td>
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<td>146,387</td>
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<td>0.0</td>
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<td>5.4</td>
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<td>11.8</td>
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<p>| Urinary catheter utilization ratio  | | | | | | | | | |</p>
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<th><strong>Type of location</strong></th>
<th>No. of locations</th>
<th>No. of urinary catheter-days</th>
<th>Pooled mean</th>
<th>Percentile</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
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<tr>
<td>Burn</td>
<td>22</td>
<td>47,584</td>
<td>78,304</td>
<td>0.61</td>
<td>0.24</td>
<td>0.46</td>
<td>0.59</td>
<td>0.75</td>
<td>0.91</td>
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<tr>
<td>Medical cardiac</td>
<td>108</td>
<td>302,388</td>
<td>536,190</td>
<td>0.56</td>
<td>0.29</td>
<td>0.48</td>
<td>0.62</td>
<td>0.69</td>
<td>0.78</td>
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</table>
Table 5. (Continued)

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<th>No. of locations</th>
<th>Urinary catheter-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>Percentile</th>
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<td></td>
<td></td>
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<td></td>
<td>10%</td>
<td>25%</td>
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<td>53</td>
<td>324,082</td>
<td>447,282</td>
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<td>289,636</td>
<td>389,397</td>
<td>0.74</td>
<td>0.47</td>
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<td>546,824</td>
<td>700,556</td>
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<td>0.54</td>
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<td>459,741</td>
<td>717,260</td>
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<td>0.38</td>
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<td>111 (110)</td>
<td>675,759</td>
<td>858,552</td>
<td>0.79</td>
<td>0.60</td>
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<tr>
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<td>49,681</td>
<td>64,539</td>
<td>0.77</td>
<td>0.64</td>
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<td>32</td>
<td>135,006</td>
<td>176,565</td>
<td>0.76</td>
<td>0.46</td>
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<tr>
<td>Pediatric cardiothoracic</td>
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<td>6079</td>
<td>26,302</td>
<td>0.23</td>
<td>0.20</td>
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<tr>
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<td>2025</td>
<td>9873</td>
<td>0.21</td>
<td>0.18</td>
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<tr>
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<td>88,718</td>
<td>308,116</td>
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<td>0.13</td>
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<td>474,506</td>
<td>588,523</td>
<td>0.81</td>
<td>0.63</td>
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<tr>
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<td>86</td>
<td>307,988</td>
<td>399,731</td>
<td>0.77</td>
<td>0.44</td>
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<tr>
<td>Trauma</td>
<td>37</td>
<td>212,948</td>
<td>240,301</td>
<td>0.89</td>
<td>0.66</td>
</tr>
</tbody>
</table>

| Specialty care areas |                |                       |              |            |            |           |           |           |           |
|---------------------|----------------|-----------------------|--------------|------------|------------|-----------|-----------|-----------|
| Bone marrow transplant | 11 | 6495 | 56,182 | 0.12 | 0.11 | 0.15 | 0.22 | 0.39 | 0.53 |
| Hematology/oncology | 32 | 28,702 | 141,304 | 0.20 | 0.08 | 0.13 | 0.20 | 0.25 | 0.41 |
| Long-term acute care | 51 | 124,487 | 267,233 | 0.47 | 0.11 | 0.36 | 0.56 | 0.67 | 0.78 |
| Pediatric hematology/oncology | 5 | 869 | 21,167 | 0.04 | 0.03 | 0.06 | 0.09 | 0.12 | 0.18 |
| Solid organ transplant | 6 | 8312 | 37,723 | 0.22 | 0.17 | 0.22 | 0.27 | 0.32 | 0.40 |

| Inpatient wards |                |                       |              |            |            |           |           |           |           |
|-----------------|----------------|-----------------------|--------------|------------|------------|-----------|-----------|-----------|
| Adult step-down unit (postcritical care) | 130 (128) | 189,265 | 726,161 | 0.26 | 0.11 | 0.15 | 0.22 | 0.39 | 0.53 |
| Behavioral health/psychiatric | 66 (63) | 3264 | 142,396 | 0.02 | 0.00 | 0.01 | 0.02 | 0.04 | 0.05 |
| Gerontology | 5 (4) | 2330 | 9607 | 0.24 | 0.17 | 0.22 | 0.26 | 0.30 | 0.34 |
| Gynecology | 10 | 8356 | 46,388 | 0.18 | 0.12 | 0.17 | 0.21 | 0.26 | 0.31 |
| Labor and delivery | 27 | 7539 | 38,716 | 0.19 | 0.01 | 0.05 | 0.14 | 0.29 | 0.38 |
| Labor, delivery, recovery, postpartum suite | 57 (56) | 17,991 | 107,894 | 0.17 | 0.07 | 0.11 | 0.15 | 0.22 | 0.30 |
| Medical | 174 | 232,766 | 1,182,850 | 0.20 | 0.09 | 0.12 | 0.16 | 0.24 | 0.36 |
| Medical/surgical | 559 (554) | 717,604 | 3,325,379 | 0.22 | 0.11 | 0.15 | 0.20 | 0.26 | 0.37 |
| Neurologic | 10 | 13,228 | 62,958 | 0.21 | 0.10 | 0.15 | 0.21 | 0.27 | 0.32 |
| Neurosurgical | 14 | 17,093 | 62,659 | 0.27 | 0.16 | 0.21 | 0.26 | 0.32 | 0.38 |
| Orthopedic | 53 (52) | 86,277 | 311,694 | 0.28 | 0.13 | 0.21 | 0.26 | 0.36 | 0.42 |
| Pediatric medical | 11 | 297 | 23,650 | 0.19 | 0.18 | 0.25 | 0.31 | 0.37 | 0.43 |
| Pediatric medical/surgical | 54 | 12,604 | 138,517 | 0.09 | 0.01 | 0.05 | 0.12 | 0.18 | 0.24 |
| Postpartum | 68 | 37,003 | 242,277 | 0.15 | 0.07 | 0.11 | 0.15 | 0.20 | 0.26 |
| Rehabilitation | 123 (122) | 74,481 | 660,670 | 0.11 | 0.04 | 0.06 | 0.08 | 0.12 | 0.18 |
| Surgical | 83 | 146,387 | 555,808 | 0.26 | 0.15 | 0.18 | 0.24 | 0.31 | 0.42 |

| Inpatient long-term care units |                |                       |              |            |            |           |           |           |           |
|-------------------------------|----------------|-----------------------|--------------|------------|------------|-----------|-----------|-----------|
| Behavioral health/psychiatric | 5 | 603 | 61,434 | 0.01 | 0.01 | 0.02 | 0.03 | 0.05 | 0.07 |
| Long-term care | 11 | 14,376 | 87,740 | 0.16 | 0.15 | 0.18 | 0.24 | 0.31 | 0.42 |

UTI, urinary tract infection. CAUTI, urinary catheter-associated UTI.

\( z \) Number of urinary catheter-days.

\( y \) Number of patient-days.

\( ^1 \) Number of locations meeting minimum requirements for percentile distributions if less than the total number of locations. If this number is <20, then percentile distributions are not calculated.

\( ^2 \) Number of urinary catheter-days.

\( ^3 \) Number of patient-days.

2006 through December 2008 (Tables 3 to 12). Data on select attributes of the device-associated infections are provided in Tables 13 to 20. For the PA module where sufficient data existed, we tabulated procedure-associated infection rates for this same period (Tables 21 to 23).

Tables 3 to 6 update and augment previously published device-associated rates and DU ratios by type of non-NICU locations. For inclusion in these tables, the pooled mean infection rates and DU ratios required data from at least 5 different locations of a given type. For the percentile distributions, data from at least 20 different locations were required, excluding rates or DU ratios for locations that did not report at least 50 device-days or patient-days. Because of this, the number
Table 6. Pooled means and key percentiles of the distribution of ventilator-associated PNEU rates and ventilator utilization ratios, by type of location, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Type of location</th>
<th>No. of locations</th>
<th>No. of VAP</th>
<th>Ventilator-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical care units</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burn</td>
<td>25</td>
<td>364</td>
<td>34,088</td>
<td>10.7</td>
<td>0.0</td>
<td>2.4</td>
<td>7.4</td>
<td>13.1</td>
<td>15.1</td>
</tr>
<tr>
<td>Medical cardiac</td>
<td>129 (123)</td>
<td>366</td>
<td>174,480</td>
<td>2.1</td>
<td>0.0</td>
<td>0.0</td>
<td>1.2</td>
<td>2.8</td>
<td>5.8</td>
</tr>
<tr>
<td>Medical major teaching</td>
<td>77</td>
<td>690</td>
<td>281,990</td>
<td>2.4</td>
<td>0.0</td>
<td>1.0</td>
<td>2.2</td>
<td>4.2</td>
<td>8.3</td>
</tr>
<tr>
<td>Medical all others</td>
<td>80 (76)</td>
<td>398</td>
<td>181,102</td>
<td>2.2</td>
<td>0.0</td>
<td>0.0</td>
<td>1.3</td>
<td>3.5</td>
<td>6.1</td>
</tr>
<tr>
<td>Medical/surgical major teaching</td>
<td>115 (109)</td>
<td>1093</td>
<td>383,068</td>
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<td>0.0</td>
<td>0.9</td>
<td>2.0</td>
<td>3.1</td>
<td>5.6</td>
</tr>
<tr>
<td>Medical/surgical all others ≤ 15 beds</td>
<td>325 (272)</td>
<td>621</td>
<td>282,004</td>
<td>2.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.7</td>
<td>3.0</td>
<td>5.8</td>
</tr>
<tr>
<td>Medical/surgical all others &gt; 15 beds</td>
<td>138 (137)</td>
<td>904</td>
<td>469,719</td>
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<td>0.0</td>
<td>0.4</td>
<td>1.3</td>
<td>3.0</td>
<td>4.2</td>
</tr>
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<table>
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<th>No. of locations</th>
<th>Ventilator-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burn</td>
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<td>90,906</td>
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<td>0.12</td>
<td>0.19</td>
<td>0.41</td>
<td>0.53</td>
<td>0.70</td>
</tr>
<tr>
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<td>636,144</td>
<td>0.27</td>
<td>0.09</td>
<td>0.18</td>
<td>0.25</td>
<td>0.37</td>
<td>0.46</td>
</tr>
<tr>
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<td>281,990</td>
<td>585,593</td>
<td>0.48</td>
<td>0.27</td>
<td>0.38</td>
<td>0.48</td>
<td>0.60</td>
<td>0.67</td>
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<td>0.07</td>
<td>0.20</td>
<td>0.34</td>
<td>0.46</td>
<td>0.54</td>
</tr>
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<td>870,206</td>
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<td>0.30</td>
<td>0.40</td>
<td>0.54</td>
<td>0.62</td>
</tr>
<tr>
<td>Medical/surgical all others ≤ 15 beds</td>
<td>325 (320)</td>
<td>282,004</td>
<td>965,299</td>
<td>0.29</td>
<td>0.06</td>
<td>0.13</td>
<td>0.24</td>
<td>0.38</td>
<td>0.46</td>
</tr>
<tr>
<td>Medical/surgical all others &gt; 15 beds</td>
<td>138 (137)</td>
<td>469,719</td>
<td>1,255,856</td>
<td>0.37</td>
<td>0.21</td>
<td>0.29</td>
<td>0.37</td>
<td>0.43</td>
<td>0.53</td>
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<tr>
<td>Neurologic</td>
<td>15</td>
<td>25,528</td>
<td>66,882</td>
<td>0.38</td>
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<tr>
<td>Neurosurgical</td>
<td>42</td>
<td>76,763</td>
<td>212,778</td>
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<tr>
<td>Pediatric cardiothoracic</td>
<td>10</td>
<td>18,316</td>
<td>51,610</td>
<td>0.35</td>
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<tr>
<td>Pediatric medical</td>
<td>9</td>
<td>3509</td>
<td>15,649</td>
<td>0.22</td>
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<td></td>
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</tr>
<tr>
<td>Pediatric medical/surgical</td>
<td>79 (78)</td>
<td>172,208</td>
<td>413,123</td>
<td>0.42</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Respiratory</td>
<td>5</td>
<td>8748</td>
<td>18,856</td>
<td>0.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Surgical</td>
<td>127</td>
<td>311,739</td>
<td>802,912</td>
<td>0.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical cardiothoracic</td>
<td>109</td>
<td>214,373</td>
<td>553,214</td>
<td>0.39</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Trauma</td>
<td>41</td>
<td>145,294</td>
<td>255,374</td>
<td>0.57</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Specialty care areas</td>
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<td></td>
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<tr>
<td>Long-term acute care</td>
<td>28</td>
<td>43,208</td>
<td>124,736</td>
<td>0.35</td>
<td>0.07</td>
<td>0.15</td>
<td>0.28</td>
<td>0.49</td>
<td>0.67</td>
</tr>
<tr>
<td>Inpatient wards</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Adult step-down unit (postcritical care)</td>
<td>35 (34)</td>
<td>18,760</td>
<td>194,639</td>
<td>0.10</td>
<td>0.01</td>
<td>0.03</td>
<td>0.10</td>
<td>0.16</td>
<td>0.27</td>
</tr>
<tr>
<td>Medical</td>
<td>12</td>
<td>9783</td>
<td>63,746</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical/surgical</td>
<td>19 (18)</td>
<td>12,421</td>
<td>76,360</td>
<td>0.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary</td>
<td>5</td>
<td>2129</td>
<td>19,601</td>
<td>0.11</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

PNEU, pneumonia infection; VAP, ventilator-associated PNEU.

*Number of VAP = (Number of ventilator-days × 1000).

†Number of locations meeting minimum requirements for percentile distributions if less than total the number of locations. If this number is < 20, then percentile distributions are not calculated.

‡Number of patient-days

§Number of ventilator-days
Table 7. Pooled means and key percentiles of the distribution of central line–associated BSI rates and central line utilization ratios for level III NICUs, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations&lt;sup&gt;1&lt;/sup&gt;</th>
<th>No. of CLABSI</th>
<th>Central line-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>142 (124)</td>
<td>481</td>
<td>122,272</td>
<td>3.9</td>
<td>0.0</td>
<td>0.0</td>
<td>3.2</td>
<td>5.3</td>
<td>8.0</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>153 (133)</td>
<td>373</td>
<td>111,293</td>
<td>3.4</td>
<td>0.0</td>
<td>0.0</td>
<td>2.5</td>
<td>4.8</td>
<td>7.5</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>154 (136)</td>
<td>276</td>
<td>112,926</td>
<td>2.4</td>
<td>0.0</td>
<td>0.0</td>
<td>1.4</td>
<td>3.5</td>
<td>6.0</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>152 (117)</td>
<td>216</td>
<td>90,384</td>
<td>2.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.7</td>
<td>3.5</td>
<td>4.8</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>145 (106)</td>
<td>157</td>
<td>82,677</td>
<td>1.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.6</td>
<td>6.1</td>
</tr>
</tbody>
</table>

Central line utilization ratio<sup>1</sup>

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Central line-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>142 (139)</td>
<td>122,272</td>
<td>345,082</td>
<td>0.35</td>
<td>0.19</td>
<td>0.28</td>
<td>0.35</td>
<td>0.46</td>
<td>0.56</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>153 (145)</td>
<td>111,293</td>
<td>348,976</td>
<td>0.32</td>
<td>0.16</td>
<td>0.25</td>
<td>0.30</td>
<td>0.41</td>
<td>0.55</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>154 (151)</td>
<td>112,926</td>
<td>472,563</td>
<td>0.24</td>
<td>0.10</td>
<td>0.15</td>
<td>0.22</td>
<td>0.33</td>
<td>0.50</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>152 (148)</td>
<td>90,384</td>
<td>547,895</td>
<td>0.16</td>
<td>0.04</td>
<td>0.07</td>
<td>0.12</td>
<td>0.21</td>
<td>0.37</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>145 (140)</td>
<td>82,677</td>
<td>420,114</td>
<td>0.20</td>
<td>0.04</td>
<td>0.07</td>
<td>0.13</td>
<td>0.21</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Table 8. Pooled means and key percentiles of the distribution of umbilical catheter–associated BSI rates and umbilical catheter utilization ratios for level III NICUs, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations&lt;sup&gt;1&lt;/sup&gt;</th>
<th>No. of UCAB</th>
<th>Umbilical catheter-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>141 (108)</td>
<td>129</td>
<td>32,948</td>
<td>3.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>5.5</td>
<td>9.6</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>146 (111)</td>
<td>75</td>
<td>29,492</td>
<td>2.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.4</td>
<td>8.8</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>147 (122)</td>
<td>59</td>
<td>34,379</td>
<td>1.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.5</td>
<td>6.1</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>143 (107)</td>
<td>28</td>
<td>32,499</td>
<td>0.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.2</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>150 (111)</td>
<td>40</td>
<td>45,568</td>
<td>0.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Umbilical catheter utilization ratio<sup>1</sup>

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Umbilical catheter-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>141 (132)</td>
<td>32,948</td>
<td>298,854</td>
<td>0.11</td>
<td>0.05</td>
<td>0.09</td>
<td>0.13</td>
<td>0.20</td>
<td>0.32</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>146 (140)</td>
<td>29,492</td>
<td>301,167</td>
<td>0.10</td>
<td>0.05</td>
<td>0.07</td>
<td>0.12</td>
<td>0.19</td>
<td>0.27</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>147 (146)</td>
<td>34,379</td>
<td>420,419</td>
<td>0.08</td>
<td>0.04</td>
<td>0.05</td>
<td>0.08</td>
<td>0.16</td>
<td>0.23</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>143 (142)</td>
<td>32,499</td>
<td>509,693</td>
<td>0.06</td>
<td>0.02</td>
<td>0.03</td>
<td>0.06</td>
<td>0.10</td>
<td>0.14</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>150 (148)</td>
<td>45,568</td>
<td>437,876</td>
<td>0.10</td>
<td>0.04</td>
<td>0.06</td>
<td>0.10</td>
<td>0.15</td>
<td>0.21</td>
</tr>
</tbody>
</table>

BSI, bloodstream infection; UCAB, umbilical catheter-associated BSI.

<sup>1</sup>Number of locations meeting minimum requirements for percentile distributions if less than total number of locations. If this number is < 20, percentile distributions are not calculated.

<sup>2</sup>Number of patient-days.
Table 9. Pooled means and key percentiles of the distribution of central line–associated BSI rates and central line utilization ratios for level II/III NICUs, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations</th>
<th>No. of CLABSI</th>
<th>Central line-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>(median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>96 (75)</td>
<td>250</td>
<td>60,199</td>
<td>4.9</td>
<td>0.0</td>
<td>0.0</td>
<td>2.6</td>
<td>6.4</td>
<td>10.2</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>112 (84)</td>
<td>159</td>
<td>49,673</td>
<td>3.2</td>
<td>0.0</td>
<td>0.0</td>
<td>1.7</td>
<td>6.8</td>
<td>9.6</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>125 (93)</td>
<td>120</td>
<td>58,893</td>
<td>2.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.6</td>
<td>3.4</td>
<td>6.4</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>119 (73)</td>
<td>65</td>
<td>43,544</td>
<td>1.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.0</td>
<td>6.4</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>116 (60)</td>
<td>49</td>
<td>39,669</td>
<td>1.2</td>
<td>0.0</td>
<td>0.0</td>
<td>1.8</td>
<td>5.1</td>
<td>1.0</td>
</tr>
</tbody>
</table>

BSI, bloodstream infection (includes laboratory-confirmed BSI and clinical sepsis BSI); CLABSI, central line-associated BSI.

Table 10. Pooled means and key percentiles of the distribution of umbilical catheter–associated BSI rates and umbilical catheter utilization ratios for level II/III NICUs, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations</th>
<th>No. of UCAB</th>
<th>Umbilical catheter-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>(median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>101 (64)</td>
<td>98</td>
<td>17,084</td>
<td>5.7</td>
<td>0.0</td>
<td>0.0</td>
<td>4.0</td>
<td>9.3</td>
<td>13.8</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>111 (76)</td>
<td>51</td>
<td>16,128</td>
<td>3.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.5</td>
<td>11.3</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>123 (82)</td>
<td>33</td>
<td>19,459</td>
<td>1.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.5</td>
<td>7.5</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>123 (90)</td>
<td>19</td>
<td>18,724</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.2</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>127 (78)</td>
<td>26</td>
<td>25,890</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.6</td>
<td>4.2</td>
</tr>
</tbody>
</table>

BSI, bloodstream infection (includes laboratory-confirmed BSI and clinical sepsis BSI); UCAB, umbilical catheter-associated BSI.
Table 11. Pooled means and key percentiles of the distribution of ventilator-associated PNEU rates and ventilator utilization ratios for level III NICUs, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations</th>
<th>No. of VAP</th>
<th>Ventilator-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>81 (72)</td>
<td>214</td>
<td>95,841</td>
<td>2.2</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>1.3</td>
<td>3.1</td>
<td>7.3</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>85 (73)</td>
<td>105</td>
<td>58,055</td>
<td>1.8</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.5</td>
<td>7.4</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>84 (68)</td>
<td>50</td>
<td>36,439</td>
<td>1.4</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.4</td>
<td>3.7</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>83 (57)</td>
<td>25</td>
<td>28,996</td>
<td>0.9</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.6</td>
<td>2.2</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>86 (61)</td>
<td>27</td>
<td>36,010</td>
<td>0.7</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Ventilator utilization ratio

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations</th>
<th>Ventilator-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>81 (72)</td>
<td>95,841</td>
<td>203,127</td>
<td>0.47</td>
<td>0.29</td>
<td>0.40</td>
<td>0.45</td>
<td>0.60</td>
<td>0.77</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>85 (81)</td>
<td>58,055</td>
<td>194,123</td>
<td>0.30</td>
<td>0.14</td>
<td>0.19</td>
<td>0.28</td>
<td>0.41</td>
<td>0.60</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>84 (82)</td>
<td>36,439</td>
<td>260,592</td>
<td>0.14</td>
<td>0.05</td>
<td>0.08</td>
<td>0.13</td>
<td>0.20</td>
<td>0.34</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>83 (81)</td>
<td>28,996</td>
<td>324,770</td>
<td>0.09</td>
<td>0.02</td>
<td>0.03</td>
<td>0.06</td>
<td>0.14</td>
<td>0.26</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>86 (84)</td>
<td>36,010</td>
<td>256,418</td>
<td>0.14</td>
<td>0.03</td>
<td>0.05</td>
<td>0.10</td>
<td>0.19</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Table 12. Pooled means and key percentiles of the distribution of ventilator-associated PNEU rates and ventilator utilization ratios for level II/III NICUs, DA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations</th>
<th>No. of VAP</th>
<th>Ventilator-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>56 (47)</td>
<td>103</td>
<td>38,321</td>
<td>2.7</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>1.1</td>
<td>4.7</td>
<td>12.6</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>63 (47)</td>
<td>65</td>
<td>23,147</td>
<td>2.8</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.2</td>
<td>4.0</td>
<td>8.6</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>67 (46)</td>
<td>16</td>
<td>15,358</td>
<td>1.0</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.0</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>70 (40)</td>
<td>10</td>
<td>12,503</td>
<td>0.8</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.1</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>69 (44)</td>
<td>10</td>
<td>16,839</td>
<td>0.6</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Ventilator utilization ratio

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>No. of locations</th>
<th>Ventilator-days</th>
<th>Patient-days</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤750 g</td>
<td>56 (49)</td>
<td>38,321</td>
<td>86,680</td>
<td>0.44</td>
<td>0.28</td>
<td>0.34</td>
<td>0.48</td>
<td>0.58</td>
<td>0.75</td>
</tr>
<tr>
<td>751-1000 g</td>
<td>63 (56)</td>
<td>23,147</td>
<td>78,224</td>
<td>0.30</td>
<td>0.13</td>
<td>0.20</td>
<td>0.28</td>
<td>0.37</td>
<td>0.47</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>67 (63)</td>
<td>15,358</td>
<td>115,307</td>
<td>0.13</td>
<td>0.05</td>
<td>0.07</td>
<td>0.11</td>
<td>0.18</td>
<td>0.27</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>70 (69)</td>
<td>12,503</td>
<td>147,933</td>
<td>0.08</td>
<td>0.02</td>
<td>0.03</td>
<td>0.05</td>
<td>0.11</td>
<td>0.20</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>69 (66)</td>
<td>16,839</td>
<td>119,087</td>
<td>0.14</td>
<td>0.03</td>
<td>0.05</td>
<td>0.10</td>
<td>0.14</td>
<td>0.26</td>
</tr>
</tbody>
</table>

PNEU, pneumonia infection; VAP, ventilator-associated PNEU.

*Number of VAP × 1000.

1Number of locations meeting minimum requirements for percentile distributions if less than the total number of locations. If this number is <20, then percentile distributions are not calculated.

2Number of ventilator-days

3Number of patient-days

4PNEU, pneumonia infection; VAP, ventilator-associated PNEU.
Table 13. Distribution of criteria for central line–associated laboratory-confirmed BSI by location, 2006 through 2008

<table>
<thead>
<tr>
<th>Type of location</th>
<th>Criterion 1</th>
<th>Criterion 2</th>
<th>Criterion 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical care units</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burn</td>
<td>344</td>
<td>88.2%</td>
<td>46</td>
<td>11.8%</td>
</tr>
<tr>
<td>Medical cardiac</td>
<td>707</td>
<td>80.7%</td>
<td>169</td>
<td>19.3%</td>
</tr>
<tr>
<td>Medical major teaching</td>
<td>1232</td>
<td>87.4%</td>
<td>178</td>
<td>12.6%</td>
</tr>
<tr>
<td>Medical all others</td>
<td>547</td>
<td>79.6%</td>
<td>140</td>
<td>20.4%</td>
</tr>
<tr>
<td>Medical/surgical major teaching</td>
<td>1097</td>
<td>74.4%</td>
<td>377</td>
<td>25.6%</td>
</tr>
<tr>
<td>Medical/surgical all others ≤15 beds</td>
<td>844</td>
<td>74.7%</td>
<td>286</td>
<td>25.3%</td>
</tr>
<tr>
<td>Medical/surgical all others &gt;15 beds</td>
<td>1023</td>
<td>70.6%</td>
<td>426</td>
<td>29.4%</td>
</tr>
<tr>
<td>Neurologic</td>
<td>49</td>
<td>80.3%</td>
<td>12</td>
<td>19.7%</td>
</tr>
<tr>
<td>Neurosurgical</td>
<td>305</td>
<td>77.0%</td>
<td>91</td>
<td>23.0%</td>
</tr>
<tr>
<td>Pediatric cardiovascular</td>
<td>171</td>
<td>87.7%</td>
<td>23</td>
<td>11.8%</td>
</tr>
<tr>
<td>Pediatric medical</td>
<td>20</td>
<td>87.0%</td>
<td>3</td>
<td>13.0%</td>
</tr>
<tr>
<td>Pediatric medical/surgical*</td>
<td>770</td>
<td>83.4%</td>
<td>152</td>
<td>16.5%</td>
</tr>
<tr>
<td>Respiratory</td>
<td>26</td>
<td>89.7%</td>
<td>3</td>
<td>10.3%</td>
</tr>
<tr>
<td>Surgical</td>
<td>1358</td>
<td>80.7%</td>
<td>325</td>
<td>19.3%</td>
</tr>
<tr>
<td>Surgical cardiothoracic</td>
<td>680</td>
<td>77.4%</td>
<td>199</td>
<td>22.6%</td>
</tr>
<tr>
<td><strong>Inpatient wards</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult step-down unit (postcritical care)</td>
<td>239</td>
<td>79.9%</td>
<td>60</td>
<td>20.1%</td>
</tr>
<tr>
<td>Genitourinary</td>
<td>14</td>
<td>63.6%</td>
<td>8</td>
<td>36.4%</td>
</tr>
<tr>
<td>Gerontology</td>
<td>3</td>
<td>75.0%</td>
<td>1</td>
<td>25.0%</td>
</tr>
<tr>
<td>Gynecology</td>
<td>4</td>
<td>66.7%</td>
<td>2</td>
<td>33.3%</td>
</tr>
<tr>
<td>Level I nursery</td>
<td>1</td>
<td>100.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level II nursery</td>
<td>1</td>
<td>100.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td>338</td>
<td>80.1%</td>
<td>84</td>
<td>19.9%</td>
</tr>
<tr>
<td>Medical/surgical</td>
<td>560</td>
<td>76.4%</td>
<td>173</td>
<td>23.6%</td>
</tr>
<tr>
<td>Neurologic</td>
<td>8</td>
<td>100.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurosurgical</td>
<td>9</td>
<td>75.0%</td>
<td>3</td>
<td>25.0%</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>21</td>
<td>65.6%</td>
<td>11</td>
<td>34.4%</td>
</tr>
<tr>
<td>Pediatric medical/surgical</td>
<td>72</td>
<td>70.6%</td>
<td>30</td>
<td>29.4%</td>
</tr>
<tr>
<td>Pediatric medical</td>
<td>15</td>
<td>83.3%</td>
<td>3</td>
<td>16.7%</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>29</td>
<td>74.4%</td>
<td>10</td>
<td>25.6%</td>
</tr>
<tr>
<td>Surgical</td>
<td>131</td>
<td>69.3%</td>
<td>58</td>
<td>30.7%</td>
</tr>
<tr>
<td>Vascular surgery</td>
<td>6</td>
<td>46.2%</td>
<td>7</td>
<td>53.8%</td>
</tr>
<tr>
<td><strong>Inpatient long-term care units</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term care</td>
<td>5</td>
<td>83.3%</td>
<td>1</td>
<td>16.7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11,329</td>
<td>79.1%</td>
<td>2995</td>
<td>20.9%</td>
</tr>
</tbody>
</table>

NOTE. LCBI criterion 1: Patient has a recognized pathogen cultured from one or more blood cultures, and organism cultured from blood is not related to an infection at another site. LCBI criterion 2: Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension, and signs and symptoms and positive laboratory results are not related to an infection at another site and common skin contaminant (ie, diphtheroids [Corynebacterium spp], Bacillus [not B anthracis] spp, Propionibacterium spp, coagulase-negative staphylococci [including S epidermidis], viridans group streptococci, Aerococcus spp, Micrococcus spp) is cultured from 2 or more blood cultures drawn on separate occasions. LCBI criterion 3: Patient age <1 year has at least one of the following signs or symptoms: fever (>38°C core), hypothermia (<36°C core), apnea, or bradycardia, and signs and symptoms, and positive laboratory results are not related to an infection at another site and common skin contaminant (ie, diphtheroids [Corynebacterium spp], Bacillus [not B anthracis] spp, Propionibacterium spp, coagulase-negative staphylococci [including S epidermidis], viridans group streptococci, Aerococcus spp, Micrococcus spp) is cultured from 2 or more blood cultures drawn on separate occasions.

BSI, bloodstream infection; LCBI, laboratory-confirmed BSI.

An exception to this occurred in pediatric medical/surgical ICU where 6 CLABSIs were reported using the clinical sepsis criteria for neonates.

Tables 7 to 12 update and augment the previously published, device-associated rates and DU ratios by birth-weight category for NICU locations. For NICUs in the DA module, device-days consist of the total number of central line-days, umbilical catheter-days, or ventilator-days. Each of the pooled mean rates in NICUs required data from at least 5 different locations for a given type of nursery and birth-weight category.

The distribution of criteria for central line–associated laboratory-confirmed BSI by location, 2006 through 2008, is shown in the table. The table includes critical care units, inpatient wards, and inpatient long-term care units. The criteria used to define laboratory-confirmed bloodstream infection (LCBI) are also explained.
Table 14. Distribution of criteria for permanent and temporary central line–associated laboratory confirmed BSI by location, 2006 through 2008

<table>
<thead>
<tr>
<th>Type of location</th>
<th>LCBI</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Criterion 1</td>
<td>Criterion 2</td>
<td>Total</td>
</tr>
<tr>
<td>Permanent central line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone marrow transplant</td>
<td>176</td>
<td>74.9%</td>
<td>59</td>
</tr>
<tr>
<td>Hematology/oncology</td>
<td>104</td>
<td>63.8%</td>
<td>54</td>
</tr>
<tr>
<td>Long-term acute care</td>
<td>35</td>
<td>92.1%</td>
<td>3</td>
</tr>
<tr>
<td>Pediatric hematology/oncology</td>
<td>56</td>
<td>74.7%</td>
<td>19</td>
</tr>
<tr>
<td>Solid organ transplant</td>
<td>4</td>
<td>36.4%</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>375</td>
<td>72.5%</td>
<td>142</td>
</tr>
<tr>
<td>Temporary central line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone marrow transplant</td>
<td>66</td>
<td>68.8%</td>
<td>30</td>
</tr>
<tr>
<td>Hematology/oncology</td>
<td>77</td>
<td>65.8%</td>
<td>40</td>
</tr>
<tr>
<td>Long-term acute care</td>
<td>194</td>
<td>74.6%</td>
<td>66</td>
</tr>
<tr>
<td>Pediatric hematology/oncology</td>
<td>26</td>
<td>55.3%</td>
<td>21</td>
</tr>
<tr>
<td>Solid organ transplant</td>
<td>50</td>
<td>75.8%</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>413</td>
<td>70.5%</td>
<td>173</td>
</tr>
</tbody>
</table>

NOTE. LCBI criterion 1: Patient has a recognized pathogen cultured from one or more blood cultures, and organism cultured from blood is not related to an infection at another site.3

LCBI criterion 2: Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension and signs and symptoms and positive laboratory results are not related to an infection at another site and common skin contaminant (ie, diphtheroids [Corynebacterium spp], Bacillus [not B anthracis] spp, Propionibacterium spp, coagulase-negative staphylococci [including S epidermidis], viridans group streptococci, Aerococcus spp, Micrococcus spp) is cultured from 2 or more blood cultures drawn on separate occasions.3

BSI, bloodstream infection; LCBI, laboratory-confirmed BSI.

category. For percentile distributions, data from at least 20 different locations were required, excluding rates or DU ratios for locations that did not report at least 50 device-days or patient-days. Because of this, the number of units contributing data varies in the tables.

Tables 13 to 20 provide data on select attributes of the device-associated infections for each location. For example, Tables 13, 14, 17, and 18 show the frequency and percent distribution of the specific sites of BSI and the criterion used for identifying these infections. Note that for adult and pediatric ICUs and wards, only laboratory-confirmed BSI are allowed and shown, unless neonates are included in pediatric wards, in which case a BSI may be reported using clinical sepsis criteria. Otherwise, clinical sepsis is only included as a valid BSI event for neonates in NICU. A total of 6 device-associated clinical sepsis BSIs for pediatric medical/surgical ICU were reported.

Table 21 provides data on PPP rates by procedure. Note that although pooled means and percentile distributions are included, the volume of data is still low and the rates should be considered provisional.

Tables 22 and 23 update and augment previously published SSI rates by operative procedure type and NNIS risk index categories.1 For inclusion in these tables, the pooled mean infection rates required data from at least 5 different hospitals. For the percentile distributions, data from at least 20 different hospitals were required; therefore, PPP or SSI rates for hospitals that did not report at least 20 NHSN operative procedures for a given type of NHSN procedure were excluded.

**DISCUSSION**

The characteristics of hospitals reporting to NHSN continue to evolve since the first report was published, including a sustained influx of smaller hospitals. This trend is likely due to 2 factors: (1) mandatory HAI reporting laws in Colorado, Connecticut, Delaware, Illinois, Massachusetts, Maryland, Oklahoma, Pennsylvania, Tennessee, Virginia, and Washington that require data to be reported through NHSN to their respective responsible state agencies, and (2) opening of enrollment in NHSN to all hospitals regardless of size beginning in June 2007. As more states opt to use NHSN as their operational system for mandatory HAI reporting requirements and as enrollment is opened to more types of facilities (eg, long-term acute care and outpatient [ambulatory] surgery centers), an even more diverse group of health care facilities may report to NHSN in the future.

Comparing these data to the last NHSN Report reveals several differences in the reported data. All CLABSI rates exclude BSIs reported using criterion 2b or 3b due to a recent change in the BSI definition.3 This allows unpublished hospital-specific CLABSI rates collected using the changed BSI definition to be compared directly to the aggregate data included in this report. Another important change is the differing composition of reporting hospitals, which is apparent in the nearly 3-fold increase in the number of medical/surgical ICUs from nonmajor teaching hospitals reporting CLABSI rates that are now stratified into 2 unit bed size groups. In these 2 types of ICUs, the
Table 15. Distribution of specific sites of urinary catheter–associated UTI by location, 2006 through 2008

<table>
<thead>
<tr>
<th>Type of location</th>
<th>ASB (%)</th>
<th>SUTI (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical care units</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burns</td>
<td>25.4%</td>
<td>74.6%</td>
<td>351</td>
</tr>
<tr>
<td>Medical cardiac</td>
<td>52.9%</td>
<td>47.1%</td>
<td>1457</td>
</tr>
<tr>
<td>Medical major teaching</td>
<td>39.1%</td>
<td>60.9%</td>
<td>1531</td>
</tr>
<tr>
<td>Medical all others</td>
<td>51.8%</td>
<td>48.2%</td>
<td>1135</td>
</tr>
<tr>
<td>Medical/surgical major teaching</td>
<td>40.2%</td>
<td>59.8%</td>
<td>1853</td>
</tr>
<tr>
<td>Medical/surgical all others ≤15 beds</td>
<td>57.9%</td>
<td>42.1%</td>
<td>1586</td>
</tr>
<tr>
<td>Medical/surgical all others &gt;15 beds</td>
<td>46.9%</td>
<td>53.1%</td>
<td>2104</td>
</tr>
<tr>
<td>Neurologic</td>
<td>55.3%</td>
<td>44.7%</td>
<td>369</td>
</tr>
<tr>
<td>Neurosurgical</td>
<td>34.0%</td>
<td>66.0%</td>
<td>938</td>
</tr>
<tr>
<td>Pediatric cardiothoracic</td>
<td>33.3%</td>
<td>66.7%</td>
<td>27</td>
</tr>
<tr>
<td>Pediatric medical</td>
<td>0.0%</td>
<td>100.0%</td>
<td>8</td>
</tr>
<tr>
<td>Pediatric medical/surgical</td>
<td>25.7%</td>
<td>74.3%</td>
<td>377</td>
</tr>
<tr>
<td>Surgical</td>
<td>42.9%</td>
<td>57.1%</td>
<td>2033</td>
</tr>
<tr>
<td>Surgical cardiothoracic</td>
<td>50.7%</td>
<td>49.3%</td>
<td>1094</td>
</tr>
<tr>
<td>Trauma</td>
<td>28.4%</td>
<td>71.6%</td>
<td>1151</td>
</tr>
<tr>
<td><strong>Specialty care areas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone marrow transplant</td>
<td>44.0%</td>
<td>56.0%</td>
<td>25</td>
</tr>
<tr>
<td>Hematology/oncology</td>
<td>55.8%</td>
<td>44.2%</td>
<td>197</td>
</tr>
<tr>
<td>Pediatric hematology/oncology</td>
<td>100.0%</td>
<td>0.0%</td>
<td>1</td>
</tr>
<tr>
<td>Long-term acute care</td>
<td>51.8%</td>
<td>48.2%</td>
<td>695</td>
</tr>
<tr>
<td>Solid organ transplant</td>
<td>25.5%</td>
<td>74.5%</td>
<td>51</td>
</tr>
<tr>
<td><strong>Inpatient wards</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult step-down unit (postcritical care)</td>
<td>61.8%</td>
<td>38.2%</td>
<td>1295</td>
</tr>
<tr>
<td>Behavioral health/psychiatric</td>
<td>81.8%</td>
<td>18.2%</td>
<td>22</td>
</tr>
<tr>
<td>Gerontology</td>
<td>80.0%</td>
<td>20.0%</td>
<td>5</td>
</tr>
<tr>
<td>Gynecology</td>
<td>64.7%</td>
<td>35.3%</td>
<td>34</td>
</tr>
<tr>
<td>Labor and delivery</td>
<td>33.3%</td>
<td>66.7%</td>
<td>9</td>
</tr>
<tr>
<td>Labor, delivery, recovery, postpartum suite</td>
<td>34.3%</td>
<td>65.7%</td>
<td>35</td>
</tr>
<tr>
<td>Medical</td>
<td>60.8%</td>
<td>39.2%</td>
<td>1570</td>
</tr>
<tr>
<td>Medical/surgical</td>
<td>62.5%</td>
<td>37.5%</td>
<td>4224</td>
</tr>
<tr>
<td>Neurologic</td>
<td>55.8%</td>
<td>44.2%</td>
<td>120</td>
</tr>
<tr>
<td>Neurosurgical</td>
<td>58.3%</td>
<td>41.7%</td>
<td>151</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>59.0%</td>
<td>41.0%</td>
<td>522</td>
</tr>
<tr>
<td>Pediatric medical/surgical</td>
<td>65.9%</td>
<td>34.1%</td>
<td>91</td>
</tr>
<tr>
<td>Pediatric medical</td>
<td>0.0%</td>
<td>100.0%</td>
<td>2</td>
</tr>
<tr>
<td>Postpartum</td>
<td>57.1%</td>
<td>42.9%</td>
<td>49</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>62.1%</td>
<td>37.9%</td>
<td>1071</td>
</tr>
<tr>
<td>Surgical</td>
<td>58.4%</td>
<td>41.6%</td>
<td>949</td>
</tr>
<tr>
<td><strong>Inpatient long-term care units</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term care</td>
<td>33.3%</td>
<td>66.7%</td>
<td>60</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50.8%</td>
<td>49.2%</td>
<td>27,192</td>
</tr>
</tbody>
</table>

ASB, asymptomatic bacteriuria; UTI, urinary tract infection; SUTI, symptomatic UTI.

The pooled mean CLABSI rates were 1.5 CLABSIs per 1000 central line-days; however, their distributions are statistically significantly different from each other. Furthermore, the pooled mean CAUTI and VAP rates along with their distributions were significantly different as well. The relatively large number of medical/surgical ICUs reporting from non–major teaching hospitals was an important factor that enabled this further stratification. There has been increased reporting of device-associated infections from inpatient wards, which is apparent in the 5-fold increase in the number of medical wards reporting CLABSI rates. In this type of inpatient ward, the pooled mean CLABSI rate was reduced from 1.8 to 1.5 CLABSIs per 1000 central line-days. This reduction may be due to the definition change, the increased contribution of data from smaller hospitals that generally have lower risks of HAI, and an increase in the implementation and effectiveness of HAI prevention strategies. As the number and types of inpatient wards and specialty care areas reporting data grow over time, we will continue to be better able to characterize the risk of device-associated infections among these patients.
Table 16. Distribution of specific sites of ventilator-associated pneumonia by location, 2006 through 2008

<table>
<thead>
<tr>
<th>Type of location</th>
<th>PNU1</th>
<th>PNU2</th>
<th>PNU3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical care units</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burn</td>
<td>253</td>
<td>69.5%</td>
<td>110</td>
<td>30.2%</td>
</tr>
<tr>
<td>Medical cardiac</td>
<td>237</td>
<td>64.8%</td>
<td>126</td>
<td>34.4%</td>
</tr>
<tr>
<td>Medical major teaching</td>
<td>531</td>
<td>77.0%</td>
<td>151</td>
<td>21.9%</td>
</tr>
<tr>
<td>Medical all others</td>
<td>257</td>
<td>64.6%</td>
<td>138</td>
<td>34.7%</td>
</tr>
<tr>
<td>Medical/surgical major teaching</td>
<td>708</td>
<td>64.8%</td>
<td>383</td>
<td>35.0%</td>
</tr>
<tr>
<td>Medical/surgical all others &amp; &lt;15 beds</td>
<td>336</td>
<td>54.1%</td>
<td>279</td>
<td>44.9%</td>
</tr>
<tr>
<td>Medical/surgical all others &amp; &gt;15 beds</td>
<td>530</td>
<td>58.6%</td>
<td>368</td>
<td>40.7%</td>
</tr>
<tr>
<td>Neurologic</td>
<td>129</td>
<td>75.9%</td>
<td>41</td>
<td>24.1%</td>
</tr>
<tr>
<td>Neurosurgical</td>
<td>244</td>
<td>60.0%</td>
<td>163</td>
<td>40.0%</td>
</tr>
<tr>
<td>Pediatric cardiothoracic</td>
<td>8</td>
<td>72.7%</td>
<td>3</td>
<td>27.3%</td>
</tr>
<tr>
<td>Pediatric medical</td>
<td>238</td>
<td>75.1%</td>
<td>75</td>
<td>23.7%</td>
</tr>
<tr>
<td>Pediatric medical/surgical</td>
<td>287</td>
<td>64.7%</td>
<td>156</td>
<td>35.3%</td>
</tr>
<tr>
<td>Respiratory</td>
<td>2</td>
<td>50.0%</td>
<td>2</td>
<td>50.0%</td>
</tr>
<tr>
<td>Surgical</td>
<td>979</td>
<td>64.6%</td>
<td>488</td>
<td>32.2%</td>
</tr>
<tr>
<td>Surgical cardiothoracic</td>
<td>476</td>
<td>57.3%</td>
<td>346</td>
<td>41.6%</td>
</tr>
<tr>
<td>Trauma</td>
<td>493</td>
<td>42.0%</td>
<td>678</td>
<td>57.8%</td>
</tr>
<tr>
<td>Specialty care areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term acute care</td>
<td>42</td>
<td>84.0%</td>
<td>7</td>
<td>14.0%</td>
</tr>
<tr>
<td>Inpatient wards</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult step-down unit (postcritical care)</td>
<td>46</td>
<td>82.1%</td>
<td>9</td>
<td>16.1%</td>
</tr>
<tr>
<td>Medical</td>
<td>3</td>
<td>75.0%</td>
<td>1</td>
<td>25.0%</td>
</tr>
<tr>
<td>Medical/surgical</td>
<td>7</td>
<td>77.8%</td>
<td>2</td>
<td>22.2%</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>2</td>
<td>100.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>5529</td>
<td>61.5%</td>
<td>3370</td>
<td>37.5%</td>
</tr>
</tbody>
</table>

PNU1, clinically defined pneumonia; PNU2, pneumonia with specific laboratory findings; PNU3, pneumonia in immunocompromised patients.

Table 17. Distribution of specific sites and criteria for device-associated BSI among level III NICUs by birthweight, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>Criterion 1</th>
<th>Criterion 2</th>
<th>Criterion 3</th>
<th>CSEP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central line–associated BSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤750 g</td>
<td>317</td>
<td>65.9%</td>
<td>100</td>
<td>20.8%</td>
<td>29</td>
</tr>
<tr>
<td>750-1000 g</td>
<td>251</td>
<td>67.3%</td>
<td>74</td>
<td>19.8%</td>
<td>23</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>177</td>
<td>64.1%</td>
<td>62</td>
<td>22.5%</td>
<td>16</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>139</td>
<td>64.4%</td>
<td>54</td>
<td>25.0%</td>
<td>8</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>94</td>
<td>59.9%</td>
<td>41</td>
<td>26.1%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>978</td>
<td>61.5%</td>
<td>331</td>
<td>22.0%</td>
<td>78</td>
</tr>
<tr>
<td>Umbilical catheter–associated BSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤750 g</td>
<td>93</td>
<td>72.1%</td>
<td>18</td>
<td>14.0%</td>
<td>2</td>
</tr>
<tr>
<td>750-1000 g</td>
<td>39</td>
<td>52.0%</td>
<td>18</td>
<td>24.0%</td>
<td>8</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>32</td>
<td>54.2%</td>
<td>14</td>
<td>23.7%</td>
<td>5</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>17</td>
<td>60.7%</td>
<td>4</td>
<td>14.3%</td>
<td>1</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>22</td>
<td>55.0%</td>
<td>9</td>
<td>22.5%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>203</td>
<td>61.4%</td>
<td>63</td>
<td>19.0%</td>
<td>18</td>
</tr>
</tbody>
</table>

NOTE. LCBI criterion 1: Patient has a recognized pathogen cultured from one or more blood cultures, and organism cultured from blood is not related to an infection at another site. LCBI criterion 2: Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension, and signs and symptoms and positive laboratory results are not related to an infection at another site and common skin contaminant (ie, diphtheroids [Corynebacterium spp], Bacillus [not B anthracis] spp, Propionibacterium spp, coagulase-negative staphylococci [including S epidermidis], viridans group streptococci, Aerococcus spp, Micrococcus spp) is cultured from 2 or more blood cultures drawn on separate occasions. LCBI criterion 3: Patient age <1 year has at least one of the following signs or symptoms: fever (>38°C core), hypothermia (<36°C core), apnea, or bradycardia, and signs and symptoms and positive laboratory results are not related to an infection at another site and common skin contaminant (ie, diphtheroids [Corynebacterium spp], Bacillus [not B anthracis] spp, Propionibacterium spp, coagulase-negative staphylococci [including S epidermidis], viridans group streptococci, Aerococcus spp, Micrococcus spp) is cultured from 2 or more blood cultures drawn on separate occasions.

BSI, bloodstream infection; LCBI, laboratory-confirmed bloodstream infection; CSEP, clinical sepsis.
Table 18. Distribution of specific sites and criteria for device-associated BSI among level II/III NICUs by birthweight, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>Criterion 1</th>
<th>Criterion 2</th>
<th>Criterion 3</th>
<th>CSEP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central line-associated BSI</td>
<td>60.8%</td>
<td>28.0%</td>
<td>6.0%</td>
<td>5.2%</td>
<td>250</td>
</tr>
<tr>
<td>‰750 g</td>
<td>70</td>
<td>15</td>
<td>13</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>750-1000 g</td>
<td>61.6%</td>
<td>27.7%</td>
<td>6.9%</td>
<td>3.8%</td>
<td>159</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>65.0%</td>
<td>25.8%</td>
<td>3.3%</td>
<td>7</td>
<td>120</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>72.3%</td>
<td>24.6%</td>
<td>3.1%</td>
<td>0</td>
<td>65</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>57.1%</td>
<td>32.7%</td>
<td>0</td>
<td>10.2%</td>
<td>49</td>
</tr>
<tr>
<td>Total</td>
<td>62.7%</td>
<td>27.5%</td>
<td>5.0%</td>
<td>4.8%</td>
<td>643</td>
</tr>
</tbody>
</table>

Unbiliical catheter-associated BSI

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>PNU1</th>
<th>PNU2</th>
<th>PNU3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>‰750 g</td>
<td>59.2%</td>
<td>30.6%</td>
<td>4</td>
<td>61.1%</td>
</tr>
<tr>
<td>750-1000 g</td>
<td>62.7%</td>
<td>23.5%</td>
<td>2</td>
<td>98%</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>69.7%</td>
<td>21.2%</td>
<td>2</td>
<td>3.0%</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>68.4%</td>
<td>15.8%</td>
<td>1</td>
<td>10.5%</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>65.4%</td>
<td>15.4%</td>
<td>0</td>
<td>19.2%</td>
</tr>
<tr>
<td>Total</td>
<td>63.0%</td>
<td>24.7%</td>
<td>0</td>
<td>8.4%</td>
</tr>
</tbody>
</table>

NOTE. LCBI criterion 1: Patient has a recognized pathogen cultured from one or more blood cultures and organism cultured from blood is not related to an infection at another site.3

LCBI criterion 2: Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension, and signs and symptoms and positive laboratory results are not related to an infection at another site and common skin contaminant (ie, diphtheroids [Corynebacterium spp], Bacillus [not B anthracis] spp, Propionibacterium spp, coagulase-negative staphylococci [including S epidermidis], viridans group streptococci, Aerococcus spp, Micrococcus spp) is cultured from 2 or more blood cultures drawn on separate occasions.3

LCBI criterion 3: Patient age < 1 year has at least one of the following signs or symptoms: fever (>38°C core), hypothermia (<36°C core), apnea, or bradycardia, and signs and symptoms and positive laboratory results are not related to an infection at another site and common skin contaminant (ie, diphtheroids [Corynebacterium spp], Bacillus [not B anthracis] spp, Propionibacterium spp, coagulase-negative staphylococci [including S epidermidis], viridans group streptococci, Aerococcus spp, Micrococcus spp) is cultured from 2 or more blood cultures drawn on separate occasions.3

NOTE. PNU1, clinically defined pneumonia; PNU2, pneumonia with specific laboratory findings; PNU3, pneumonia in immunocompromised patients.3

Table 19. Distribution of specific sites of ventilator-associated pneumonia among level III NICUs by birth weight, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth-weight category</th>
<th>PNU1</th>
<th>PNU2</th>
<th>PNU3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>‰750 g</td>
<td>74</td>
<td>31</td>
<td>0</td>
<td>105</td>
</tr>
<tr>
<td>750-1000 g</td>
<td>42</td>
<td>8</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>11</td>
<td>6</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>7</td>
<td></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>&gt;2500 g</td>
<td>3</td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>46</td>
<td>3</td>
<td>204</td>
</tr>
</tbody>
</table>

Table 20. Distribution of specific sites of ventilator-associated pneumonia among level II/III NICUs by birthweight, 2006 through 2008

<table>
<thead>
<tr>
<th>Birth weight category</th>
<th>PNU1</th>
<th>PNU2</th>
<th>PNU3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>‰750 g</td>
<td>53</td>
<td>11</td>
<td>2</td>
<td>65</td>
</tr>
<tr>
<td>750-1000 g</td>
<td>11</td>
<td>5</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>1001-1500 g</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1501-2500 g</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>16</td>
<td>3</td>
<td>204</td>
</tr>
</tbody>
</table>

NOTE. PNU1, clinically defined pneumonia; PNU2, pneumonia with specific laboratory findings; PNU3, pneumonia in immunocompromised patients.3

days and patient days nearly doubled in each birthweight group, the device utilization ratios stayed essentially the same. This suggests that prevention efforts may be having the desired effects.9,10

Table 13 to 20 were included to aid the reader in interpreting the device-associated infection rates data. One important use of these data is to aid understanding of the distribution of device-associated
Table 21. Pooled means and key percentiles of the distribution of post-procedure pneumonia rates* by operative procedure category, PA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Procedure code</th>
<th>Operative procedure description</th>
<th>No. of hospitals</th>
<th>No. of procedures</th>
<th>No. of PPP</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>Abdominal aortic aneurysm repair</td>
<td>17 (8)</td>
<td>566</td>
<td>8</td>
<td>1.41</td>
<td></td>
<td></td>
<td>1.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMP</td>
<td>Limb amputation</td>
<td>6 (5)</td>
<td>618</td>
<td>0</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPY</td>
<td>Appendix surgery</td>
<td>11 (8)</td>
<td>1971</td>
<td>2</td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVSD</td>
<td>Atrioventricular shunt for dialysis</td>
<td>7 (4)</td>
<td>254</td>
<td>0</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BILI</td>
<td>Bile duct, liver, or pancreatic surgery</td>
<td>6 (4)</td>
<td>288</td>
<td>1</td>
<td>0.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BRST</td>
<td>Breast surgery, limb, liver, or pancreatic surgery</td>
<td>8 (5)</td>
<td>593</td>
<td>0</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARD</td>
<td>Cardiac surgery</td>
<td>40 (32)</td>
<td>5478</td>
<td>45</td>
<td>0.82</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.87</td>
</tr>
<tr>
<td>CBGB</td>
<td>Coronary bypass with chest and donor incisions</td>
<td>61 (52)</td>
<td>20,746</td>
<td>174</td>
<td>0.84</td>
<td>0.00</td>
<td>0.00</td>
<td>0.50</td>
<td>1.47</td>
<td>2.77</td>
</tr>
<tr>
<td>CBGC</td>
<td>Coronary bypass graft with chest incision</td>
<td>49 (20)</td>
<td>1423</td>
<td>17</td>
<td>1.19</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.54</td>
<td>2.94</td>
</tr>
<tr>
<td>CEA</td>
<td>Carotid endarterectomy</td>
<td>11 (5)</td>
<td>877</td>
<td>2</td>
<td>0.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHOL</td>
<td>Gallbladder surgery</td>
<td>19 (15)</td>
<td>2900</td>
<td>7</td>
<td>0.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLO</td>
<td>Colon surgery</td>
<td>55 (40)</td>
<td>7893</td>
<td>44</td>
<td>0.56</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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PPP, post-procedure pneumonia.
*Per 100 operations.
†Number of hospitals meeting minimum requirements for percentile distributions if less than the total number of hospitals. If this number is <20, then percentile distributions are not calculated.

Infections by type of reporting criterion. For example, most of the CLABSIs from adult and pediatric ICU and inpatient wards were identified using the most objective criterion (1); however for NICUs, fewer than two-thirds used this criterion. Similarly, the specific site of ventilator-associated pneumonia most frequently reported, regardless of location, was the clinical criterion (PNU1). However, in adult and pediatric locations,
### Table 22. Pooled means and key percentiles of the distribution of SSI rates* by operative procedure and risk index categories, PA module, 2006 through 2008

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<th>No. of SSI</th>
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<th>Percentiles</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>FX</td>
<td>Open reduction of fracture</td>
<td>138</td>
<td>1</td>
<td>38 (30)</td>
<td>5629</td>
<td>100</td>
<td>1.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FX</td>
<td>Open reduction of fracture</td>
<td>138</td>
<td>2, 3</td>
<td>36 (10)</td>
<td>1249</td>
<td>42</td>
<td>3.36</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>GAST</td>
<td>Gastric surgery</td>
<td>160</td>
<td>0</td>
<td>40 (29)</td>
<td>6350</td>
<td>109</td>
<td>1.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GAST</td>
<td>Gastric surgery</td>
<td>160</td>
<td>2, 3</td>
<td>37 (20)</td>
<td>1821</td>
<td>77</td>
<td>4.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HER</td>
<td>Herniorrhaphy</td>
<td>124</td>
<td>0</td>
<td>89 (32)</td>
<td>2852</td>
<td>21</td>
<td>0.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HER</td>
<td>Herniorrhaphy</td>
<td>124</td>
<td>1</td>
<td>88 (38)</td>
<td>3348</td>
<td>81</td>
<td>2.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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</table>

*SSI = surgical site infection; PA = primary action.
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Code</th>
<th>Count</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herniorrhaphy</td>
<td>HER</td>
<td>124</td>
<td>2, 3 72</td>
</tr>
<tr>
<td>Hip prosthesis</td>
<td>HPRO</td>
<td>120</td>
<td>0-627</td>
</tr>
<tr>
<td>Hip prosthesis</td>
<td>HPRO</td>
<td>120</td>
<td>1, 665</td>
</tr>
<tr>
<td>Hip prosthesis</td>
<td>HPRO</td>
<td>120</td>
<td>2, 3 600</td>
</tr>
<tr>
<td>Heart transplant</td>
<td>HTP</td>
<td>377</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td>Abdominal hysterectomy</td>
<td>HYST</td>
<td>143</td>
<td>0, 348</td>
</tr>
<tr>
<td>Abdominal hysterectomy</td>
<td>HYST</td>
<td>143</td>
<td>1, 334</td>
</tr>
<tr>
<td>Abdominal hysterectomy</td>
<td>HYST</td>
<td>143</td>
<td>2, 3 258</td>
</tr>
<tr>
<td>Knee prosthesis</td>
<td>KPRO</td>
<td>119</td>
<td>0, 494</td>
</tr>
<tr>
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<td>KPRO</td>
<td>119</td>
<td>1, 518</td>
</tr>
<tr>
<td>Knee prosthesis</td>
<td>KPRO</td>
<td>119</td>
<td>2, 3 484</td>
</tr>
<tr>
<td>Kidney transplant</td>
<td>KTP</td>
<td>237</td>
<td>0, 1 10</td>
</tr>
<tr>
<td>Kidney transplant</td>
<td>KTP</td>
<td>237</td>
<td>2, 3 10</td>
</tr>
<tr>
<td>Laminectomy</td>
<td>LAM</td>
<td>166</td>
<td>0, 76</td>
</tr>
<tr>
<td>Laminectomy</td>
<td>LAM</td>
<td>166</td>
<td>1, 77</td>
</tr>
<tr>
<td>Laminectomy</td>
<td>LAM</td>
<td>166</td>
<td>2, 3 76</td>
</tr>
<tr>
<td>Liver transplant</td>
<td>LTP</td>
<td>414</td>
<td>0, 1 7</td>
</tr>
<tr>
<td>Liver transplant</td>
<td>LTP</td>
<td>414</td>
<td>2, 3 6</td>
</tr>
<tr>
<td>Neck surgery</td>
<td>NECK</td>
<td>363</td>
<td>0, 1 10</td>
</tr>
<tr>
<td>Neck surgery</td>
<td>NECK</td>
<td>363</td>
<td>2, 3 7</td>
</tr>
<tr>
<td>Kidney surgery</td>
<td>NEPH</td>
<td>257</td>
<td>0, 1 11</td>
</tr>
<tr>
<td>Kidney surgery</td>
<td>NEPH</td>
<td>257</td>
<td>2, 3 9</td>
</tr>
<tr>
<td>Kidney surgery</td>
<td>NEPH</td>
<td>257</td>
<td>0, 1 11</td>
</tr>
<tr>
<td>Ovarian surgery</td>
<td>OVRY</td>
<td>183</td>
<td>0, 1 14</td>
</tr>
<tr>
<td>Ovarian surgery</td>
<td>OVRY</td>
<td>183</td>
<td>2, 3 11</td>
</tr>
<tr>
<td>Pacemaker surgery</td>
<td>PACE</td>
<td>73</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td>Prostate surgery</td>
<td>PRST</td>
<td>245</td>
<td>0, 1 14</td>
</tr>
<tr>
<td>Prostate surgery</td>
<td>PRST</td>
<td>245</td>
<td>2, 3 8</td>
</tr>
<tr>
<td>Peripheral vascular bypass</td>
<td>PVBY</td>
<td>221</td>
<td>0, 46</td>
</tr>
<tr>
<td>Peripheral vascular bypass</td>
<td>PVBY</td>
<td>221</td>
<td>1, 2, 3 56</td>
</tr>
<tr>
<td>Rectal surgery</td>
<td>REC</td>
<td>252</td>
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</tr>
<tr>
<td>Rectal surgery</td>
<td>REC</td>
<td>252</td>
<td>1, 2 19</td>
</tr>
<tr>
<td>Rectal surgery</td>
<td>REC</td>
<td>252</td>
<td>2, 3 9</td>
</tr>
<tr>
<td>Refusion of spine</td>
<td>RFSN</td>
<td>310</td>
<td>0, 1 41</td>
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<td>RFSN</td>
<td>310</td>
<td>2, 3 24</td>
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<td>Small bowel surgery</td>
<td>SB</td>
<td>192</td>
<td>0, 29</td>
</tr>
<tr>
<td>Small bowel surgery</td>
<td>SB</td>
<td>192</td>
<td>1, 2, 3 32</td>
</tr>
<tr>
<td>Spleen surgery</td>
<td>SPLE</td>
<td>217</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td>Thoracic surgery</td>
<td>THOR</td>
<td>188</td>
<td>0, 1 15</td>
</tr>
<tr>
<td>Thoracic surgery</td>
<td>THOR</td>
<td>188</td>
<td>2, 3 14</td>
</tr>
<tr>
<td>Thyroid and/or parathyroid</td>
<td>THYR</td>
<td>150</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td>Vaginal hysterectomy</td>
<td>VHY</td>
<td>133</td>
<td>0, 158</td>
</tr>
<tr>
<td>Vaginal hysterectomy</td>
<td>VHY</td>
<td>133</td>
<td>1, 2, 3 149</td>
</tr>
<tr>
<td>Ventricle shunt</td>
<td>VSHN</td>
<td>79</td>
<td>0, 23</td>
</tr>
<tr>
<td>Ventricle shunt</td>
<td>VSHN</td>
<td>79</td>
<td>1, 2, 3 24</td>
</tr>
<tr>
<td>Exploratory abdominal surgery</td>
<td>XLAP</td>
<td>199</td>
<td>0, 1 29</td>
</tr>
<tr>
<td>Exploratory abdominal surgery</td>
<td>XLAP</td>
<td>199</td>
<td>2, 3 21</td>
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</tbody>
</table>

Outpatient procedures:

- Appendix surgery
- Breast surgery
- Breast surgery

(Continued)
Table 22. (Continued)

<table>
<thead>
<tr>
<th>Procedure code</th>
<th>Operative procedure description</th>
<th>Duration cutpoint, minutes</th>
<th>Risk index category</th>
<th>No. of hospitals¹</th>
<th>No. of procedures</th>
<th>No. of SSI</th>
<th>Pooled mean</th>
<th>10%</th>
<th>25%</th>
<th>50% (median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHOL</td>
<td>Gallbladder surgery</td>
<td>65</td>
<td>0</td>
<td>71 (47)</td>
<td>5696</td>
<td>6</td>
<td>0.11</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.13</td>
</tr>
<tr>
<td>CHOL</td>
<td>Gallbladder surgery</td>
<td>65</td>
<td>1, 2, 3</td>
<td>71 (42)</td>
<td>4379</td>
<td>15</td>
<td>0.34</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.47</td>
</tr>
<tr>
<td>FX</td>
<td>Open reduction of fracture</td>
<td>105</td>
<td>0, 1, 2, 3</td>
<td>12 (6)</td>
<td>715</td>
<td>2</td>
<td>0.28</td>
<td></td>
<td></td>
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<tr>
<td>HER</td>
<td>Herniorrhaphy</td>
<td>63</td>
<td>0, 1</td>
<td>99 (69)</td>
<td>10,305</td>
<td>47</td>
<td>0.46</td>
<td>0.00</td>
<td>0.00</td>
<td>0.23</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>HER</td>
<td>Herniorrhaphy</td>
<td>63</td>
<td>2, 3</td>
<td>72 (9)</td>
<td>685</td>
<td>9</td>
<td>1.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPRO</td>
<td>Knee prosthesis</td>
<td>131</td>
<td>0, 1, 2, 3</td>
<td>7 (0)</td>
<td>16</td>
<td>0</td>
<td>0.00</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>LAM</td>
<td>Laminectomy</td>
<td>95</td>
<td>0, 1, 2, 3</td>
<td>21 (10)</td>
<td>901</td>
<td>7</td>
<td>0.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VHYS</td>
<td>Vaginal hysterectomy</td>
<td>117</td>
<td>0, 1, 2, 3</td>
<td>5 (1)</td>
<td>44</td>
<td>0</td>
<td>0.00</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

SSI, surgical site infection.
¹Per 100 operations.
²Number of hospitals meeting minimum requirements for percentile distributions if less than the total number of hospitals. If this number is <20, then percentile distributions are not calculated.

Table 23. SSI rates* following coronary artery bypass graft procedure, by risk index category and specific site, PA module, 2006 through 2008

<table>
<thead>
<tr>
<th>Infection site</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. SSI</td>
<td>Rate</td>
<td>No. SSI</td>
<td>Rate</td>
</tr>
<tr>
<td>Secondary (donor site)</td>
<td>2</td>
<td>0.12</td>
<td>599</td>
<td>0.66</td>
</tr>
<tr>
<td>Superficial incisional</td>
<td>2</td>
<td>0.12</td>
<td>464</td>
<td>0.51</td>
</tr>
<tr>
<td>Deep incisional</td>
<td>0</td>
<td>0.00</td>
<td>135</td>
<td>0.15</td>
</tr>
<tr>
<td>Primary (chest site)</td>
<td>4</td>
<td>0.23</td>
<td>1720</td>
<td>1.89</td>
</tr>
<tr>
<td>Superficial incisional</td>
<td>2</td>
<td>0.11</td>
<td>721</td>
<td>0.79</td>
</tr>
<tr>
<td>Deep incisional</td>
<td>1</td>
<td>0.06</td>
<td>527</td>
<td>0.58</td>
</tr>
<tr>
<td>Organ/space</td>
<td>1</td>
<td>0.06</td>
<td>472</td>
<td>0.52</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>0.35</td>
<td>2319</td>
<td>2.55</td>
</tr>
</tbody>
</table>

NOTE. Denominators for the risk categories are as follows: category 0, 1738; category 1, 91,007; category 2, 30,204; category 3, 106.
CABG, coronary artery bypass graft with primary (chest) and secondary (donor) incisions.
*Per 100 operations.
nearly 40% of ventilator-associated pneumonias reported used the more rigorous criteria of PNU2 and PNU3. The specific site of catheter-associated UTI was equally reported between symptomatic UTI and asymptomatic bacteriuria. However, the distinction between symptomatic UTI and asymptomatic bacteriuria is often only the presence of fever, which can be difficult to attribute completely to infection versus other processes in critically ill patients. For this reason, beginning in 2009, the criteria for UTI have been modified to eliminate all asymptomatic bacteriuria except those few in which a secondary BSI was present.4

We assessed the potential impact of mandatory reporting on the pooled mean CLABSI rates for those types of ICUs required by law to report these infections in Colorado, Connecticut, Delaware, Illinois, Massachusetts, Maryland, New York, Oklahoma, Pennsylvania, South Carolina, Tennessee, Vermont, Virginia, and Washington, and found no consistent significant differences with or without these states’ data.

In this second report of pooled mean PPP rates, we find that they remain very low, ranging from 0% for vaginal hysterectomy to 1.41% for abdominal aortic aneurysm repair procedures. Even though the volume of procedures and list of procedure types nearly doubled compared with the last report, these rates should still be considered provisional due to the limited number of pneumonia infections for most procedures.

The risk of SSI varies by procedure and risk category as reported previously (Table 22). The cutpoint for the duration of procedure is the exact 75th percentile of that distribution shown in minutes and allows for a more precise determination of the duration factor when assigning the NNIS risk index level.

Compared with the last NHSN Report, these SSI rates were very similar or slightly lower. However, the groupings of the risk index categories have changed for many procedures, which has an impact on the SSI rates reported in Table 22. For example, the risk index categories for cesarean section were changed from 0 versus 1, 2, 3 to 0 versus 1 versus 2, 3. In addition, we assessed the potential impact of mandatory reporting on the SSI rates for those procedure types with required SSI reporting in Colorado, Massachusetts, New York, Pennsylvania, South Carolina, Tennessee, and Vermont, and found no consistent significant differences with or without these states’ data. There was insufficient evidence to warrant further stratification by mandatory versus voluntary reporting status. As more and diverse types of facilities participate in NHSN, either voluntarily or by mandate, the need for careful scrutiny of the data increases. We will continue to assess how the changing composition of facilities, the changing proportion of data contributed by various types of facilities, and the effects of validation efforts by mandatory reporting states impact the rates and their distributions so that the best possible risk-adjusted comparative data may be provided in future reports.

If you would like to compare your hospital’s rates and ratios with those in this report, you must first collect information from your hospital in accordance with the methods described for NHSN.2-4 You should also refer to Appendices A and B for further instructions. Appendix A discusses the calculation of infection rates and DU ratios for the DA module. Appendix B gives a step-by-step method for interpretation of percentiles of infection rates or DU ratios. Although a high rate or ratio (>90th percentile) does not necessarily define a problem, it does suggest an area for further investigation. Similarly, a low rate or ratio (<10th percentile) may be the result of inadequate infection detection.

Facilities should use the data in this report or their own data to guide local prevention strategies and other quality improvement efforts aimed at reducing the occurrence of infections as much as possible.

We are indebted to the NHSN participants for their ongoing efforts to monitor infections and improve patient safety. We also gratefully acknowledge our colleagues in the Division of Healthcare Quality Promotion who tirelessly support this unique public health network.

References


APPENDIX A: HOW TO CALCULATE A DEVICE-ASSOCIATED INFECTION RATE AND DEVICE UTILIZATION RATIO WITH DA MODULE DATA

Calculation of device-associated infection rate

Step 1: Decide on the time period for your analysis. It may be a month, a quarter, 6 months, a year, or some other period.

Step 2: Select the patient population for analysis (e.g., the type of location or a birth-weight category in a NICU).

Step 3: Select the infections to be included in the numerator. They must be site-specific and must have occurred in the selected patient population. Their date of onset must be during the selected time period.

Step 4: Determine the number of device-days, which is used as the denominator of the rate. Device-days are the total number of days of exposure to the device (central line, umbilical catheter, ventilator, or urinary catheter) by all of the patients in the selected population during the selected time period.

Example: Five patients on the first day of the month had one or more central lines in place; five on day 2; two on day 3; five on day 4; three on day 5; four on day 6; and four on day 7. Adding the number of patients with central lines on days 1 through 7, we would have 5 + 5 + 2 + 5 + 3 + 4 + 4 = 28 central line-days for the first week. If we continued for the entire month, the number of central line-days for the month is simply the sum of the daily counts.

Step 5: Calculate the device-associated infection rate (per 1000 device-days) using the following formula:

Device-associated infection rate = number of device-associated infections for an infection site × 1000

\[ \div \text{number of device-days} \]

Example: Central line-associated BSI rate per 1000 central line-days = number of central line-associated BSIs × 1000 ÷ number of central line-days.

Calculation of DU ratio

Steps 1, 2, and 4: Same as device-associated infection rates plus determine the number of patient-days, which is used as the denominator of the DU ratio. Patient-days are the total number of days that patients are in the location during the selected time period.

Example: Ten patients were in the unit on the first day of the month; 12 on day 1; 11 on day 3; 13 on day 4; 10 on day 5; 6 on day 6; and 10 on day 7; and so on. If we counted the patients in the unit from days 1 through 7, we would add 10 + 12 + 11 + 13 + 10 + 6 + 10, for a total of 72 patient-days for the first week of the month. If we continued for the entire month, the number of patient-days for the month is simply the sum of the daily counts.

Step 5: Calculate the DU ratio with the following formula:

DU ratio = number of device-days

\[ \div \text{number of patient-days} \]

With the number of device-days and patient-days from the examples above, DU = 28/72 = 0.39 or 39% of patient-days were also central line-days for the first week of the month.

Step 6: Examine the size of the denominator for your hospital's rate or ratio. Rates or ratios may not be good estimates of the "true" rate or ratio for your hospital if the denominator is small (i.e., < 50 device-days or patient-days).

Step 7: Compare your hospital's location-specific rates or ratios with those found in the tables of this report. Refer to Appendix B for interpretation of the percentiles of the rates/ratios.

APPENDIX B: INTERPRETATION OF PERCENTILES OF INFECTION RATES OR DEVICE UTILIZATION RATIOS

Step 1: Evaluate the rate (ratio) you have calculated for your hospital and confirm that the variables in the rate (both numerator and denominator) are identical to the rates (ratios) in the table.

Step 2: Examine the percentiles in each of the tables and look for the 50th percentile (or median). At the 50th percentile, 50% of the hospitals have lower rates (ratios) than the median and 50% have higher rates (ratios).

Step 3: Determine if your hospital’s rate (ratio) is above or below this median.

Determining whether your hospital’s rate or ratio is a high outlier

Step 4: If it is above the median, determine whether the rate (ratio) is above the 75th percentile. At the 75th percentile, 75% of the hospitals had lower rates (ratios) and 25% of the hospital had higher rates (ratios).

Step 5: If the rate (ratio) is above the 75th percentile, determine whether it is above the 90th percentile. If it
is, then the rate (ratio) is an outlier which may indicate a problem.

**Determining whether your hospital’s rate or ratio is a low outlier**

Step 6: If it is below the median, determine whether the rate (ratio) is below the 25th percentile. At the 25th percentile, 25% of the hospitals had lower rates (ratios) and 75% of the hospitals had higher rates (ratios).

Step 7: If the rate (ratio) is below the 25th percentile, determine whether it is below the 10th percentile. If the rate is, then it is a low outlier, which may be due to underreporting of infections. If the ratio is below the 10th percentile, it is a low outlier and may be due to infrequent and/or short duration of device use.

Note: Device-associated infection rates and device utilization ratios should be examined together so that preventive measures may be appropriately targeted. For example, you find that the ventilator-associated pneumonia rate for a certain type of ICU is consistently above the 90th percentile and the ventilator utilization ratio is routinely between the 75th and 90th percentiles. Because the ventilator is a significant risk factor for pneumonia, you may want to limit the duration of ventilation whenever possible (ie, decrease unnecessary use) while at the same time optimize infection prevention strategies in patients for which ventilator use is required.