

# NRP

## Instructor Update

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November 28, 2005

Dear NRP Instructor:

Today the International Liaison Committee on Resuscitation (ILCOR) Consensus on Science and Treatment Recommendations (CoSTR), as well as the American Heart Association's Guidelines for Emergency Cardiovascular Care (ECC) were published in *Circulation*. Included within the ECC Guidelines are the newly revised American Academy of Pediatrics/American Heart Association Guidelines for Neonatal Resuscitation. It is from these scientific documents that the NRP Steering Committee developed the revisions that will appear in the *Textbook of Neonatal Resuscitation, 5th Edition*.

Both the CoSTR and Guidelines documents are the result of a nearly three-year effort. Volunteers logged over 5,000 hours in the preparation, review, and debate of the evidence-based worksheets that laid the foundation for both documents.

This issue of the *NRP Instructor Update* offers some background and rationale about the Guidelines changes. We encourage you to thoroughly read about the changes in preparation for the release of the updated materials, scheduled for late Spring 2006. We also suggest you view the full guidelines at [www.americanheart.org/eccguidelines](http://www.americanheart.org/eccguidelines).

In the meantime, you should continue to teach the existing course with the 4th edition materials; however, please let students within your courses know that new guidelines are available. You are welcome

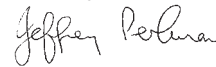
to share with your students a brief (2-page) summary of changes that can be down loaded from the NRP Web site at [www.aap.org/nrp](http://www.aap.org/nrp).

Per your requests, the NRP Steering Committee will once again be offering those instructors interested in more in-depth information about the Guideline and material changes the opportunity to register for and participate in a two-hour teleconference. During these teleconferences you will have the opportunity to ask questions of the committee members and material editors. Registration information and teleconference dates will be provided in the spring issue of the *NRP Instructor Update*.

Please be sure to visit the NRP Web site at [www.aap.org/nrp](http://www.aap.org/nrp) for the latest updates and information regarding the release of the 5th edition materials.

*We recognize that while the release of new guidelines and educational materials is quite exciting, coordinating this transition at your local hospital requires an extensive personal commitment of time, energy, and resources. We thank you for your continued dedication to the program.*

Sincerely,



Jeffrey Perlman, MB, ChB  
Cochair, NRP Steering Committee



Jay P. Goldsmith, MD  
Cochair, NRP Steering Committee

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WE HOPE YOU LIKE THIS NEW DESIGN FOR THE *NRP INSTRUCTOR UPDATE*. PLEASE SEND ANY COMMENTS ABOUT THE NEW DESIGN OR POTENTIAL ARTICLES TO [LIFESUPPORT@AAP.ORG](mailto:LIFESUPPORT@AAP.ORG).



The Neonatal Resuscitation Program (NRP) Steering Committee offers the *NRP Instructor Update* to all AAP/AHA Neonatal Resuscitation Program Instructors.

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# Your Questions About the New Guidelines and Materials Answered

## **Q. How were the Guidelines developed?**

A. The Guidelines were prepared by the American Heart Association Pediatric Subcommittee and American Academy of Pediatrics Neonatal Resuscitation Program Steering Committee. The Guidelines are based on the Consensus on Science and Treatment Recommendations (CoSTR) document, developed through work with the International Liaison Committee on Resuscitation (ILCOR). The Guidelines were used to develop and revise the *Textbook of Neonatal Resuscitation, 5th Edition* and accompanying NRP education materials.

## **Q. What is ILCOR?**

A. The International Liaison Committee on Resuscitation (ILCOR) is a multi-national collaborative delegation of Resuscitation Councils responsible for researching, evaluating and developing an expert consensus based on peer-reviewed scientific studies related to CPR. The ILCOR Neonatal Delegation is comprised of the following groups:

- Australian Resuscitation Council (ARC)
- Council of Latin America for Resuscitation (CLAR)
- Dutch Resuscitation Council (DRC)
- European Resuscitation Council (ERC)
- Heart and Stroke foundation of Canada (HSFC)
- New Zealand Resuscitation Council
- Resuscitation Council of South Africa (RCSA)
- World Health Organization (WHO)
- American Academy of Pediatrics/American Heart Association NRP Steering Committee

## **Q. What was involved in the evidence-based review process?**

A. Each ILCOR Neonatal Delegation representative was asked to research and evaluate a specific question pertaining to a particular resuscitation technique. They were also required to develop a worksheet based on the data gathered on their particular question. An initial meeting was held in December 2004 where delegation members presented and discussed their preliminary data.

The nearly three-year evidence evaluation and science review culminated with the International CoSTR conference held in January 2005. The findings from CoSTR were published on November 28, 2005 and represent an International Consensus on Science.

## **Q. Where can I view the evidence-based worksheets?**

A. The evidence-based worksheets can be viewed at [www.c2005.org](http://www.c2005.org).

## **Q. Why is there a time lag between the release of Guidelines and the publication of new NRP materials?**

A. This evidence review process was rigorous, time-consuming, and far more encompassing than previous efforts. Further, many controversial issues were not resolved until the very last minute. Although development of the NRP materials began nearly two years ago, the NRP Steering Committee had to focus its efforts on achieving consensus on the science before focusing on the educational materials. Once a consensus was reached on hot topics such as room air vs oxygen, the committee began revising the NRP materials to reflect new scientific data and the revised Guidelines.

We realize that the time lag between the Guidelines publication and the release of the NRP materials is not ideal and may be frustrating. We will try to minimize the inconvenience by keeping instructors informed via the NRP Web site.

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# Summary of Major Changes to the 2005 AAP/AHA Emergency Cardiovascular Care Guidelines for Neonatal Resuscitation: Translating Evidence-Based Guidelines to the NRP

## Use of oxygen during neonatal resuscitation

Current evidence is insufficient to resolve all questions regarding supplemental oxygen use during neonatal resuscitation.

For babies born at term,

- The Guidelines recommend use of 100% supplemental oxygen when a baby is cyanotic or when positive-pressure ventilation is required during neonatal resuscitation.
- However, research suggests that resuscitation with something less than 100% may be just as successful.
- If resuscitation is started with less than 100% oxygen, supplemental oxygen up to 100% should be administered if there is no appreciable improvement within 90 seconds following birth.
- If supplemental oxygen is unavailable, use room air to deliver positive-pressure ventilation.

To reduce excessive tissue oxygenation if a very preterm baby (less than approximately 32 weeks) is being electively delivered at your facility:

- Use an oxygen blender and pulse oximeter during resuscitation.
- Begin PPV with oxygen concentration between room air and 100% oxygen. No studies justify starting at any particular concentration.
- Adjust oxygen concentration up or down to achieve an oxyhemoglobin concentration that gradually increases toward 90%. Decrease the oxygen concentration as saturations rise over 95%.

- If the heart rate does not respond by increasing rapidly to > 100 beats per minute, correct any ventilation problem and use 100% oxygen.

If your facility does not have use of an oxygen blender and pulse oximeter in the delivery room, and there is insufficient time to transfer the mother to another facility, the resources and oxygen management described for a term baby are appropriate. There is no convincing evidence that a brief period of 100% oxygen during resuscitation will be detrimental to the preterm infant.

## Meconium

No longer recommend that all meconium-stained babies routinely receive intrapartum suctioning (i.e., before delivery of shoulders). Other recommendations about post delivery neonatal suctioning remain unchanged.

## Bag-and-mask ventilation

- Call for assistance when beginning PPV.
- After beginning ventilation at appropriate rate and pressure, ask the assistant to report heart rate and breath sounds as indicators of effective ventilation. Heart rate is assessed first, and if not improving, assess chest movement and ask about breath sounds.

## Devices for assisting ventilation

Flow-controlled pressure limited mechanical devices (e.g., T-piece resuscitators) are recognized as an acceptable method of administering positive-pressure ventilation during resuscitation of the newly born and in particular the premature infant;

however, self-inflating and flow-inflating bag-and-mask equipment and techniques remain the cornerstone of achieving effective ventilation in most resuscitations.

## Effectiveness of assisted ventilation

Increasing heart rate is the primary sign of effective ventilation during resuscitation. Other signs are:

- Improving color
- Spontaneous breathing
- Improving muscle tone

Check these signs of improvement after 30 seconds of PPV. This requires the assistance of another person.

## Laryngeal mask airway

The laryngeal mask airway has been shown to be an effective alternative for assisting ventilation of some newborns who have failed bag-and-mask ventilation or endotracheal intubation.

## Use of CO<sub>2</sub> detector

An increasing heart rate and CO<sub>2</sub> detection are the primary methods for confirming ET tube placement.

## Epinephrine

If the endotracheal route is used, doses of 0.01 or 0.03 mg/kg will likely be ineffective. Therefore, IV administration of 0.01 to 0.03 mg/kg per dose is the preferred route (Class IIa). While access is being obtained, administration of a higher dose (up to 0.1 mg/kg) through the endotracheal tube may be considered (Class Indeterminate), but the safety and efficacy of this practice have not been evaluated.

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**Recommended dose**

IV: 0.1 to 0.3 mL/kg of 1:10,000 solution. Draw up in 1-mL syringe

ET: 0.3 to 1.0 mL/kg of 1:10,000 solution. Draw up in 3-mL or 5-mL syringe

**Naloxone**

Naloxone is not recommended during the primary steps of resuscitation

The indications for giving naloxone to the baby require both of the following to be present:

- Continued respiratory depression after positive-pressure ventilation has restored a normal heart rate and color, and
- A history of maternal narcotic administration within the past 4 hours.

There are no studies reporting the efficacy of endotracheal naloxone. This route is not recommended.

- Intravenous route preferred.
- Intramuscular route acceptable, but delayed onset of action.

**Temperature control**

Polyethylene bags may help maintain body temperature during resuscitation of very low birth weight (VLBW) infants.

**Therapeutic hypothermia**

- Hypothermia may reduce the extent of brain injury following hypoxia-ischemia.
- There is insufficient data to recommend routine use of selective and/or systemic hypothermia after resuscitation of infants with suspected asphyxia. Further clinical trials are needed to determine which infants

benefit most and which method of cooling is most effective.

**Hyperthermia**

- Hyperthermia may worsen the extent of brain injury following hypoxia-ischemia.
- The goal should be to achieve normothermia and to avoid iatrogenic hyperthermia in resuscitated newborns.

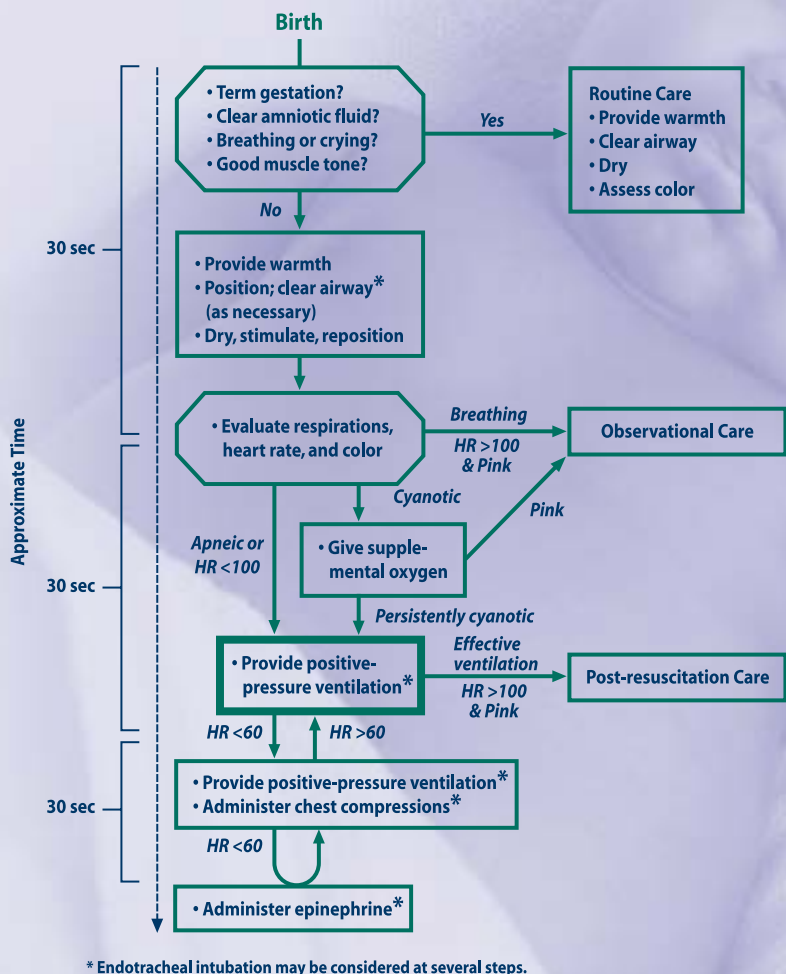
**Withholding or withdrawing resuscitation**

A consistent and coordinated approach to individual cases by the obstetric and neonatal teams and the parents is an important goal. Noninitiation of resuscitation and discontinuation of life-sustaining treatment during or after resuscitation are ethically equivalent, and clinicians should not hesitate to withdraw support when functional survival is highly unlikely. The following guidelines must be interpreted according to current regional outcomes:

- In conditions associated with a high rate of survival and acceptable morbidity, resuscitation is nearly always indicated. This will generally include babies with gestational age  $\geq 25$  weeks (unless there is evidence of fetal compromise such as intrauterine infection or hypoxia-ischemia) and those with most congenital malformations.
- In conditions with uncertain prognosis in which survival is borderline, the morbidity rate is relatively high, and the anticipated burden to the child is high, parental desires concerning initiation of resuscitation should be supported.

**Discontinuing resuscitation efforts**

After 10 minutes of continuous and adequate resuscitative efforts, discontinuation of resuscitation may be justified if there are no signs of life (no heart beat and no respiratory effort).



# Guidelines Changes for Room Air and Oxygen & Use of CO<sub>2</sub> Detectors

The myriad of neonatal resuscitation guideline changes that will appear in the revised *Textbook of Neonatal Resuscitation, 5th Edition* includes new details about the use of a CO<sub>2</sub> monitor and the use of room air or supplemental oxygen during resuscitation.

“This has been a very exciting and fulfilling process. As a team, we’ve spent a lot of time and energy to get to this point and to get it right,” said Jay P. Goldsmith, MD, FAAP, referring to the efforts of the International Liaison Committee on Resuscitation Neonatal Delegation (ILCOR Neonatal Delegation), which includes the American Academy of Pediatrics/American Heart Association NRP Steering Committee, which led the charge to help determine new international resuscitation treatment recommendations that will impact the future of neonatal resuscitation. Dr. Goldsmith is former chair, Department of Pediatrics at the Ochsner Clinic in New Orleans. He currently serves as Cochair of the NRP Steering Committee.

The new Guidelines recommend the use of a CO<sub>2</sub> detector when a prompt increase in heart rate does not occur after endotracheal intubation. “An increasing heart rate and CO<sub>2</sub> detection are the primary methods for confirming endotracheal tube placement,” Dr. Goldsmith said.

There are two types of CO<sub>2</sub> detectors used in the delivery room to validate proper placement of the endotracheal tube. The first is called a colorimetric device, the most commonly used method to detect CO<sub>2</sub>. This device connects to the endotracheal tube and changes color in the presence of CO<sub>2</sub>. The other is called a capnograph, which relies on placement of a special electrode at the endotracheal tube connector. The capnograph will

display a specific CO<sub>2</sub> level and should indicate more than 2% to 3% saturation of CO<sub>2</sub> if the tube is in the trachea.

“The CO<sub>2</sub> detector should be connected as soon as the endotracheal tube has been inserted, noting the presence or absence of CO<sub>2</sub> during exhalation,” Dr. Goldsmith said. “If CO<sub>2</sub> is not detected after several positive-pressure breaths, consider removing the tube, resuming bag-and-mask ventilation, and repeating the intubation process.”

## THE NEW GUIDELINES RECOMMEND THE USE OF A CO<sub>2</sub> MONITOR WHEN A PROMPT INCREASE IN HEART RATE DOES NOT OCCUR AFTER ENDOTRACHEAL INTUBATION.

It’s important to note that a CO<sub>2</sub> detector may not change color if a baby’s cardiac output is very low or absent, such as in the event of cardiac arrest. If there is no detectable heartbeat, a CO<sub>2</sub> detector should not be used as an indicator of correct or incorrect placement of the endotracheal tube.

Determining whether room air or supplemental oxygen should be used during resuscitation was at the front and center of spirited discussion amongst those serving on the ILCOR team. Although current scientific evidence is insufficient to resolve all questions regarding supplemental oxygen use for positive-pressure ventilation during neonatal resuscitation, any and all available scientific data were carefully analyzed over a two-year period before finalizing this guideline.

The use of 100% supplemental oxygen when positive-pressure ventilation is required for resuscitation of term babies is recommended; however, research suggests that less than 100% oxygen may be just as successful. If resuscitation is started with less than 100% oxygen, supplemental oxygen up to 100% should be administered if there is no appreciable improvement within 90 seconds of birth. If supplemental oxygen is unavailable, use room air to deliver positive-pressure ventilation.

To reduce excessive tissue oxygenation if a very preterm baby (less than approximately 32 weeks) is being electively delivered at your facility:

- Use an oxygen blender and pulse oximeter during resuscitation.
- Begin PPV with oxygen concentration between room air and 100% oxygen. No studies justify starting at any particular concentration.
- Adjust oxygen concentration up or down to achieve an oxyhemoglobin concentration that gradually increases toward 90%. Decrease the oxygen concentration as saturations rise over 95%.
- If the heart rate does not respond by increasing rapidly to > 100 beats per minute, correct any ventilation problem and use 100% oxygen.

If your facility does not have use of an oxygen blender and pulse oximeter in the delivery room, and there is insufficient time to transfer the mother to another facility, the resources and oxygen management described for a term baby are appropriate.

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## Guidelines Changes for Room Air and Oxygen...

There is no convincing evidence that a brief period of 100% oxygen during resuscitation will be detrimental to the preterm infant.

**Ventilation of the lungs is the single most important and most effective step in cardiopulmonary resuscitation of the compromised infant.** Indications for positive-pressure ventilation include apnea/gasping, a heart rate of less than 100 beats per minute, and persistent central cyanosis despite 100% free-flow oxygen.

Two types of resuscitation bags—self-inflating and flow-inflating—may be used to ventilate a baby. A third type of resuscitation device, the T-piece resuscitator, can be used to deliver positive-pressure ventilation and can deliver up to 100% oxygen. This mechanical device depends on a compressed gas source and must have a tight face-mask seal to inflate the lungs. The operator sets maximum circuit pressure, peak inspiratory pressure, and positive end-expiratory pressure. Peak inspiratory pressure must be adjusted during resuscitation to achieve physiologic improvement, audible breath sounds, and perceptible chest movements. Positive-pressure is provided by alternately occluding and releasing the hole in the PEEP cap.

In regards to bag-and-mask ventilation, it is now recommended that this method include at least two persons so that the bag-and-mask ventilation is done by one person, while the other person evaluates chest movement, heart rate, etc. Therefore, it will be helpful to practice this with a partner, taking turns in each of the roles.

# Guidelines Changes for Ethics

The International Liaison Committee on Resuscitation Neonatal Delegation and members of the NRP Steering Committee invested many hours to review the scientific evidence related to ethical issues in the delivery room. The groups then worked arduously to develop and define these carefully written Guidelines.

## PARENTS ARE CONSIDERED TO BE THE APPROPRIATE SURROGATE DECISION MAKERS FOR THEIR INFANTS. IN ORDER FOR PARENTS TO FULFILL THIS ROLE RESPONSIBLY, THEY MUST BE GIVEN COMPLETE AND ACCURATE INFORMATION ABOUT THE RISKS AND BENEFITS OF EACH TREATMENT OPTION.

“One of the main reasons we developed the ethics guidelines is so that neonatologists will recognize that it’s not necessarily mandated that every patient ought to be resuscitated, and it provides a specific way in which to approach these issues,” added John Kattwinkel, MD, FAAP, editor of the revised *Textbook of Neonatal Resuscitation, 5th Edition*, and Professor of Pediatrics at the University of Virginia in Charlottesville.

The following represents an overview of the key points related to ethics:

- The ethical principles regarding the resuscitation of a newborn should be no different from those followed in resuscitating an older child or adult.
- No law mandates attempted resuscitation in all circumstances, and withdrawal of support is considered appropriate if there is general agreement by health professionals that further resuscitation efforts would serve no useful purpose, i.e. resuscitation would be considered “futile.”

- Parents are considered to be the appropriate “surrogate” decision makers for their infants. In order for parents to fulfill this role responsibly, they must be given complete and accurate information about the risks and benefits of each treatment option.
- Where gestation, birth weight, and/or congenital anomalies are associated with almost certain early death, or unacceptably high morbidity is likely among the rare survivors, resuscitation is not indicated.
- In conditions associated with uncertain prognosis, borderline survival, and high risks of morbidity, and where the burden to the child is high, parental desires regarding initiation of resuscitation should be supported.
- Unless there is in vitro fertilization, techniques used for obstetrical dating are accurate only to plus or minus 1 to 2 weeks and estimates of fetal weight are accurate only to plus or minus 15% to 20%. When counseling parents about the birth of infants born at the extremes of prematurity, advise them that decisions made about neonatal management before birth may need to be modified in the delivery room depending on the condition of the baby at birth and the postnatal gestational age assessment.
- Under any circumstances, discontinuation of resuscitation efforts may be appropriate after 10 minutes of absent heart rate following complete and adequate resuscitation efforts.
- Consistent, sensitive, and compassionate care for dying infants and their families requires advanced preparation, coordination, training, practice, and skillful communication with cultural sensitivity.

# Guidelines Changes for Epinephrine Administration

Until now, the recommended initial route for administration of epinephrine was via the endotracheal tube. However, a recent review of the scientific literature indicates that it is best to administer epinephrine intravenously via a catheter placed in the umbilical vein.

“This issue was a major point of spirited discussion within the NRP Steering Committee,” said John Kattwinkel, MD, FAAP, editor of the 5th edition and Professor of Pediatrics at the University of Virginia in Charlottesville. “It’s still acceptable to administer epinephrine through the endotracheal tube while waiting for someone else to establish venous access. However, there will be two different doses to keep track of, and so people will need

to remember to use a 3 cc syringe for endotracheal administration and a 1 cc syringe for intravenous dosing.”

Specifically, it will be important to remember that if epinephrine is administered through an endotracheal tube, the dose may need to be more than 3 times the previously recommended dose (up to 1 mL/kg). However, if epinephrine is administered intravenously, the dose

**THIS IS A BIG CHANGE, AND INSTRUCTORS WILL HAVE TO MAKE THIS AS FOOLPROOF AS POSSIBLE TO HELP AVOID MEDICATION ERRORS.**

remains 0.1 to 0.3 mL/kg. The key to mastering the new epinephrine recommendations is to practice drawing up and administering the drug and to use distinctive labels on epinephrine for endotracheal or intravenous access.

“This is a big change, and instructors will have to make this as foolproof as possible to help avoid medication errors,” explained Jeanette Zaichkin, RNC, MN, editor of the revised *Instructor’s Manual for Neonatal Resuscitation*. “They can do this by making sure people remember to mark their medications with different color labels and to use different size syringes to help prevent mistakes. Also, verbalize what you’re doing. It’s important to say, ‘I’m drawing up 3 cc of epinephrine in the syringe for endotracheal administration’ so your resuscitation team knows what you’re doing.”



# Guidelines Changes for Meconium Suctioning

A randomized controlled study to assess the effectiveness of intrapartum oropharyngeal and nasopharyngeal suctioning for the prevention of meconium aspiration syndrome, a life-threatening respiratory disorder in infants born through meconium-stained amniotic fluid, found that this common, widely-accepted procedure did not prevent the aspiration of meconium into a baby's lungs.

These findings were used to develop a new guideline stating that it is no longer recommended that all meconium-stained babies routinely receive intrapartum suctioning (ie, before delivery of the shoulders).

IT'S NO LONGER  
RECOMMENDED THAT  
ALL MECONIUM-STAINED  
BABIES ROUTINELY RECEIVE  
INTRAPARTUM SUCTIONING  
(IE, BEFORE DELIVERY OF  
THE SHOULDERS).

"For the past 30 years, the standard in the delivery room has been for physicians to suction out the mouth, nose, and throat of meconium-stained babies once their heads were delivered, but prior to when their chests and the rest of their bodies were delivered," explained Thomas E. Wiswell, MD, FAAP, of the Center for Neonatal Care in Orlando, FL, and member of the NRP Steering Committee. "The thinking, supported by some anecdotal studies, was that this maneuver would prevent aspiration of meconium into the infant's lungs. That's what we thought back then, but our understanding is much better now."

The lack of reliable data prompted Dr. Wiswell and a team of physicians in Argentina, all of whom had an interest in meconium aspiration syndrome (MAS), to embark on a large, randomized controlled trial involving 2,514 babies of gestational age of at least 37 weeks born through meconium-stained amniotic fluid (MSAF.) Dr. Wiswell, who was based at SUNY Stony Brook in New York at the time, received a \$25,000 NRP Research Grant to help cover the costs associated with conducting this study. The study began in March 2000 and continued through early October 2001. Eleven hospitals in Argentina and one hospital in the United States participated in this study.

"This study was the largest of its kind, and essentially, we found this widely-accepted procedure to be of no benefit," explained Dr. Wiswell. "Routine intrapartum oropharyngeal and nasopharyngeal suctioning of term-gestation infants born through meconium-stained amniotic fluid does not prevent meconium aspiration syndrome. The primary outcome was incidence of meconium aspiration syndrome. Now, most of us believe that children who develop MAS aspirate while inside the uterus, and it happens minutes, hours, if not days before they're born, especially in the sickest of babies with this disorder. With meconium, nothing surprises me anymore, and this study was definitely one of them."

According to Dr. Wiswell, every year 15 million babies around the world are born meconium stained. Studies, especially those of this size, provide clinicians with the opportunity to gather enough scientific data to help answer tough questions.



"I have to really commend my colleagues here and in Argentina. They gave so much of their own time and equipment and did such a wonderful job," said Dr. Wiswell. "They enrolled the vast majority of babies [in this trial] and were really enthusiastic about it."

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# Welcome Dr. Little

George A. Little, MD, FAAP, is no stranger to the American Academy of Pediatrics. He's made his rounds, so to speak, on a variety of Academy committees, and his latest stop is the NRP Steering Committee, where he began his first two-year term in July.

"I've done a lot with the Academy over the years. I've worked in other areas within the Academy, and in the process, I've gotten to know many of the people on the NRP Steering Committee. The NRP is such a great and successful initiative, and it's really an honor to be a part of it," said Dr. Little, who by day is a neonatologist and Professor of Pediatrics at Children's Hospital, Dartmouth-Hitchcock Medical Center in Lebanon, NH. His interests include clinical research, perinatal health policy, regionalization, outcomes, reproductive and perinatal ethics, the family in the neonatal intensive care unit, and international health.

Before becoming a member of the NRP Steering Committee, Dr. Little served as Chair of the Committee on Fetus and Newborn (COFN) and as Chair of the Section on Perinatal Pediatrics. His experience on these committees will naturally carry over to his duties on the NRP Steering Committee. "There's been a lot of interaction between these committees, and it will be a real pleasure for me to bring all of this together," he said.

I'VE DONE A LOT WITH THE ACADEMY OVER THE YEARS. I'VE WORKED IN OTHER AREAS WITHIN THE ACADEMY, AND IN THE PROCESS, I'VE GOTTEN TO KNOW MANY OF THE PEOPLE ON THE NRP STEERING COMMITTEE. THE NRP IS SUCH A GREAT AND SUCCESSFUL INITIATIVE, AND IT'S REALLY AN HONOR TO BE A PART OF IT.

During his first term, Dr. Little looks forward to furthering the NRP Steering Committee's efforts of researching and disseminating more scientific data and outcomes information related to neonatal resuscitation, which, as he says, "is the fundamental foundation of the entire NRP effort."

Additionally, he'd like to see the NRP continue to grow on an international level. "In the 1990s, I taught the NRP to a group of Egyptian doctors in Cairo through a USAID-sponsored project. Today, the doctors I trained are teaching the NRP," said Dr. Little. "This is a domestic and a worldwide effort."

**Welcome Dr. Little!**

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## Your questions about the new guidelines materials answered...

### **Q. Should I make any changes in my scheduled courses before the revised materials are available?**

A. We encourage you to teach the existing course with the 4th edition materials; however, please let students attending your courses know that new guidelines are available. You are welcome to share with your students the brief summary of changes located on pages 3 & 4. A PDF version of the summary can be downloaded from the NRP web site at [www.aap.org/nrp](http://www.aap.org/nrp). The 4th edition materials may be purchased until the new materials are available. New materials should be in use by January 1, 2007.

### **Q. Will current NRP Instructors need to take the new written evaluation or Megacode in order to maintain instructor status? Because there are two new chapters in the Textbook, will instructors need to somehow be evaluated on this material?**

A. NRP providers who wish to become instructors after you begin using the new materials (and anytime after January 1, 2007) must first take a Provider Course that includes Lessons 1 through 9, demonstrate the Performance Checklists, and take the Megacode. However, current NRP instructors may continue as instructors without formal classroom instruction on the new material. Each instructor who is being "grandfathered in" should self-study the new material in the *Textbook of Neonatal Resuscitation 5th Edition*, review the Performance Checklists, and self-assess or perform a comprehensive Megacode to ensure comprehension and mastery of the revised materials.

### **Q. When can I order the new materials?**

A. Enclosed with this issue of the *NRP Instructor Update* is a 5th edition NRP pre-order form. You can place advance orders using this form. **Please be advised that all materials that are pre-ordered will NOT be shipped until late spring when the materials are released.**



# Megacode Validation Study Brings

For over three years, the NRP Steering Committee, working in cooperation with Nalini Singhal, MD, FRCP, of the University of Calgary in Alberta, Canada, has developed a megacode validation tool for clinical skill assessment in neonatal resuscitation. The revised megacode is in the final stages of development and will be found in the new *Textbook of Neonatal Resuscitation, 5th Edition*, which is scheduled for publication in late Spring 2006.

“The purpose of this study was to create and assess the psychometric characteristics [validity and reliability] of an objective, structured clinical examination checklist that can be used to assess healthcare professional performance on a neonatal resuscitation megacode,” explained Dr. Singhal, Professor of Pediatrics, at the University of Calgary. “People need to recognize that this megacode will prepare them to function in a systematic manner with their neonatal resuscitation team in the event a neonate requires resuscitation. The functioning has to be timely, quick, and appropriate, and this megacode will prepare them for that when faced with a stressful situation.”

The study was conducted in phases. Initial work involved bringing together a team of neonatologists who drafted a megacode checklist to be used in assessing a student’s ability to

THIS MEGACODE WILL BE VERY STRESSFUL FOR STUDENTS, BUT IMAGINE HOW STRESSFUL IT WILL BE WHEN THEY’RE DOING THIS WITH A REAL BABY.

resuscitate a neonate. The NRP Steering Committee reviewed and modified the checklist before soliciting feedback from 8,000 instructors. The checklist was posted on the Academy’s web site and was ultimately reviewed by 822 instructors in the United States and Canada, who provided data about the importance of each item listed on the checklist and the perceived ability to assess students on each item.

The performance of the modified checklist was then tested for validity and reliability by developing 28 video clips of actual megacodes administered by 17 NRP instructors. “I think this was the first step towards actually seeing what happens in the classroom and comparing it to what we expect to see in clinical scenarios when a student is with a real baby,” Dr. Singhal said. “This megacode will be very stressful for students, but imagine how stressful it will be when they’re doing this with a real baby.”

Feedback provided by the videotaped megacodes varied. Some said the format might be too difficult for novice instructors to use/apply and others felt the checklist might require more time and could be condensed

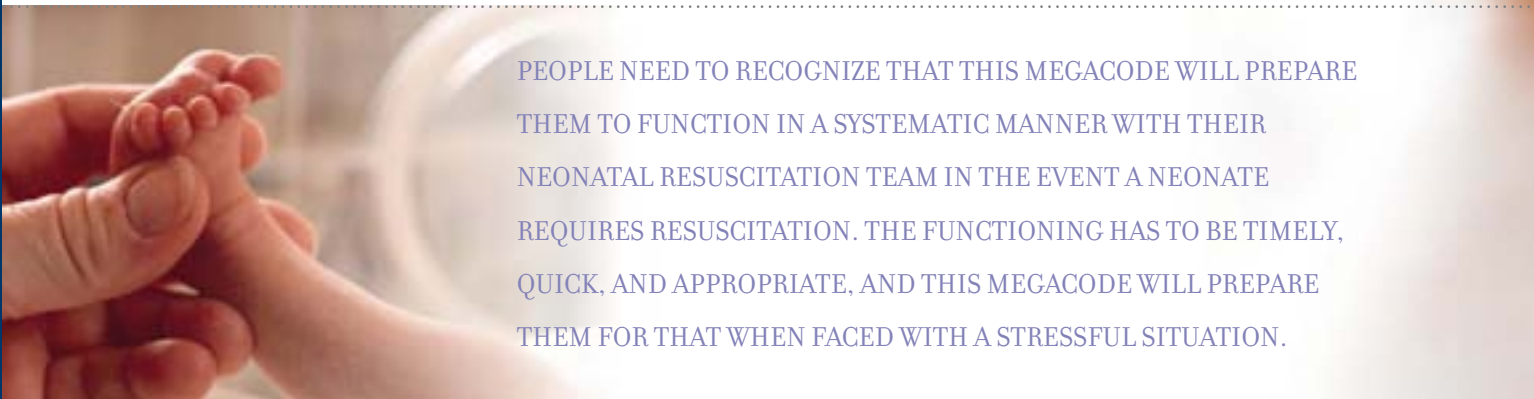
by combining several steps. “This feedback enabled us to develop a 19-item checklist,” Dr. Singhal said.

The final megacode checklist assessment will feature 19 questions for a possible total score of 38 points. This 19-item checklist must be used in assessing neonatal resuscitation performance, using a scale of zero (not done), one (done inadequately or out of sequence), and two (done well and in order).

In order to pass the megacode assessment, a student must score at least 85% and all items on the checklist must be done well and in order. In addition, there are five critical items, all of which have to be done correctly for the student to be successful.

“The biggest change is that there will be a score,” said Gary Weiner, MD, FAAP, member of the NRP Steering Committee. “This will not be a subjective assessment by the instructor whether [students] pass or fail the exam. There will be a score that students must achieve to pass.”

PEOPLE NEED TO RECOGNIZE THAT THIS MEGACODE WILL PREPARE THEM TO FUNCTION IN A SYSTEMATIC MANNER WITH THEIR NEONATAL RESUSCITATION TEAM IN THE EVENT A NEONATE REQUIRES RESUSCITATION. THE FUNCTIONING HAS TO BE TIMELY, QUICK, AND APPROPRIATE, AND THIS MEGACODE WILL PREPARE THEM FOR THAT WHEN FACED WITH A STRESSFUL SITUATION.



# Change to NRP Performance Testing



The key items on the megacode checklist will include the following:

- Equipment assessment to check bag, mask, and oxygen supply
- Rapid assessment to determine the need to resuscitate
- Identifying initial steps in resuscitation, such as determining if meconium is present, indications for endotracheal tube suctioning, positioning, and repositioning
- First evaluation of breathing, heart rate, and color
- Assisted bag-mask ventilation strategies
- Chest compressions
- Endotracheal intubation
- Use of medications
- Identifying the need for volume expansion, route and rate of infusion
- Closure to identify that the neonate was properly resuscitated

Dr. Weiner reiterated that the new megacode can be stressful for students and instructors. With that, he shared the following updated list of helpful “tips and strategies” that NRP instructors can use in the classroom. They should use these tips with the existing megacode, as well as the updated version when it is published in 2006:

- Demonstrate an “ideal” megacode with another instructor before starting to evaluate students. They’ll appreciate seeing a “model performance” and better understand your expectations. If you’re teaching alone, consider showing a model resuscitation from the NRP video on DVD. It’s a terrific resource. A new and improved NRP video on DVD will be available in 2006.

- Before starting, clearly outline your expectations to the group and with each individual. Let students know in advance what prompts you will and won’t be giving. Remind them to perform exactly as they would during a real resuscitation.
- Take advantage of the supplemental materials provided by the NRP for instructors, including the guide to developing megacode scenarios in the textbook, the discussion forum on the NRP Instructor Web site, and the new NRP video on DVD.
- Instructors should plan to set up megacode evaluations in a realistic setting, eg, where they will actually use these skills, so they get to perform in a setting that prompts their skills.
- Instructors should plan scenarios in advance. They should not try to develop the scenario on the fly. They should be well-prepared and think through the scenario that they’re going to present.
- Limit the megacode to 5-10 minutes. Stick to this timeframe and don’t prolong the scenario. During most resuscitations in the delivery room, the skills that are being evaluated are applied within the first 5-10 minutes. The megacode should reflect what most students will see in their work setting. A particularly complex scenario might take longer, but most should take no more than 10 minutes.

THE NRP STEERING  
COMMITTEE REVIEWED  
AND MODIFIED THE  
CHECKLIST BEFORE  
SOLICITING FEEDBACK  
FROM 8,000 INSTRUCTORS.

# Welcome Dr. Goldsmith



Not even Hurricane Katrina, the devastating category 4 storm that ripped through New Orleans and other parts of the Gulf Coast in late August, could keep Jay P. Goldsmith, MD, FAAP from his NRP duties. This life-altering event occurred just one month after Dr. Goldsmith began a two-year term as Cochair of the NRP Steering Committee.

Dr. Goldsmith, former chair, Department of Pediatrics at Ochsner Clinic in New Orleans, took over for David Boyle, MD, FAAP as Cochair of NRP in July. Dr. Goldsmith has served on the NRP Steering Committee since 2000 and, up until recently, also held the title of Editor, *NRP Instructor Update*.

"I'm very honored to be a part of this committee. Everyone brings a great deal of talent and experience to each and every issue we tackle as a team," said Dr. Goldsmith.

His new role as Cochair, serving side-by-side with Cochair Jeffrey Perlman, MB, ChB, of New York Presbyterian Hospital, Weill Medical College in New York City, provides an opportunity to reflect on the past and to look forward to the future of new scientific discoveries in neonatal resuscitation.

Dr. Goldsmith joined the committee five years ago, just before the *Textbook of Neonatal Resuscitation, 4th edition*,

"THE INTERNATIONAL PERSPECTIVE, PARTICULARLY THROUGH THE ILCOR, SERVES AS THE FOUNDATION FOR THE NRP," DR. GOLDSMITH SAID.

rolled off the press. Work on the 5th edition of the textbook began almost immediately, with the new content featuring the latest scientific data related to neonatal resuscitation.

"I look forward to continuing to evaluate the evidence-based algorithm, which started in the late 1990s and was first evident in the 4th edition of the textbook," said Dr. Goldsmith. "The evidence-gathering process has evolved into a very sophisticated approach that will continue to evolve and improve. This is it – this is the cat's meow. The evidence-based approach is the model for medical care guidelines, and it has been developed through the International Liaison Committee on Resuscitation (ILCOR)."

He would also like to expand the international scope of the NRP to include other countries where the program has not been introduced. "The international perspective, particularly through the ILCOR, serves as the foundation for the NRP," Dr. Goldsmith said.

Finally, Dr. Goldsmith said he will support the continued creation of realistic, interactive mannequins to be used in neonatal resuscitation training to help improve skills, and he will foster new neonatal resuscitation research opportunities through the NRP Research Grant process.

The NRP and the American Academy of Pediatrics are grateful to Dr. Goldsmith for his ongoing commitment and dedication. Dr. Goldsmith, congratulations on your latest appointment to the NRP Steering Committee!

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