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Pulse Oximetry: Common Questions

Pulse oximetry is an important tool for assessing the newborn's oxygenation status. Although pulse oximetry has been used in the NICU since the 1980s, it was first recommended for routine use to NRP providers in the 6th edition of the *Textbook of Neonatal Resuscitation*. As providers have gained experience, questions have developed about the best method of applying the oximeter's sensor immediately after birth.



Q *Should the oximeter sensor be connected to the monitor before or after it is attached to the baby?*



There is conflicting evidence for this question.

- A small observational study in 2005¹ suggested that you would achieve a reliable signal faster if the sensor was attached to the baby before it was connected to the oximeter cable. Based on this study, the 6th edition textbook recommended a sensor-to-baby first approach.
- A larger, randomized trial in 2014² came to the opposite conclusion and found that a reliable signal was achieved faster if the sensor was connected to the monitor before it was attached to the baby. These authors recommended a sensor-to-monitor first approach.
- After reviewing the conflicting evidence, the NRP Steering Committee felt that any difference between the two approaches was likely to be small (a few seconds) and chose not to make any specific recommendation in the 7th edition textbook.

Providers may choose to attach the sensor either to the baby first or to the monitor first.



Q *Does it matter if the pulse oximeter sensor is attached to the baby's hand or wrist?*



- For a small baby, some health care providers find it easier to secure the sensor to the baby's wrist. However, some manufacturers recommend placing the sensor only on the baby's hand (palm) across the hypothenar eminence.
- A study in a NICU population³ showed good agreement between saturation measurements made in the hand and wrist. The time to achieve a signal from these two sites was also similar.
- In studies that established the normal progression of oxygen saturation in healthy newborns in the delivery room, the sensor was placed on either the baby's right hand or wrist.⁴⁻⁷
- The 7th edition textbook states that placement on either the right hand or wrist is acceptable as long as the transmitted light is detected by the sensor and a reliable signal is obtained.

See page 2 for references.

NRP or PALS?

The NRP Steering Committee is often asked, "What is the rule for deciding when to use NRP or PALS?" This question is especially relevant for those who work in units that care for babies beyond the neonatal period, including babies being treated for cardiac disease.

In the delivery room, NRP recommendations should be used to resuscitate the newborn. Outside the delivery room, there is little evidence to say when it is better to use NRP vs PALS. Consider the following when deciding to use NRP or PALS for resuscitation.

- During the first weeks following birth, respiratory failure is still the cause of nearly all cardiopulmonary arrests. Therefore, the initial priority for resuscitating a baby during the neonatal period, regardless of location, should be to restore adequate ventilation. Once adequate ventilation is ensured, additional information about the baby's history can be used to guide interventions. (7th ed., pg. 259)
- Consider the etiology of the arrest. If it is likely a respiratory etiology, NRP is appropriate because its primary focus is on effective ventilation. If the etiology is more likely cardiac in origin, a common cause within the cardiac ICU, then PALS is appropriate.

Thus, an arrest in a 50-day old former 24-week gestation infant with chronic lung disease is most likely respiratory in origin, and NRP makes sense for the initial approach. A 14-day old with complex congenital heart disease might best be approached by assuming an underlying cardiac etiology, and PALS would be more appropriate.

No matter which algorithm is used, airway control with intubation and the quality of the ventilation and compressions are paramount. In addition, clear and effective communication must be used to ensure that all team members know which algorithm is in use at all times.

References for page 1 article.

1. O'Donnell CP, Kamlin CO, Davis PG, Morley CJ. Feasibility of and delay in obtaining pulse oximetry during neonatal resuscitation. *The Journal of Pediatrics*. 2005;147(5):698-699.
2. Louis D, Sundaram V, Kumar P. Pulse oximeter sensor application during neonatal resuscitation: a randomized controlled trial. *Pediatrics*. 2014;133(3):476-482.
3. Phattraprayoon N, Sardesai S, Durand M, Ramanathan R. Accuracy of pulse oximeter readings from probe placement on newborn wrist and ankle. *J Perinatol*. 2012;32(4):276-280.
4. Dawson JA, Kamlin CO, Vento M, et al. Defining the reference range for oxygen saturation for infants after birth. *Pediatrics*. 2010;125(6):e1340-1347.
5. Rabi Y, Yee W, Chen SY, Singhal N. Oxygen saturation trends immediately after birth. *The Journal of Pediatrics*. 2006;148(5):590-594.
6. Kamlin CO, O'Donnell CP, Davis PG, Morley CJ. Oxygen saturation in healthy infants immediately after birth. *The Journal of Pediatrics*. 2006;148(5):585-589.
7. Mariani G, Dik PB, Ezquer A, et al. Pre-ductal and post-ductal O2 saturation in healthy term neonates after birth. *The Journal of Pediatrics*. 2007;150(4):418-421.



NRP Acknowledgements

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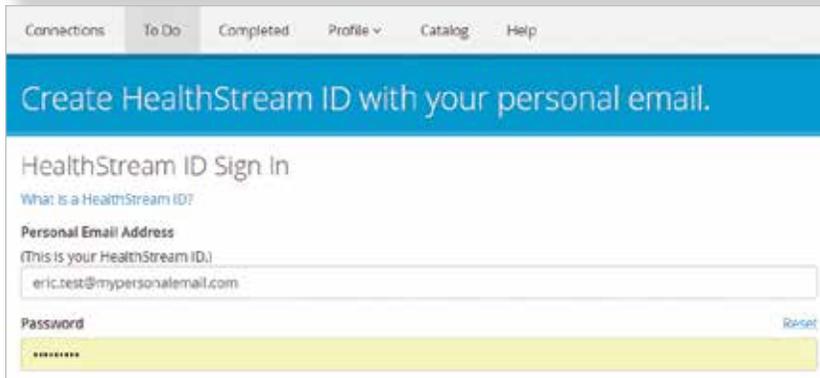
NRP Learning Management System (LMS) Enhancements

Thank you for your patience during the transition to the new NRP Learning Management System (LMS), and for sharing suggestions for system improvements. As we continue to enhance the user experience, we are pleased to share the following exciting updates.



Card Renewal Checklist

A checklist confirming what items need to be completed for NRP Instructor renewal has been added. The checklist is available under "Profile" in "My Resuscitation Cards."



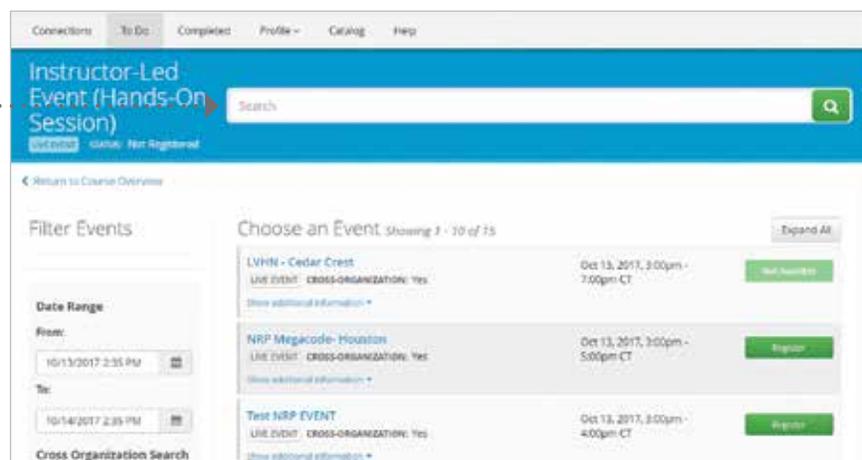
Manage Your HealthStream ID

All users can now reset their HealthStream ID password on their own.

Reminder: A HealthStream ID is created to allow learners/instructors to sync their course completion information if/when they move to another institution.

Instructor-Led Events Updates (Provider Course Scheduling)

- Although learners are encouraged to register in advance for their Instructor-led Events, learners can now search and register themselves to past events.
- Searching for Instructor-led Events is now easier! Learners can search using the event title as a text entry. When scheduling an Instructor-led Event, don't forget to create a unique event title to share with students.



2018 NRP® Research Grant and Young Investigator Award Call for Applications

The American Academy of Pediatrics Neonatal Resuscitation Program (NRP) Steering Committee is pleased to announce the availability of the 2018 NRP Research Grant and Young Investigator Awards. The awards are designed to support basic science, clinical, epidemiological, or educational research pertaining to the broad area of neonatal resuscitation.

Physicians in training or individuals within four years of completing fellowship training are eligible to apply for up to \$15,000 through the **NRP Young Investigator Award**. Any health care professional with an interest in neonatal resuscitation can submit a proposal for up to \$50,000 through the **NRP Research Grant Program**.

Grants are currently available to fund research projects in the United States and Canada.

The NRP Research Grant and Young Investigator Award Program Guidelines and Intent for Application will be available in December 2017. To obtain a copy of the guidelines, a list of potential research topics, or a list of previously funded studies, please visit the NRP website at www.aap.org/nrp and select the "Science" box in the center of the page.



We Want YOU to Share Your Great Ideas!

Every day we learn of ingenious ways instructors are innovating NRP courses and systems – everything from innovative equipment storage ideas to mentor coffee talks. **You need to share these great ideas with others!**

To help in this sharing, the NRP Steering Committee will feature a poster session at the November 2, 2018 NRP Seminar in Orlando, FL. These will not be posters of rigorous scientific studies, but rather a sharing of **your novel ideas**.

Have you...

- Developed a clever mnemonic?
- Effectively utilized social media to market courses or extend learning outside of the class?
- Fashioned a great orientation for learners?
- Developed sim scenarios from actual cases?
- Corrected a systems issue or room layout flaw based on lessons learned in simulation and debriefing?
- Incorporated fun into the course experience (eg, integrated gaming; wine & cheese post course social; etc)?
- ...and so on

What you think was just a solution for your hospital could actually be of great value to others.

Think about sharing your strategies/problem-solving/light-bulb moments! Plan to submit a poster and join us in Orlando to share and learn.

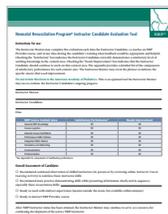
Mark your calendar for November 2 and let your administrator know you will be out presenting at a conference!

Information on the poster submission process and criteria will be available in the spring. Check the NRP website and Facebook page for details, and be looking for a blast email too.

What's New in the ITK

Some Instructor Mentors have asked for guidance on how to evaluate an Instructor Candidate. The Instructor Candidate Evaluation Tool was developed to assist the mentor in evaluating candidate performance. The mentor may complete this evaluation each time the candidate co-teaches an NRP Provider Course and at any time during the candidate's training when feedback would be appropriate and helpful.

View the new form in the Instructor Toolkit under the Instructor Mentor resources tab.



Checking the "Satisfactory Performance" box indicates the Instructor Candidate currently demonstrates a satisfactory level of working knowledge in the content area. Checking the "Needs Improvement" box indicates that the Instructor Candidate should continue to work on a specific content area. An appendix included with the tool provides a detailed list of the components of satisfactory performance for each content area.

Please give us your feedback after using the form.

Missed an NRP Live Webinar?

Previous webinar recordings are available in the Instructor Toolkit for review at any time. NRP questions and concepts are discussed by NRP Steering Committee members and guest panelists on *NRP Live*.

Previous *NRP Live* recordings can be found on the main page of the Instructor Toolkit:

March 2017

Telemedicine: Christopher Colby, MD, FAAP and Jennifer Fang, MD, MS, FAAP
Integrating OB and NRP Training: Julie Arafah, RN, MSN

April 2017

More on Meconium: Steven Ringer, MD, PhD, FAAP
Strategies for Maintaining Situational Awareness: Henry Lee, MD, FAAP

July 2017

Ask an RT: John Gallagher, MPH, RRT-NPS and Gary Weiner, MD, FAAP
What's New with the NRP LMS: Allison Ricks, MBA



2017 Avroy Fanaroff Neonatology Education Award Recipient

Susan Niermeyer, MD, FAAP received the 2017 Avroy Fanaroff Neonatology Education Award at the 2017 AAP National Conference and Exhibition in Chicago. Dr Niermeyer served on the NRP Steering Committee from 1997 to 2001, including a co-chair appointment.

During her career, Dr Niermeyer's most substantive accomplishment was in helping to develop the *Helping Babies Breathe* (HBB) program. HBB prepares birth attendants in resource-limited environments to deliver basic care to newborns at the time of birth; it is an adaptation of the concepts of NRP. Dr Niermeyer was a driving force in the development of HBB, serving as the Editor of the first edition of the program, as well as for HBB version 2.0, which was released in fall of 2016. Her educational contributions are far-reaching, including service on the Editorial Boards of *NeoReviews*, the AAP Perinatal Continuing Education Program, and consulting for national health agencies in China, Tibet, Peru, and Guatemala. Most recently, Dr Niermeyer has an appointment with USAID as a Senior Medical Advisor for Newborn Health, which she currently holds while maintaining her faculty position at the University of Colorado.