

## SENTINEL EVENT ALERT: DANGEROUS TUBING MISCONNECTIONS

The Joint Commission International Center for Patient Safety has issued a Sentinel Event Alert regarding tubing and catheter misconnection errors, believed to be a serious and under-reported problem in patient care.<sup>1</sup> At least 9 cases involving tubing misconnections have been reported to date, affecting 7 adults and 2 infants. Misconnections resulting in serious illnesses and fatalities included inadvertent connection of an enteric feeding tube to an intravenous catheter (4 cases); injection of barium sulfate, a gastrointestinal contrast medium, into a central venous catheter (1 case); inadvertent connection of an enteric feeding tube into a peritoneal dialysis catheter (1 case); inadvertent connection of a blood pressure insufflator tube to an intravenous catheter (2 cases); and injection of intravenous fluid into a tracheostomy cuff inflation tube (1 case).<sup>1</sup>

Similar medical errors occurring in neonates were reported recently by Suresh et al in their analysis of data from a voluntary, anonymous, Internet-based reporting system for medical errors in neonatal intensive care.<sup>2</sup> Intravenous administration of milk and oral medications, intratracheal administration of enteral feedings, and intravenous intralipid administered through orogastric and nasogastric feeding tubes exemplify the errors involving tubing misconnections in the NICU.

Tubing and catheter misconnection errors often involve luer connectors. There are 2 types of luer connectors—slips and locks. A luer slip connector has a tapered “male” fitting that slips into a wider “female” fitting to create a secure connection. The luer lock connector has a threaded collar on the “male” fitting and a flange on the “female” fitting that screw together to create a secure connection. Luer connectors are implicated in tubing misconnection errors because they allow functionally dissimilar tubes or catheters, such as a feeding set and a peritoneal dialysis catheter, to be connected.<sup>1</sup> Other identified causes include the routine use of tubes or catheters for unintended purposes, such as using intravenous extension tubing for epidurals, irrigation, drains, and central lines, or to extend enteric feeding tubes. Further, the positioning of functionally dissimilar tubes used in patient care in close proximity to one another, is of particular concern in the neonate.

Eliminating tubing misconnection errors will require improvements both in how products and devices are designed, as well as in work practices at the bedside. The Joint Commission offers the following recommendations and strategies to reduce tubing misconnection errors<sup>1</sup>:

1. Do not purchase nonintravenous equipment that is equipped with connectors that can physically mate with a female luer IV line connector.

2. Conduct acceptance testing (for performance, safety, and usability) and, as appropriate, risk assessment (e.g., failure mode and effect analysis), on new tubing and catheter purchases to identify the potential for misconnections and take appropriate preventive measures.
3. Always trace a tube or catheter from the patient to the point of origin before connecting any new device or infusion.
4. Recheck connections and trace all patient tubes and catheters to their sources on the patient's arrival to a new setting or service as part of the hand-off process. Standardize this “line reconciliation” process.
5. Route tubes and catheters having different purposes in different, standardized directions (e.g., intravenous lines routed toward the head; enteric lines toward the feet). This is especially important in the care of neonates.
6. Inform nonclinical staff, patients and their families that they must get help from clinical staff whenever there is a real or perceived need to connect or disconnect devices or infusions.
7. For certain high-risk catheters (e.g., epidural, intrathecal, arterial), label the catheter and do not use catheters that have injection ports.
8. Never use a standard luer syringe for oral medications or enteric feedings.
9. Emphasize the risk of tubing misconnections in orientation and training curricula.
10. Identify and manage conditions and practices that may contribute to healthcare worker fatigue, and take appropriate action.

Every neonatal intensive care unit must conduct a thorough review of all the medical equipment used within the unit to identify the potential for misconnections. Educate all staff, including anyone who might connect, disconnect, or reconnect various forms of tubing attached to patients, about the hazards of making misconnections among medical tubing in patient care.<sup>3</sup> This includes technicians who work in diagnostic units such as radiology departments, transport staff, students, physicians, and family members who are learning to care for infants with advanced technology before discharge. Untrained personnel (including parents and other visitors) should not be asked to turn off pumps or alarms, or disconnect or reconnect medical tubing.

## REFERENCES

1. Joint Commission International Center for Patient Safety. Tubing misconnections—a persistent and potentially deadly occurrence. *Sentinel Event Alert*. 2006 Apr 3;36.

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2. Suresh G, Horbar JD, Plsek P, Gray J, Edwards WH, et al [for the NICQ2000 and NICQ2002 Investigators of the Vermont Oxford Network]. Voluntary anonymous reporting of medical errors for neonatal intensive care. *Pediatrics*. 2004;113:1609–1618.
3. Institute for Safe Medicine Practices. Problems persist with life-threatening tubing misconnections. *ISMP Medication Safety Alert*. June 17, 2004. Available at <http://www.ismp.org/newsletters/acutecare/articles/20040617.asp>. Accessed June 6, 2006.

## INAUGURAL NANN NURSING RESEARCH SUMMIT

In March 2006 the National Association of Neonatal Nurses (NANN) held its inaugural Nursing Research Summit in March in Scottsdale, Arizona. Sponsored by Mead Johnson Nutritionals, the 2-day summit brought together 13 neonatal nurse researchers to present and discuss their research with colleagues in an amicable and interactive environment.

The Summit was opened with a keynote address, “Translational Research as the Focus for the Next Decade,” delivered by Diane Holditch-Davis, RN, PhD, FAAN, Professor of Duke University. Translational research aims to translate scientific discoveries into practical applications. It is the important link that is needed to achieve true evidence-based practice in neonatal nursing by evaluating the effectiveness of these applications on healthcare.

The following research abstracts were presented at the Summit:

- The Golden Hour: A Resuscitation Strategy for Infants <26 Weeks Gestational Age (Valerie Briscoe, RN, MSN; John Muir Medical Center)
- Concept Analysis of Conscientious Objection to Futile Care (Anita Catlin, DNSc, FNP, FAAN; Sonoma State University)
- Neonates Born with Single Ventricle Physiology (Paula Forsythe, RN, MSN; Rainbow Babies and Children’s Hospital, University Hospitals of Cleveland)
- Mothering an Extremely Low Birth Weight Infant (Laura Schenk, RN, PhD, CNNP; University of Mississippi Medical Center)
- Physiologic and Cost Benefits of NIDCAP-Based Care for Very Low Birth Weight Infants (Kathleen Philbin, RN, PhD; Children’s Hospital of Philadelphia)
- Kangaroo Care is an Analgesic for Heel Stick Pain (Susan Ludington, PhD, CNM, FAAN; Case Western Reserve University)
- Special Premie Oxygen Targeting (SPOT): A Program to Prevent Blindness in Premature Infants (Kristi Coe, RNC, MSN, NNP; Wake Forest

Baptist Medical Center and Brenner Children’s Hospital)

- Stress Levels of Mothers Participating in the Edmonton NIDCAP Randomized Controlled Trial (Judith Cote, RN, MN, NNP; Capital Health)
- Maternal Burden of Milk Expression (Nancy Hurst, RN, MSN, IBCLC; Texas Children’s Hospital)
- Under What Conditions Would Mothers Consent to Alcohol and Drug Screening of Their Newborns? (Shahirose Premji, RN, PhD; University of Calgary)
- Predictors of Developmental Outcome of Infants Suspected to Have Brain Injury at Birth (Linda Badr, Azusa Pacific)
- Feasibility of Saliva Collection from Newborn Infants (Cynthia Elverson, RN, MSN, NNP; South Dakota State University)
- Factors Relating to Feeding Readiness in Early Born Preterm Infants (Jacqueline McGrath, RN, PhD, NNP, FNAP; Arizona State University)

Plans are already under way for NANN’s 2nd Annual Nursing Research Summit. Watch for the Call for Abstracts in NANN publications.

## FOCUS ON PRECONCEPTION HEALTH

Optimal preconception health is now recognized as crucial to healthcare goals for women of child-bearing age. In “Recommendations to Improve Preconception Health and Health Care,”<sup>1</sup> the Centers for Disease Control (CDC) outlines 10 recommendations intended to improve the health of women of reproductive age before they become pregnant to improve pregnancy-related outcomes:

1. Encourage everyone to have a reproductive life plan.
2. Increase public awareness about preconception health.
3. Provide risk assessment and counseling during primary care visits.
4. Increase the number of women who receive interventions after risk screening.
5. Use the time between pregnancies to provide intensive interventions to women who have had a pregnancy that resulted in infant death, low birthweight, or premature birth.
6. Offer one prepregnancy visit.
7. Increase health insurance coverage among low-income women.
8. Integrate preconception health objectives into public health programs.
9. Augment research.
10. Maximize public health surveillance.

Many people do not realize the extent to which health and lifestyle factors such as smoking, misuse of alcohol, intimate partner violence, obesity, sexually transmitted diseases, vaccine-preventable diseases, and