



To Suction or Not to Suction: *The Meconium Debate Continues*

We are challenged to continue our efforts to build strong evidence for delivery room management of the non-vigorous meconium-stained baby.

In November 2015, the [American Heart Association/American Academy of Pediatrics neonatal resuscitation guidelines](#) were published. The 2015 guidelines removed the recommendation to routinely suction the trachea of non-vigorous babies born through meconium-stained amniotic fluid (MSAF). These guidelines were implemented before or beginning in January 2017.

In November 2018, *Pediatrics*® published an article titled “[Delivery Room Management of Meconium-Stained Newborns and Respiratory Support](#)” by Chiruvolu et al. The authors aimed to study the effects of the most recent 2015 guideline that no longer suggests routine intubation for tracheal suction in the non-vigorous meconium-stained newborn. The Chiruvolu study compared 130 non-vigorous meconium-stained infants born the year before the 2015 guidelines change (routinely intubated and suctioned at birth) with 101 non-vigorous meconium-stained infants born after the guidelines change (not routinely intubated and suctioned at birth).

The non-vigorous meconium-stained babies who were not intubated and suctioned at birth had significantly more NICU respiratory admissions and an increased requirement for supplemental oxygen, mechanical ventilation, and surfactant. The difference in Meconium Aspiration Syndrome (MAS) between groups was not statistically significant. However, if diagnosed with MAS, the infants who had not been intubated and suctioned had longer durations of supplemental oxygen, mechanical ventilation, and hospital length of stay.

The Chief Editor of *Pediatrics* asked Thomas E. Wiswell, MD, FAAP, to write a [commentary](#) to accompany the Chiruvolu article. Dr. Wiswell is a neonatologist, past member of the NRP Steering Committee, and an internationally known and respected researcher on delivery room management of meconium-stained babies.

In his commentary, Dr. Wiswell reflected on the possibility that the new recommendation was made prematurely. He pointed out that the 2015 recommendation came from the same data as the three previous versions of the guidelines for delivery room management of the meconium-stained baby (used for NRP 4th, 5th, and 6th editions), all of which recommended intubation and tracheal suction at birth in non-vigorous newborns.

With no high-quality human evidence to guide recommendation development, no proven benefit(s) of the practice, and the recognized need for additional research, the ILCOR Neonatal Task Force used a [values statement](#) to clarify the reasons for the change in this recommendation. The values that support the change include avoiding harm by minimizing delay in positive-pressure ventilation and potential harm from the intubation/suction procedure. However, Dr. Wiswell cited numerous studies that show little or no evidence of harm by intubating and suctioning the non-vigorous meconium-stained newborn at birth.

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Suctioning: Who, When and Why?

The NRP Steering Committee receives many questions about the current recommendation for suctioning the newborn at birth. [Part 1](#) (from the *NRP Instructor Update Fall/Winter 2018* issue) covered the obstetric provider and newborn suctioning. Part 2 of this three-part series covers the neonatal team and newborn suction in the delivery room.

Where Do Guidelines for Newborn Resuscitation Come From?

Members of the NRP Steering Committee and the American Heart Association (AHA) developed the [2015 U.S. Guidelines for Neonatal Resuscitation](#). The most recent guidelines are also reprinted in the appendix of the *Textbook of Neonatal Resuscitation*, 7th edition. The NRP educational materials translate these guidelines into practice.

The Neonatal Resuscitation Team and Suctioning in the Delivery Room

When the Baby Is Vigorous

A term newborn who has good muscle tone and is breathing or crying may remain with the mother and have initial steps of newborn care performed on the mother's chest or abdomen. Most vigorous newborns do not require suctioning at birth. If necessary, remove secretions by wiping the baby's mouth and nose with a cloth. Use a bulb syringe when secretions are obstructing the baby's breathing, and for those having difficulty clearing their secretions.

When the Baby Is Not Vigorous

When the baby is eligible for delayed cord clamping and is unexpectedly not vigorous at birth, the obstetric provider may provide brief tactile stimulation or gently suction the baby's mouth and nose. If the baby does not respond immediately, move the baby to the radiant warmer for the initial steps of newborn care. Use a bulb syringe or a suction catheter to gently clear secretions from the mouth and nose for the following situations:

- The baby is not breathing
- The baby is gasping
- The baby has poor tone
- Secretions are obstructing the airway
- The baby is having difficulty clearing the secretions
- You anticipate starting positive-pressure ventilation (PPV)

If the newborn has copious secretions, turn the baby's head to the side. This allows secretions to collect in the cheek for removal.

Suction the mouth before the nose (remember: "M" comes before "N" in the alphabet). This helps prevent aspiration if the baby should gasp when the nose is suctioned. Vigorous or deep suction can damage tissue and stimulate a vagal response leading to apnea and bradycardia. Therefore, care should be taken to suction gently and reserve deep (posterior pharyngeal) suctioning for times when airway obstruction cannot otherwise be cleared. If using a suction catheter, set the suction control at approximately 80 to 100 mm Hg when the tubing is occluded.

When Amniotic Fluid Is Meconium-stained

The NRP Steering Committee no longer suggests routine endotracheal suction for non-vigorous, meconium-stained babies until additional research demonstrates a benefit to this practice. Manage the meconium-stained baby the same way as non-vigorous babies with clear amniotic fluid.

When You Suspect Airway Obstruction

When you have performed all ventilation corrective steps (MR. SOPA), and there is still no chest movement with PPV despite a properly placed endotracheal tube, thick secretions (blood, cellular debris, vernix, or meconium) may be obstructing the airway. At this point it may be necessary to apply suction directly to the endotracheal tube using a meconium aspirator to clear the obstruction.

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To view the most recent webinar about management of newborns with meconium-stained fluid, go to the Instructor Toolkit and click on the archived January 2019 edition of "NRP Live" titled *"Meconium Management: Past, Present, and Future Science."*
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NRP Online Exam – Test Your Knowledge



Which of the following is the best indication for volume expansion after resuscitative efforts that included intubation, chest compressions, and IV epinephrine?

- A. The baby's heart rate is 120 beats per minute after resuscitative efforts, but she is very pale.
- B. The baby's heart rate remains 50 beats per minute after resuscitative efforts and pulses are weak.
- C. The baby's heart rate is 120 beats per minute after resuscitative efforts and there is a history of extensive vaginal bleeding during labor.
- D. The baby's heart rate rapidly increased to 120 beats per minute with epinephrine, but her pulses seem weak.



See page 6 for the correct answer and explanation. ►

NRP Research Grants Awarded

Congratulations to the following individuals who received 2018 NRP Grant Awards!

RESEARCH GRANTS:

Sara Berkelhamer, MD, FAAP
State University of New York at Buffalo

Intraosseous Epinephrine: An Alternate Route of Drug Administration in Neonatal Resuscitation

Munmun Rawat, MD, FAAP
State University of New York at Buffalo

Femoral Occlusion During Neonatal Cardiopulmonary Resuscitation

YOUNG INVESTIGATOR AWARD:

Britni Maple, MD, FAAP
The University of Texas Southwestern

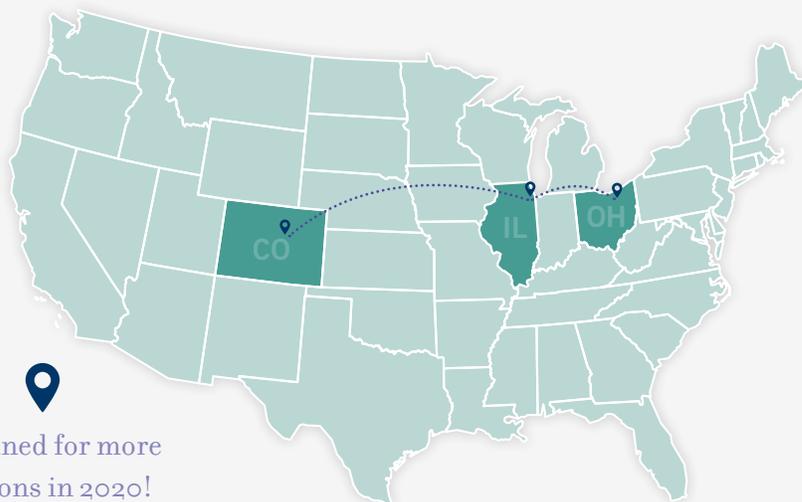
Impact of the 7th Edition NRP Guideline Changes on Outcomes of Meconium-Exposed Newborns

Congratulations to our grant awardees!

The Fall/Winter issue of the *NRP Instructor Update* will include information about the 2020 NRP Research Grant Program.



The NRP Roadshow Is Coming Your Way



Stay tuned for more locations in 2020!

Come join us at one of our upcoming NRP Roadshows!

Cleveland, OH

Rainbow Babies and Children's Hospital
June 11, 2019

Denver, CO

Children's Hospital of Colorado
August 3, 2019

Chicago, IL

University of Illinois Hospital
November 7, 2019

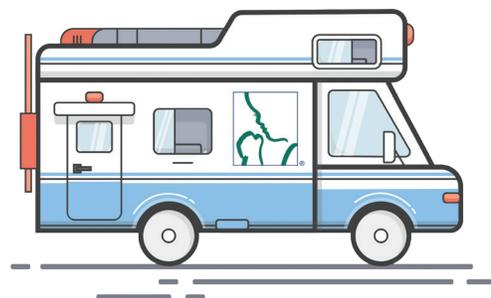
The NRP Steering Committee is hosting a special 1-day instructor workshop in several locations throughout the country in 2019 and 2020. Participants will have the opportunity to ask questions and interact with NRP experts.

Agenda items include:

- The Science Behind NRP
- NRP Algorithm Walkthrough
- NRP Live
- Challenging Teaching Situations—What Would You Do?
- What's in Your Toolkit?
- Expert Scenario: Simulation, Debriefing, Debrief the Debrief

Interactive demonstrations will cover:

- Simulation Organization, Digital Tools & NRP LMS
- Mind Your Meds!
- Airway Management



For further information on the NRP Roadshows and registration, visit our website at <https://tinyurl.com/NRPRoadshow>

Share your experiences on social media!

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The American Academy of Pediatrics (AAP) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The AAP designates this live activity for a maximum of 6.25 *AMA PRA Category 1 Credit(s)*[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity. This activity is acceptable for a maximum of 6.25 AAP credits. These credits can be applied toward the AAP CME/CPD Award available to Fellows and Candidate Members of the American Academy of Pediatrics.

The American Academy of Physician Assistants (AAPA) accepts certificates of participation for educational activities certified for *AMA PRA Category 1 Credit*[™] from organizations accredited by ACCME. Physician assistants may receive a maximum of 6.25 hours of Category 1 credit for completing this program.

This program is accredited for 6.25 NAPNAP CE contact hours of which 0 contain pharmacology (Rx) content, (0 related to psychopharmacology) (0 related to controlled substances), per the National Association of Pediatric Nurse Practitioners (NAPNAP) Continuing Education Guidelines.

This activity will provide 6.25 contact hours for nurses. This continuing nursing education activity was approved by the Ohio Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation. (OBN-001-91). ONA approval valid through 02/27/2021. Assigned ONA #22135.

This program has been approved for 6.25 contact hours of Continuing Respiratory Care Education (CRCE) credit by the American Association for Respiratory Care (AARC), 9425 N. MacArthur Blvd. Suite 100, Irving TX 75063. Course # 180738000.

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Answer to NRP Online Exam –Test Your Knowledge



The correct answer is: **B.**

The baby's heart rate remains 50 beats per minute after resuscitative efforts and pulses are weak.

This baby's heart rate has not responded to the steps of resuscitation and weak pulses are a sign of hypovolemic shock.

Emergency volume expansion is indicated if the baby is not responding to the steps of resuscitation (persistent low heart rate unresponsive to effective ventilation, chest compressions, and epinephrine) and has signs of shock or a history of acute blood loss.

If there has been an acute fetal-maternal hemorrhage, bleeding vasa previa, extensive vaginal bleeding, a placental laceration, fetal trauma, an umbilical cord prolapse, a tight nuchal cord, or blood loss from the umbilical cord, the baby may be in hypovolemic shock. Signs of hypovolemic shock include pallor, delayed capillary refill, and/or weak pulses. In some cases, there will be signs of shock with no obvious evidence of blood loss.

Volume expanders should not be given routinely during resuscitation in the absence of shock or a history of acute blood loss. Giving a large volume load to a heart that is already injured may actually worsen cardiac output and further compromise the newborn.

- In answer A, the baby's heart rate has responded to steps of resuscitation. The etiology of pallor can be evaluated during post-resuscitation care.
- In answer C, the baby's heart rate has responded to steps of resuscitation. A history of extensive vaginal bleeding may put the mother at risk for hypovolemia, but vaginal bleeding does not necessarily indicate blood loss in the newborn.
- In answer D, the baby's heart rate has responded to steps of resuscitation. The etiology of weak pulses can be evaluated during post-resuscitation care.

Signs of hypovolemic shock include pallor, delayed capillary refill, and/or weak pulses.



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