None for one year

NICU Digs Deep to Banish Central Line Infections

By Tyler Smith

Process-improvement initiatives rarely yield instant results. As the Neonatal Intensive Care Unit (NICU) at University of Colorado Hospital has demonstrated, however, determination to stick with the program can be a recipe for success.

The NICU, which has gone more than 18 months without a case of ventilator-associated pneumonia (VAP), recently passed another infection-prevention milestone: one full year without a central line-associated bloodstream infection (CLABSI). The team celebrated the achievement with an open house on its fourth-floor AIP unit June 9.

The infection-free year was hard-earned. The NICU created a CLABSI “bundle” – a series of infection-prevention steps to be followed each time a provider inserts or maintains a line – in 2009. But the program was slow to yield benefits, said Christy Math, RN, MSN, nurse manager of the NICU.

“We saw the difficulties quickly,” Math said. For example, she said, the risk of infection varies by birth weight, making it difficult to achieve consistent prevention practice.

Fighting a dangerous foe. It’s important to prevent CLABSIs in any patient population, but it’s especially vital for the NICU, which treats tiny, vulnerable patients with underdeveloped systems and few resources for fighting off infection.

“Any baby with a bacterial infection is likely to have worse outcomes later,” said James Barry, MD, medical director of the NICU. The problem isn’t simply the infection, he said. The antibiotics used to combat it upset the balance of flora in the baby’s gut, increasing the risk of necrotizing enterocolitis (NEC), a gastrointestinal disease that causes severe inflammation and tissue death in the bowel and increases mortality.

To unearth the reasons for CLABSIs, the NICU in 2011 began performing a “root cause analysis” of each case, starting with a thorough review of the medical record, said Kirtley Ceballos, MSN, RNC-NIC, the unit’s clinical nurse specialist.

Kirtley Ceballos (standing), clinical nurse specialist for the NICU, and Christy Math, nurse manager, say searching for the cause of each CLABSI has helped to change culture in the NICU.
The point was not to assign blame, but rather to isolate points in the care-delivery process that might open the door to infection. For each case, the unit examined the continuum of care, from the insertion of the line to the time of infection, probing for “causative factors,” Ceballos said.

**Moving violations.** The work revealed that problems often occurred when lines were moved frequently, Ceballos said. Nurses might have difficulty, for example, securing umbilical venous catheters, or have to change the dressing on PICC (peripherally inserted central catheter) lines multiple times. These situations can lead to infection, but they can be countered with good hand hygiene, barrier protection, and consistent use of antiseptic in the area of the line insertion, Ceballos said.

For each instance of a CLABSI, Ceballos spoke with the bedside nurse responsible for inserting or maintaining the line. “I asked the nurse to tell me about what happened,” Ceballos said. Was it a particularly busy time? Was the nurse responsible for hanging lines for three different fluids? Was there a disruption that caused the nurse or someone else to forget to scrub?

“Our focus is on the system and the environment,” Ceballos said. At the end of each of the conversations, she made sure to ask for suggestions to make the process better – a key to establishing buy-in from nurses rather than fear of punishment.

The conversations produced a recent tangible change: the unit now posts the bundle checklist at the bedside as a visual cue to the nurse to follow the steps. More importantly, however, the consistent attention to preventing CLABSIs produced a “culture change” in the NICU, Ceballos noted.

“Nurses know what to expect now, and they instruct residents about antiseptic and handling equipment,” she said. “It’s much easier five years down the road.”

**Unacceptable risk.** Indeed, the attitudes of medical providers toward infection in the NICU have changed in the past decade, Barry said.

“Most physicians previously thought that infections just happen because we have sick babies in NICUs,” he said. “Now we are proactive, and we realize that we can get infection rates down to next to nothing. The truth is in the data. People realize that what we do is working, and that’s the only way to sway physicians – show them the data and that it is attainable.”

Challenges remain, not only in maintaining the culture of safety, but in establishing a reliable way of measuring CLABSIs in the NICU, Barry said. The definition developed by the Centers for Disease Control and Prevention focuses more on adults and “doesn’t quite fit” when it’s applied to the neonatal population, he said.

“We need to develop a definition for the NICU specifically,” Barry said.
Meanwhile, the NICU continues to review all of its processes regularly through its Quality Leadership Team, which draws on the expertise of nurses, physicians, dietitians, pharmacists, and respiratory, physical, and occupational therapists. Ceballos chairs the group.

Each event that endangers or could have endangered a patient goes to the group for review and input. “It helps us keep issues on the radar,” Math said. “It’s a place for discussion and education, not for fault-finding.”