

# Noteworthy Professional News

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## Quantifying Neonatal Stress in the NICU

Infants born prematurely must grow and develop in an environment that is highly stressful compared with the womb. Multiple, repeated stressors in the NICU, both painful and nonpainful, cannot fail to have an effect on vulnerable and immature central nervous systems of preterm infants. The experience of stress in the perinatal period is believed to influence structural and functional brain development, yet the assessment and prevention of stress do not receive the same attention as the assessment and management of pain in the neonate.

Newnham and colleagues<sup>1</sup> developed and tested a tool called the Neonatal Infant Stressor Scale (NISS). The NISS comprises 44 acute, potentially stressful events organized into categories such as general nursing care, peripheral venous or arterial access, central vascular access, ventilation, feeding, medical/surgical procedures, radiological procedures, and miscellaneous items. Furthermore, the tool includes 24 chronic living conditions experienced by preterm infants, such as receiving intranasal oxygen, being jaundiced, and having a systemic infection. One hundred thirty neonatal staff members (88% nurses and 12% physicians) were asked to rate the severity of infant stress that they believed was associated with each procedure or condition, using a Likert-type scale that ranged from 1 (not stressful) to 5 (extremely stressful). Staff rated stress levels of 3 groups of preterm infants on the basis of postconceptional age (<28, 28-32, or 32-27 weeks).

Participating respondents perceived that almost every aspect of preterm infant handling, except feeding-related items, were to some degree stressful. Severity of perceived stress correlated to infants' postconceptional ages. The most highly stressful events were intubation, chest tube insertion, insertion of vascular catheters (any type), oral/nasal suctioning, lumbar puncture, eye examinations, and heelsticks. When multiple attempts were required to accomplish a single procedure, it was judged to be extremely stressful for all infants. Procedures such as diaper changes, repositioning, taking infant out of the

incubator, removing intravenous catheters, providing nasal continuous positive airway pressure, inserting nasogastric tubes, and performing echocardiograms were judged as moderately stressful. Most other nursing items were considered to be mildly or not stressful. However, a wide range of individual stress ratings was observed for various procedures, and, clearly, there is a great deal of overlap between stress and pain.

Chronic living conditions considered most stressful for infants were having a systemic infection and receiving mechanical ventilation without sedation. Being nursed on a radiant warmer was judged more stressful than in an incubator because of increased handling and noise associated with radiant warmer use.

The goal of the NISS is to measure, track, and manage presumed accumulated stress in preterm infants. The authors' vision for the NISS is to provide a tool for staff members to choose a maximum (preferred) stress score for each infant for a specific period of time, such as 2 hours. Then, infants would be assigned actual stress score points for each chronic condition or procedure. Ideally, the infant's cumulative score would remain below the maximum desired NISS, but if not, caregivers must take steps to reduce stress or delay the performance of additional stressful procedures so the preferred NISS is not exceeded. The NISS has not been validated with physiologic measures of stress, and the high variability among individuals assigning stress scores must be addressed. Additional research is also needed to correlate NISS scores with infant outcomes. However, the development of the NISS represents an important step in the recognition of the toll that stress takes on the recovery, growth, and development of preterm infants in the NICU.

## Reference

1. Newnham CA, Inder TE, Milgrom J. Measuring preterm cumulative stressors within the NICU: the Neonatal Infant Stressor Scale [published online ahead of print June 9, 2009]. *Early Hum Dev*. doi:10.1016/j.earlhumdev.2009.05.002

## Role of APRN in Neonatal Care Supported by the AAP

The American Academy of Pediatrics (AAP) released a policy statement reaffirming its support of advanced practice registered nurses (APRNs) in neonatal nursing roles, including the neonatal nurse practitioner (NNP) and the neonatal clinical nurse specialist.

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In their policy statement, *Advanced Practice in Neonatal Nursing*, the AAP endorsed both the role and the current training and credentialing processes developed by NANN.<sup>1</sup> Educational standards for the APRN include completion of a graduate-level educational program and 600 hours of supervised practice with critically ill neonates in level II and III NICUs. The AAP statement supports the master's degree for entry into practice as an NNP and does not consider doctoral preparation (including the nursing doctorate) necessary for clinical practice.

Two advanced practice nursing roles are supported. The neonatal clinical nurse specialist (NCNS) is an expert in theory and practice of neonatal nursing and fosters continuous quality improvement in neonatal nursing care and also develops and educates staff nurses. The NCNS models expert nursing care and applies and promotes evidence-based nursing practice.

The NNP manages patients in collaboration with a physician and may exercise independent judgment in the assessment, diagnosis, and management of infants and perform certain procedures. The NNP may also be responsible for education of staff, research, and developing standards of nursing care.

The AAP statement acknowledges that the duties of the APRN may vary among different institutions and different states. A list of recommendations regarding the APRN role in neonatal practice addresses collaboration, national certification, and credentialing.

## Reference

1. American Academy of Pediatrics, Committee on Fetus and Newborn. Advanced practice in neonatal nursing. *Pediatrics*. 2009;123:1606-1607.

## Healthcare Workers and Novel Influenza A

In April of 2009, we experienced a global outbreak of novel influenza A (H1N1), formerly known as "swine flu." In any epidemic, it is critical that healthcare professionals (HCPs) are protected so that they can continue to provide care to the seriously ill. When H1N1 spread to the United States, the Centers for Disease Control and Prevention (CDC) worked with healthcare institutions to reduce the risk of transmission to HCPs from exposure to patients infected with the virus. Healthcare professionals were reminded to use personal protective equipment (PPE) at all times, report any flu-like symptoms, and stay home if they were ill.

In spite of these steps, between mid-April and May 13, the CDC received 48 reports from 18 states of confirmed or probable H1N1 virus infection among HCPs.<sup>1</sup> Detailed information about these exposures was available for 26 of these cases. Affected HCPs

included 5 nurses (20%), 4 nursing assistants (16%), 4 physicians (16%), and 12 others in different occupations. Two of the infected HCPs were hospitalized, but none died. Of these 26 HCP infections, 50% were deemed to have been acquired in the healthcare setting. Most of the exposures were patient to HCP, and one was from HCP to HCP. The remaining HCP infections were most likely acquired in the healthcare setting. The use of PPE, such as masks, gowns, gloves, and eye protection, was inconsistent among the HCPs exposed in the healthcare setting. Only 3 HCPs reported always using either a surgical mask or an N95 respirator, 5 always used gloves, and none used eye protection.

It is highly likely that cases of HCP infection were underreported during the recent epidemic because many exposed individuals were only mildly affected by the virus. Still, among those who were confirmed as being infected with the virus, an alarming number of HCPs failed to adequately protect themselves. These findings point to a lack of understanding among HCPs of the importance of using PPE during a breakout of influenza. Barriers to adherence might include the belief that PPE is unnecessary or burdensome, lack of availability of PPE, or inadequate training in the use of PPE. Furthermore, it is clear that HCPs are just as likely to acquire the virus in the community as they are in the healthcare setting and must be alert to the possible symptoms of infection in themselves or family members.

## Reference

1. Harriman K, Rosenberg J, Robinson S. Novel influenza A (H1N1) virus infections among health-care personnel—United States, April–May 2009. *MMWR Morb Mortal Wkly Rep*. 2009;58:641–645.

## Counseling Parents Before Delivery of Extremely Low Gestation Infant

How to approach and counsel the expectant parents before the delivery of an extremely low gestational age infant is both controversial and emotionally charged.<sup>1</sup> The question of whether to initiate or withhold resuscitation has no simple answer. The AAP's Committee on Fetus and Newborn offers the following guidelines for antenatal counseling under these circumstances.<sup>1</sup>

Each institution caring for women at risk of delivering extremely preterm infants should provide comprehensive and consistent guidelines for antenatal counseling. Parents should be provided the most accurate prognosis possible on the basis of all the factors known to affect outcome for a particular case. Although it is not feasible to have specific criteria for when the initiation of resuscitation should or should not be offered, the following general guidelines are suggested. If the physicians involved believe that

there is no chance for survival, resuscitation is not indicated and should not be initiated. When a good outcome is considered very unlikely, the parents should be given the choice of whether resuscitation should be initiated, and clinicians should respect their preference. Finally, if a good outcome is considered reasonably likely, clinicians should initiate resuscitation and, together with the parents, continually reevaluate whether intensive care should be continued. Whenever resuscitation is considered an option, a qualified individual, preferably a neonatologist, should be involved and should be present in the delivery room to manage this complex situation. Comfort care should be provided for all infants for whom resuscitation is not initiated or is not successful.<sup>1</sup>

### Reference

1. Batton DG. Committee on Fetus and Newborn. Clinical report—antenatal counseling regarding resuscitation at an extremely low gestational age. *Pediatrics*. 2009;124:422-427.

## Most Medical Errors in Hospitals Unreported by Staff

Ever since the eye-opening report of 1999 when we learned that as many as 100,000 deaths occur annually as a result of medical errors, hospitals have tried to shift from a culture of blame to a culture of safety. A culture of safety is believed to encourage greater reporting of errors and near misses and implies attention to numerous interrelated factors such as the following:

- Open communication
- Feedback and communication about error
- Frequency of events reported
- Handoffs and transitions
- Management support for patient safety
- Nonpunitive response to error
- Organizational learning—continuous improvement
- Overall perceptions of patient safety
- Staffing
- Supervisor/manager expectations and actions promoting safety
- Teamwork across units
- Teamwork within units

To assess the degree to which hospitals have achieved a culture of safety, the Agency for Healthcare Research and Quality (AHRQ) conducted a survey of 622 hospitals nationwide.<sup>1</sup> They found that teamwork within hospital units and supervisor/manager support for patient safety are areas of strength for most hospitals, but nonpunitive response to errors and patient handoffs continue to be patient safety areas that need improvement. The AHRQ survey also found that most respondents within hospitals (52%) reported no error events in their hospital over the past 12 months. It is likely that this represents underreporting of errors and was identified as an area for improvement for most hospitals.

### Reference

1. Sorra J, Famolaro T, Dyer N, et al. *Hospital Survey on Patient Safety Culture 2009 Comparative Database Report* (Prepared by Westat, Rockville, MD, under Contract No. HHS-A 290200710024C). Rockville, MD: Agency for Healthcare Research and Quality; 2009. AHRQ Publication No. 09-0030.