TABLE S1. Distribution of Pathogens from Pediatric Device-Associated Infections Reported to the National Healthcare Safety Network, by Reporting Location, 2011–2014

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | Pathogens by HAI Type | | | | | | | |
|  | Units Reporting (n=1,517) | | Overall (n=19,270) | | CLABSI (n=15,538) | | CAUTI (n=2,366) | | VAPa (n=1,366) | |
| Location | No. | % | No. | % | No. | % | No. | % | No. | % |
| **Critical Care Units** |  |  |  |  |  |  |  |  |  |  |
| Neonatal intensive care unit | 772 | 50.9 | 8,702 | 45.2 | 7,842 | 50.5 | … | … | 860 | 63.0 |
| Pediatric intensive care unit | 355 | 23.4 | 6,004 | 31.2 | 3,543 | 22.8 | 1,960 | 82.8 | 501 | 36.7 |
| **Inpatient Wards** |  |  |  |  |  |  |  |  |  |  |
| Pediatric medical/surgical ward | 172 | 11.3 | 1,314 | 6.8 | 1,069 | 6.9 | 245 | 10.4 | 0 | … |
| Pediatric ward | 96 | 6.3 | 614 | 3.2 | 554 | 3.6 | 58 | 2.5 | 2 | 0.1 |
| Pediatric surgical ward | 22 | 1.5 | 115 | 0.6 | 80 | 0.5 | 35 | 1.5 | 0 | … |
| **Other Locations** |  |  |  |  |  |  |  |  |  |  |
| Pediatric oncologyc | 89 | 5.9 | 2,448 | 12.7 | 2,394 | 15.4 | 54 | 2.3 | 0 | … |
| Pediatric SOTP | 2 | 0.1 | 36 | 0.2 | 30 | 0.2 | 4 | 0.2 | 2 | 0.1 |
| Adolescent and pediatric behavioral health | 2 | 0.1 | 11 | 0.1 | 11 | 0.1 | 0 | … | 0 | … |
| Pediatric LTACd | 2 | 0.1 | 14 | 0.1 | 13 | 0.1 | 0 | … | 1 | 0.1 |
| Pediatric rehabilitatione | 5 | 0.3 | 12 | 0.1 | 2 | <0.1 | 10 | 0.4 | 0 | … |

NOTE. CAUTI, catheter-associated urinary tract infection; CLABSI, central line-associated bloodstream infection; HAI, healthcare-associated infection; LTAC, long-term acute care; SOTP, solid organ transplant; VAP, ventilator-associated pneumonia.

aVAP data from neonatal critical care locations from 2011 to 2013.

cIncludes oncology locations of all acuity levels (critical care, ward, and step-down) located within general acute-care hospitals and oncology hospitals.

dRepresents pediatric LTAC units within children’s hospitals.

e Quality reporting programs for inpatient rehabilitation facilities began in October 2012; therefore data reported from these facilities may not be inclusive of the entire 4-year period.

TABLE S2. Rank Order of Select Pathogens for Pediatric Central Line-associated Bloodstream Infections (CLABSIs) Reported to the National Healthcare Safety Network, by Reporting Location, 2011–2014

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Overall | | | Neonatal Intensive Care Unit | | | Pediatric Intensive Care Unit | | | Pediatric  Oncology Ward | | | Pediatric Ward | | |
| Pathogen | No. | % | Ranka | No. | % | Ranka | No. | % | Ranka | No. | % | Ranka | No. | % | Ranka |
| Coagulase-negative staphylococci | 3,254 | 20.9 | 1 | 2,202 | 28.1 | 1 | 553 | 15.6 | 1 | 269 | 11.2 | 4 | 230 | 13.1 | 2 |
| *Staphylococcus aureus* | 2,815 | 18.1 | 2 | 1,950 | 24.9 | 2 | 466 | 13.2 | 2 | 173 | 7.2 | 5 | 226 | 12.8 | 3 |
| *Klebsiella pneumoniae/oxytoca* | 1,461 | 9.4 | 3 | 552 | 7.0 | 5 | 361 | 10.2 | 4 | 286 | 11.9 | 2 | 262 | 14.9 | 1 |
| *Enterococcus faecalis* | 1,414 | 9.1 | 4 | 658 | 8.4 | 3 | 462 | 13.0 | 3 | 110 | 4.6 | 9 | 184 | 10.5 | 4 |
| *Escherichia coli* | 1,153 | 7.4 | 5 | 647 | 8.3 | 4 | 124 | 3.5 | 10 | 271 | 11.3 | 3 | 111 | 6.3 | 6 |
| *Enterobacter* spp | 852 | 5.5 | 6 | 309 | 3.9 | 6 | 283 | 8.0 | 5 | 133 | 5.6 | 6 | 127 | 7.2 | 5 |
| *Pseudomonas aeruginosa* | 532 | 3.4 | 7 | 208 | 2.7 | 8 | 141 | 4.0 | 6 | 122 | 5.1 | 8 | 61 | 3.5 | 9 |
| *Candida albicans* | 515 | 3.3 | 8 | 267 | 3.4 | 7 | 140 | 4.0 | 7 | 31 | 1.3 | 13 | 77 | 4.4 | 7 |
| Viridans group streptococci | 463 | 3.0 | 9 | 20 | 0.3 | 18 | 23 | 0.6 | 17 | 367 | 15.3 | 1 | 53 | 3.0 | 10 |
| *Serratia* spp | 389 | 2.5 | 10 | 197 | 2.5 | 9 | 126 | 3.6 | 9 | 15 | 0.6 | 17 | 51 | 2.9 | 11 |
| Other *Candida* spp | 368 | 2.4 | 11 | 96 | 1.2 | 12 | 132 | 3.7 | 8 | 71 | 3.0 | 10 | 69 | 3.9 | 8 |
| *Candida parapsilosis* | 360 | 2.3 | 12 | 188 | 2.4 | 10 | 122 | 3.4 | 11 | 22 | 0.9 | 15 | 28 | 1.6 | 13 |
| *Enterococcus faecium* | 309 | 2.0 | 13 | 26 | 0.3 | 16 | 112 | 3.2 | 12 | 124 | 5.2 | 7 | 47 | 2.7 | 12 |
| *Enterococcus* spp | 198 | 1.3 | 14 | 59 | 0.8 | 14 | 69 | 1.9 | 13 | 46 | 1.9 | 11 | 24 | 1.4 | 14 |
| *Acinetobacter* spp | 174 | 1.1 | 15 | 62 | 0.8 | 13 | 64 | 1.8 | 14 | 24 | 1.0 | 14 | 24 | 1.4 | 14 |
| Other | 1,281 | 8.2 | … | 401 | 5.1 | … | 365 | 10.3 | … | 330 | 13.8 | … | 185 | 10.5 | … |
| Total | 15,538 | 100 | … | 7,842 | 100 | … | 3,543 | 100 | … | 2,394 | 100 | … | 1,759 | 100 | … |

a The 15 most common pathogens are listed in this table and ranked according to reporting frequency of all pathogens reported to NHSN.

b Non-*albicans*, non-*parapsilosis*.

c Non-*faecium*, non-*faecalis*.

TABLE S3. Rank Order of Selected Pathogens for Pediatric Catheter-Associated Urinary Tract Infections (CAUTIs Reported to National Healthcare Safety Network, by Reporting Location, 2011–2014

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Overall | | | Pediatric Intensive Care Unit | | | Pediatric Ward | | |
| Pathogen | No. | % | Ranka | No. | % | Ranka | No. | % | Ranka |
| *Escherichia coli* | 589 | 24.9 | 1 | 467 | 23.8 | 1 | 108 | 30.7 | 1 |
| *Pseudomonas aeruginosa* | 312 | 13.2 | 2 | 268 | 13.7 | 2 | 38 | 10.8 | 3 |
| *Klebsiella pneumoniae/oxytoca* | 197 | 8.3 | 3 | 150 | 7.7 | 5 | 43 | 12.2 | 2 |
| *Candida albicans* | 191 | 8.1 | 4 | 166 | 8.5 | 3 | 22 | 6.3 | 5 |
| *Enterobacter* spp | 185 | 7.8 | 5 | 161 | 8.2 | 4 | 19 | 5.4 | 6 |
| *Enterococcus faecalis* | 159 | 6.7 | 6 | 119 | 6.1 | 6 | 36 | 10.2 | 4 |
| Other *Candida* spp | 124 | 5.2 | 7 | 110 | 5.6 | 7 | 12 | 3.4 | 7 |
| Coagulase-negative staphylococci | 105 | 4.4 | 8 | 93 | 4.7 | 8 | 10 | 2.8 | 9 |
| *Enterococcus* spp | 100 | 4.2 | 9 | 87 | 4.4 | 9 | 9 | 2.6 | 10 |
| *Citrobacter* spp | 51 | 2.2 | 10 | 45 | 2.3 | 10 | 4 | 1.1 | 13 |
| *Staphylococcus aureus* | 43 | 1.8 | 11 | 34 | 1.7 | 12 | 8 | 2.3 | 11 |
| *Proteus* spp | 42 | 1.8 | 12 | 31 | 1.6 | 13 | 11 | 3.1 | 8 |
| *Candida parapsilosis* | 38 | 1.6 | 13 | 36 | 1.8 | 11 | 1 | 0.3 | 15 |
| *Enterococcus faecium* | 28 | 1.2 | 14 | 20 | 1.0 | 15 | 6 | 1.7 | 12 |
| *Serratia* spp | 23 | 1.0 | 15 | 22 | 1.1 | 14 | 1 | 0.3 | 15 |
| Other | 179 | 7.6 | … | 151 | 7.7 | … | 24 | 6.8 | … |
| Total | 2,366b | 100 | … | 1,960 | 100 | … | 352 | 100 | … |

a The 15 most common pathogens are listed in this table and ranked according to reporting frequency of all pathogens reported to NHSN. Pathogens with matching frequencies and percentages assigned same rank.

b Pathogens from pediatric oncology wards not shown (N=54): *Escherichia coli* (n=14, 25.9%); *Pseudomonas aeruginosa* (n=6, 11.1%); *Enterobacter* spp (n=5, 9.3%); *Enterococcus faecalis*, *Enterococcus* spp, and *Klebsiella pneumoniae/oxytoca* and Other (n=4, 7.4%); *Candida albicans* (n=3, 5.6%); *Citrobacter* spp, Coagulase-negative staphylococci, *Enterococcus faecium*, and other *Candida* spp (n=2, 3.7%); *Candida parapsilosis* and *Staphylococcus aureus* (n=1, 1.9%).

TABLE S4. Rank Order of Selected Pathogens from Pediatric Ventilator-associated Pneumonias (VAPs) as Reported to the National Healthcare Safety Network, by Reporting Location, 2011–2014a

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Overall | | | Neonatal Intensive Care Unitb | | | Pediatric Intensive Care Unit | | |
| Pathogen | No. | % | Rankc | No. | % | Rankc | No. | % | Rankc |
| *Staphylococcus aureus* | 329 | 24.1 | 1 | 208 | 24.2 | 1 | 120 | 24.0 | 1 |
| *Pseudomonas aeruginosa* | 214 | 15.7 | 2 | 121 | 14.1 | 3 | 91 | 18.2 | 2 |
| *Klebsiella pneumoniae/oxytoca* | 166 | 12.1 | 3 | 128 | 14.9 | 2 | 37 | 7.4 | 4 |
| *Enterobacter* spp | 139 | 10.2 | 4 | 90 | 10.5 | 4 | 49 | 9.8 | 3 |
| *Escherichia coli* | 75 | 5.5 | 5 | 67 | 7.8 | 5 | 8 | 1.6 | 12 |
| *Serratia* spp | 64 | 4.7 | 6 | 40 | 4.7 | 8 | 24 | 4.8 | 7 |
| *Stenotrophomonas* spp | 63 | 4.6 | 7 | 41 | 4.8 | 7 | 22 | 4.4 | 8 |
| Coagulase-negative staphylococci | 52 | 3.8 | 8 | 49 | 5.7 | 6 | 3 | 0.6 | 14 |
| *Acinetobacter* spp | 48 | 3.5 | 9 | 29 | 3.4 | 9 | 19 | 3.8 | 9 |
| *Haemophilus influenzae* | 44 | 3.2 | 10 | 10 | 1.2 | 11 | 33 | 6.6 | 5 |
| *Streptococcus pneumoniae*f | 27 | 2.0 | 11 | 0 | 0.0 | … | 27 | 5.4 | 6 |
| *Moraxella catharrhalis* | 21 | 1.5 | 12 | 2 | 0.2 | 20 | 19 | 3.8 | 10 |
| *Candida albicans* | 15 | 1.1 | 13 | 5 | 0.6 | 14 | 10 | 2.0 | 11 |
| Group B *Streptococcus* | 15 | 1.1 | 14 | 15 | 1.7 | 10 | 0 | 0.0 | … |
| *Proteus* spp | 9 | 0.7 | 15 | 8 | 0.9 | 12 | 1 | 0.2 | 17 |
| Other | 85 | 6.2 | … | 47 | 5.5 | … | 38 | 7.6 | … |
| Total | 1,366g | 100 | … | 860 | 100 | … | 501 | 100 | … |

a Pediatric ward locations not shown.

b This table contains VAP data from NICU locations from 2011 to 2013.

c The 15 most common pathogens are listed in this table and ranked according to reporting frequency of all pathogens reported to NHSN. Pathogens with matching frequencies and percentages assigned same rank.

d Non-*albicans*.

e Non-*faecalis*, non-*faecium*.

f Exclusively non–*Streptococcus* *mitis* species.

g An additional 5 pathogens were reported from VAP events in pediatric ward locations: *Pseudomonas aeruginosa* (n=2), *Haemophilus influenza* (n=1), *Klebsiella (pneumoniae/oxytoca)* (n=1), *Staphylococcus aureus* (n=1).

TABLE S5. Distribution of Pathogens Associated with Pediatric Surgical Site Infections (SSIs) Frequently Reported to the National Healthcare Safety Network, by Type of Surgery, 2011–2014

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Surgery Type Preceding SSI | | | | | | | | | | | |
|  | Total Pathogens | | Abdominala | | Orthopedicb | | Neurologicalc | | Cardiacd | | Ob/Gyne | | Transplantf | |
| Pathogen | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| *Staphylococcus aureus* | 678 | 22.2 | 122 | 7.7 | 205 | 39.1 | 138 | 28.1 | 173 | 55.4 | 31 | 29.0 | 4 | 11.8 |
| *Escherichia coli* | 534 | 17.5 | 448 | 28.4 | 50 | 9.5 | 17 | 3.5 | 4 | 1.3 | 9 | 8.4 | 6 | 17.7 |
| Coagulase-negative staphylococci | 293 | 9.6 | 38 | 2.4 | 42 | 8.0 | 151 | 30.8 | 47 | 15.1 | 11 | 10.3 | 4 | 11.8 |
| *Pseudomonas aeruginosa* | 232 | 7.6 | 128 | 8.1 | 56 | 10.7 | 28 | 5.7 | 14 | 4.5 | 4 | 3.7 | 2 | 5.9 |
| *Enterobacter* spp | 190 | 6.2 | 108 | 6.8 | 33 | 6.3 | 29 | 5.9 | 12 | 3.8 | 6 | 5.6 | 2 | 5.9 |
| *Enterococcus faecalis* | 137 | 4.5 | 99 | 6.3 | 16 | 3.1 | 10 | 2.0 | 5 | 1.6 | 5 | 4.7 | 2 | 5.9 |
| *Bacterioides* spp | 131 | 4.3 | 121 | 7.7 | 5 | 1.0 | 0 | 0.0 | 0 | 0.0 | 3 | 2.8 | 1 | 2.9 |
| Viridans group streptococci | 119 | 3.9 | 93 | 5.9 | 3 | 0.6 | 15 | 3.1 | 5 | 1.6 | 2 | 1.9 | 1 | 2.9 |
| *Klebsiella pneumoniae/oxytoca* | 116 | 3.8 | 59 | 3.7 | 25 | 4.8 | 21 | 4.3 | 6 | 1.9 | 4 | 3.7 | 1 | 2.9 |
| *Enterococcus* spp | 93 | 3.0 | 80 | 5.1 | 6 | 1.1 | 1 | 0.2 | 2 | 0.6 | 1 | 0.9 | 3 | 8.8 |
| *Proteus* spp | 49 | 1.6 | 14 | 0.9 | 20 | 3.8 | 7 | 1.4 | 3 | 1.0 | 5 | 4.7 | 0 | 0.0 |
| *Candida albicans* | 48 | 1.6 | 38 | 2.4 | 3 | 0.6 | 4 | 0.8 | 2 | 0.6 | 1 | 0.9 | 0 | 0.0 |
| *Citrobacter* spp | 47 | 1.5 | 38 | 2.4 | 6 | 1.1 | 1 | 0.2 | 1 | 0.3 | 1 | 0.9 | 0 | 0.0 |
| *Serratia* spp | 43 | 1.4 | 7 | 0.4 | 16 | 3.1 | 10 | 2.0 | 9 | 2.9 | 1 | 0.9 | 0 | 0.0 |
| *Enterococcus faecium* | 33 | 1.1 | 28 | 1.8 | 2 | 0.4 | 1 | 0.2 | 0 | 0.0 | 1 | 0.9 | 1 | 2.9 |
| Other | 310 | 10.2 | 156 | 9.9 | 36 | 6.9 | 58 | 11.8 | 29 | 9.3 | 22 | 20.6 | 7 | 20.6 |
| Total | 3,053 | 100 | 1,577 | 100 | 524 | 100 | 491 | 100 | 312 | 100 | 107 | 100 | 34 | 100 |

NOTE. Ob/Gyn, obstetrical and gynecological. The following surgical types had fewer than 10 pathogens reported from 2011 to 2014 and are not shown above: breast (*Staphylococcus aureus*, n=2), kidney (*Bacterioides* spp, n=1; Other, n=2) and vascular (*Staphylococcus aureus*, n=3).

a Appendectomy, bile duct, liver, or pancreatic surgery, gallbladder surgery, colon surgery, gastric surgery, herniorrhaphy, small bowel surgery, spleen surgery, abdominal surgery, and rectal surgery.

b Open reduction of fracture, hip prosthesis, knee prosthesis, limb amputation, spinal fusion, refusion of spine, and laminectomy.

c Craniotomy and ventricular shunt.

d Cardiac surgery, coronary artery bypass graft with chest incision with or without donor incision, pacemaker surgery, and thoracic surgery.

e Cesarean section, abdominal hysterectomy, ovarian surgery, and vaginal hysterectomy.

f Heart transplant, kidney transplant, and liver transplant.