

7th Edition NRP GUIDELINES



5 YEAR EVIDENCE BASED TOPIC REVIEW BY THE
INTERNATIONAL LIAISON COMMITTEE ON
RESUSCITATION.

SKILLS DAY 2016

Recommendation/Evidence



- Class I = strong recommendation (Benefit \gg Risk)
- Class IIa = moderate recommendation (Benefit $>$ Risk)
- Class IIb = weak recommendation (Benefit \geq Risk)
- Class III = no benefit (Benefit = Risk)
- Class III Harm = (Risk $>$ Benefit)

- LOE – A = evidence from >1 or meta-analysis of high quality RCTs
- LOE – BR = evidence from >1 or meta-analysis of moderate quality RCTs
- LOE – BNR = evidence from >1 or meta-analysis of moderate quality non-randomized studies, observational studies.
- LOE – CLD = evidence from or meta-analysis of randomized and non-randomized studies, observational studies with limitations of design/execution.
- LOE – CEO = expert opinion consensus based on clinical experiences.

7th Edition Changes



- Required Implementation?
 - **January 1st 2017** - all institutions and learners should be utilizing the 7th edition of the NRP.
- Initiation of 7th Ed. Changes at UCLA?
 - July 1st 2016
- Book available for purchase beginning of May 2016

2017 NRP Major Changes



Cord Clamping: evidence suggests that cord clamping should be delayed for at least 30 to 60 seconds for most vigorous term and preterm newborns.

- Insufficient evidence for recommendation for infants who require resuscitation or who have known risk factors for decreased placental circulation. (Class IIa, LOE C-LD)

- *Pro:* Less IVH, high BPs, higher blood volume, less need for transfusions s/p birth and less NEC.
- *Con:* Slightly increased bilirubin levels assoc w/ need for phototherapy.

➤ **UCLA Recommendations:**

- OB will provide delay of cord clamping per request of patient if the mother and newborn are clinical stability

2017 NRP Major Changes



Oxygen Use:

- **Infants \geq 35 weeks gestation** begin with 21% oxygen (room air).
 - **Infants $<$ 35 weeks gestation** resuscitation should begin w/ 21%-30% FiO₂ to maintain appropriate target preductal oxygen saturations. (Class I, LOE B-R)
 - Initiating resuscitation w/ higher than 65% FiO₂ is not recommended. (Class III HARM, LOE B-R)
 - Continued recommendation of the use of 100% FiO₂ whenever chest compressions are provided.
- **UCLA Recommendations:**
- All FIO₂ blenders set at 21%
 - Preterm infants $<$ 37 weeks begin at 30%

2017 NRP Major Changes



Positive-Pressure Ventilation: After completing the initial steps, PPV is indicated if a newborn is apneic or gasping or the heart rate is less than 100 beats/m

- Once PPV initiated – Adjust flowmeter to 10 L/min.
- If PPV is required for resuscitation of a preterm newborn, it is preferable to use a device that can provide PEEP.
 - Using PEEP (5 cm H₂O) helps the baby's lungs remain inflated between positive pressure breaths.
- When PPV begins, the assistant listens for increasing heart rate for the first 15 seconds of PPV.

➤ **UCLA Recommendations:**

- PPV initiated – Adjust flowmeter to 10L/min
- The “T-Piece” should be used to deliver PPV. Hyperinflation bags will be available during transition period.

How to Set up the T-piece



1. Attach to a flowmeter, dial in **10 liters/min**
2. Keep the circuit plugged\ covered at the end and adjust **PEEP to 5 cmH₂O**.
3. Adjust **PIP to 20 cmH₂O**, adjust the indicator at the green\ yellow zone.



2017 NRP Major Changes



Non-vigorous Infant w/ MSAF: If meconium stained amniotic fluid is present w/ poor tone and inadequate respiration, begin initial steps of resuscitation.

- PPV should be initiated if infant is not breathing or HR < 100bpm.
- Routine intubation for tracheal suctioning is not suggested. (Class IIb, LOE C-LD)
- Insufficient evidence from studies evaluated to continue recommending this practice. Experts placed greater value on harm avoidance (ex delays in providing bag-mask ventilation, harm of procedure) over unknown benefits of tracheal suctioning.

➤ **UCLA Recommendations:**

- NICU team present at all MSAF delivery
- Do not perform routine suction
- Initiate NRP initial steps
- NICU team lead decides on next steps based on clinical assessment

2017 NRP Major Changes



Assessment of HR: 3-lead ECG for rapid/accurate measurement of newborn's HR may be beneficial, however, does not replace the need for pulse oximetry to evaluate oxygenation. (Class IIb, LOE C-LD)

- Clinical assessment of HR is unreliable and inaccurate resulting in underestimation of HR which may lead to unnecessary resuscitation.
- Pulse oximetry often displays a lower rate in the first 2min of life, usually at levels suggesting need for interventions.
- Initial heart rate assessment to be performed by auscultation
 - Umbilical palpation is unreliable
- **UCLA Recommendations:**
 - Initial heart rate assessment to be performed by auscultation

2017 NRP Major Changes



Chest Compressions: Two thumb technique preferred as it generates higher BPs and improved coronary perfusion pressures w/ less provider fatigue. (Class IIb, LOE C-LD)

- Secured endotracheal tube/airway- the compressor administers chest compressions from the head of the newborn
- An electronic cardiac monitor is the preferred method for assessing heart rate during chest compressions.

➤ **UCLA Recommendations:**

- Chest compressions administered with the 2 thumb technique.
- Consider chest compressor to stand at HOB when airway is secured and ventilator at side of bed if line placement is needed

2017 NRP Major Changes



Endotracheal Intubation & Laryngeal Masks: Intubation is strongly recommended prior to beginning chest compressions. If intubation is not successful or not feasible, a laryngeal mask may be used.

➤ **UCLA Recommendations:**

- Consider intubation prior to initiation of chest compressions

Medications: Epinephrine is not indicated prior to establishing ventilation that effectively inflates the lungs

- One endotracheal dose of epinephrine may be considered while vascular access is being established.
- Unsatisfactory response via ETT, a repeat dose should be given as soon as emergency UVC or intraosseous access is obtained
 - Do not wait 3–5 minutes after the endotracheal dose.

2017 NRP Major Changes



Thermoregulation: Preterm newborn - increase temperature in the room where the baby will receive initial care to approximately 23°C to 25°C (74°F–77°). (Class I, LOE B-NR & C-LD)

- The goal is an axillary temperature between 36.5°C and 37.5°C.
- If the anticipated gestational age is less than 32 weeks:
 - Additional thermoregulation interventions, such as plastic wrap or bag and thermal mattress and hat, are recommended.
 - A 3-lead electronic cardiac monitor with chest or limb leads provides a rapid and reliable method of continuously displaying the baby's heart rate if the pulse oximeter has difficulty acquiring a stable signal.
 - A resuscitation device capable of providing PEEP and CPAP, such as a T-piece resuscitator or flow-inflating bag, is preferred.

Thermoregulation at UCLA RR: Current State



Hypothermic Newborns (Body temperature under 36 ° C), 2006 to 2016

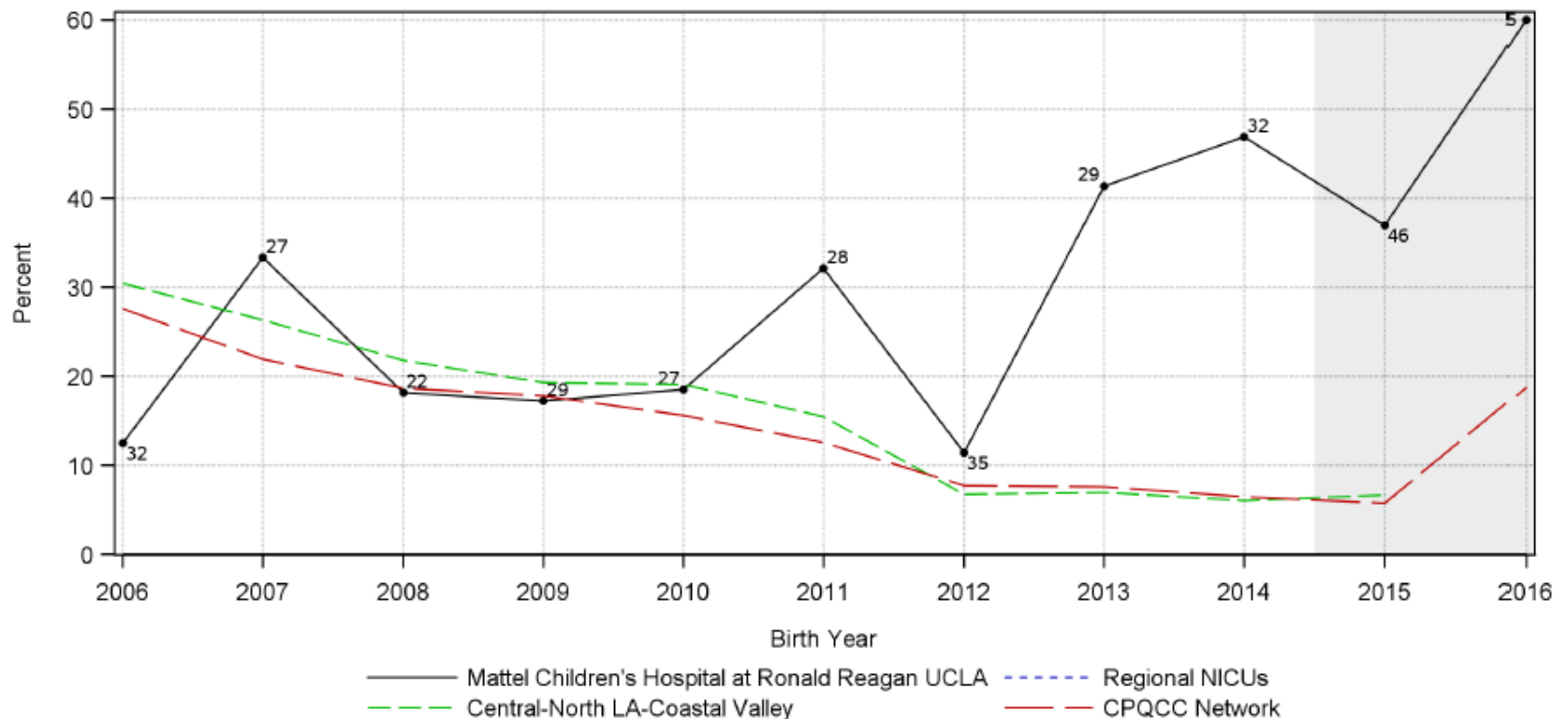
Inborn Infants 401 to 1,500 grams or 22 to 31 completed weeks of gestation, 01/01/2006 to 01/13/2016

Mattel Children's Hospital at Ronald Reagan UCLA

Compared to all CPQCC Network Centers, all Region Centers, and all Regional Centers

The shaded area in the chart corresponds to years for which the data collection is on-going/incomplete.

California Perinatal Quality Care Collaborative (CPQCC)



Thermoregulation at UCLA SM: Current State

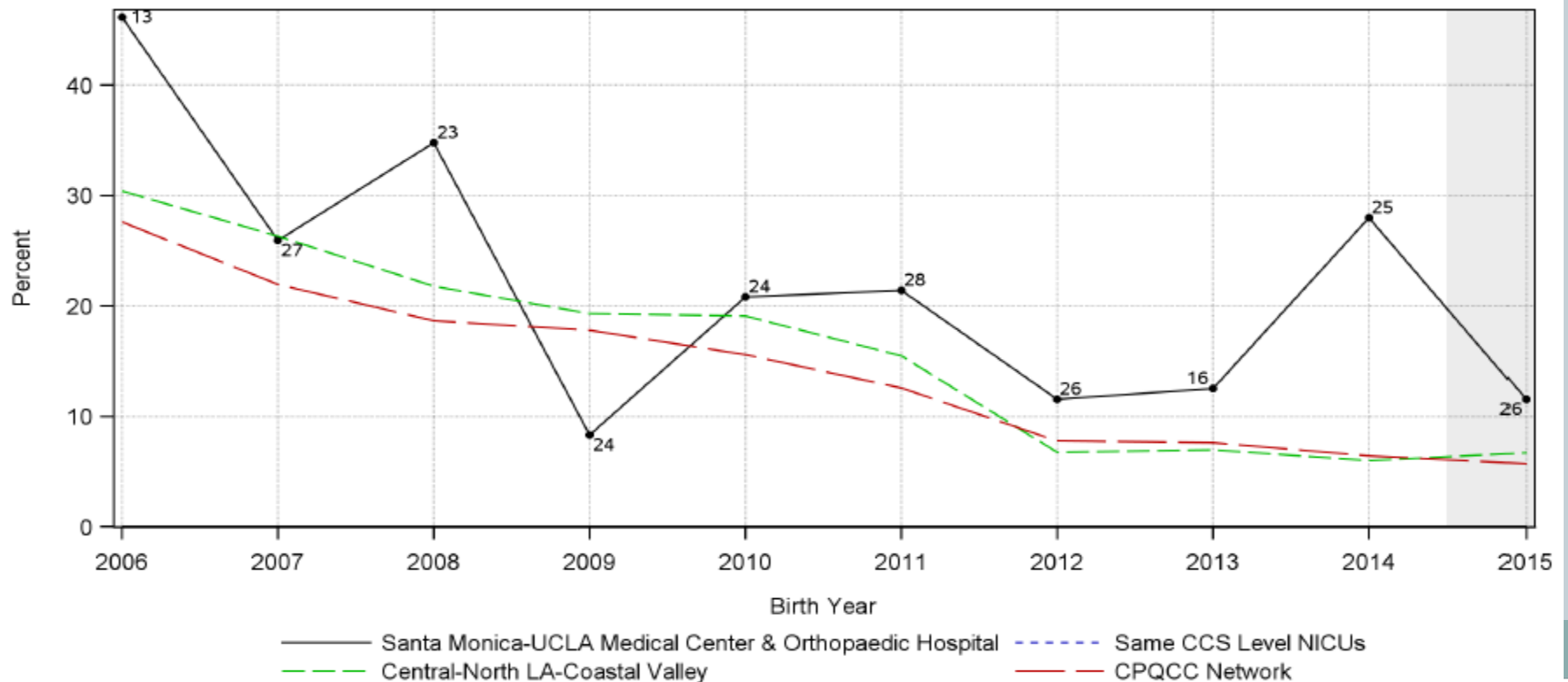


Hypothermic Newborns (Body temperature under 36 ° C), 2006 to 2015

Inborn Infants 401 to 1,500 grams or 22 to 31 completed weeks of gestation, 01/01/2006 to 12/31/2015

Santa Monica-UCLA Medical Center & Orthopaedic Hospital
Compared to all CPQCC Network Centers, all Region Centers, and all Same CCS Level Centers
The shaded area in the chart corresponds to years for which the data collection is on-going/incomplete.

California Perinatal Quality Care Collaborative (CPQCC)



Thermoregulation: UCLA Changes



- **Initiation of interdisciplinary hypothermia QI task force**
 - March 2016
- **Creation of hypothermia bundle**
 - Aim
 - Improve outcomes by reducing hypothermia in infants during the first hour of life
 - Process Measures
 - Data collection: OR/DR temperatures and infant's temperature within 15 minutes of NICU arrival (and axillary Q15 min, as necessary)

Hypothermia Bundle



- Initiate for all infants ≤ 32 wks 6/7 days or ≤ 1500 grams



MLBW THERMOREGULATION AUDIT TOOL**DELIVERY ROOM CHECKLIST:****NICU CHECKLIST:**

Delivery Notification Time: _____

Patient MR Number: _____

Resuscitation Team: _____

MD _____ RN _____RT _____ RN _____

Time of birth: _____

Time of arrival to NICU: _____

Time of temp in NICU (*within 15 minutes of NICU arrival*): _____

Admission skin temp: _____ °C Admission axillary temp: _____ °C

Measure temp q15 until $\geq 36.5^{\circ}\text{C}$ for 2 consecutive readings and then q30 x2:

Axillary temp: _____ °C Time: _____

Axillary temp: _____ °C Time: _____

Axillary temp: _____ °C Time: _____

Axillary temp: _____ °C Time: _____

Axillary temp: _____ °C Time: _____

Axillary temp: _____ °C Time: _____

Birth weight: _____ GA: _____

Debriefing Documentation

Barriers to effective delivery room management:

What went really well?

ACTION	Y/N	PERSON RESPONSIBLE
Room temperature (goal: 75°F) Temperature: _____		L&D staff
Warmer preheated to 100%		L&D RN
Chemical mattress activated & placed in bed		NICU RN
Two hats under chemical mattress		NICU RN
3 warm blankets placed on mattress		NICU RN
Resuscitation equipment checked/ready		RT
Place wet infant inside plastic bag		NICU RN (& assistant provider)
Applied pulse oximeter and temp probe		NICU RN
Bed changed to servo control (37°C)		NICU RN
Two caps on infant's head		Team leader
Hydrocolloid adhesive on upper lip prior and securing of ETT		RT
OR/DR skin temperature: _____ °C OR/DR axillary temperature: _____ °C		NICU RN
Was cord clamping delayed?		L&D RN
Team debriefing after transport		≥ 1 member from each team

NICU delivery nurse to complete above checklist and summarize debriefing discussion. Please place completed form in CNS mailbox.

NICU delivery nurse completing above checklist: _____

NICU RN Responsibility Prior to Delivery: ≤32 & 6/7 OR ≤1500g



- ❑ Initiate Hypothermia Bundle
- ❑ Activate chemical mattress and place in bed with white cloth side up
- ❑ Place two hats under chemical mattress
- ❑ Set up 3 warm blankets

NICU RN Responsibility During Delivery: Thermoregulation

- ❑ Start Apgar timer (@cord clamping)
- ❑ Apply skin temp probe
- ❑ ≤ 32 & 6/7 OR $\leq 1500g$ place wet baby in skin wrap & stimulate
- ❑ ≥ 33 & 0/7 AND $\geq 1500g$ dry with blankets & stimulate
- ❑ Record axillary & skin temp prior to departure and within 15 minutes of NICU arrival
 - ❑ Then axillary temp q15 until $\geq 36.5^\circ$ for 2 consecutive readings and then q30 min x2

<p>Thermoregulation</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Activate chemical mattress & place in bed <input type="checkbox"/> Place 2 caps under chemical mattress and 3 warm blankets in nest position <input type="checkbox"/> Start Apgar timer (@cord clamping) <input type="checkbox"/> Apply skin temp probe <input type="checkbox"/> ≤ 32 & 6/7 OR $\leq 1500g$ place wet baby in skin wrap & stimulate <input type="checkbox"/> ≥ 33 & 0/7 AND $\geq 1500g$ dry with blankets & stimulate <input type="checkbox"/> Record axillary & skin temp prior to departure and within 15 minutes of NICU arrival (then axillary q15 until $\geq 36.5^\circ$ for 2 consecutive readings and then q30 min x2)
<p>Ventilation/Oxygenation</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Call-out 30 sec. time at each interval <input type="checkbox"/> Place pulse-ox probe on right hand/wrist <input type="checkbox"/> Verbally confirms with Assistant provider when reliable pulse-ox reading obtained <input type="checkbox"/> Adjust FiO_2 based on pulse ox reading/time
<p>Chemical Resuscitation</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Draws up meds/boluses as indicated <input type="checkbox"/> Delegates arrest documentation <input type="checkbox"/> Call for NICU assistance as needed
<p>DR Departure</p>	<p>None</p>

NICU Staff Thermoregulation DR/OR Responsibilities

Team Leader	Assistant Provider	Respiratory Therapist	Nurse
<ul style="list-style-type: none"> <input type="checkbox"/> ≤32 & 6/7 OR ≤1500g secure wrap and place 2 caps on head <input type="checkbox"/> ≥33 & 0/7 AND ≥1500g dry head and place cap on head 	<ul style="list-style-type: none"> <input type="checkbox"/> ≤32 & 6/7 OR ≤1500g place wet baby in skin wrap & stimulate <input type="checkbox"/> ≥33 & 0/7 AND ≥1500g dry with blankets & stimulate 	<ul style="list-style-type: none"> <input type="checkbox"/> Record OR temp (should be 69-72°) 	<ul style="list-style-type: none"> <input type="checkbox"/> Start Apgar timer (@cord clamping) <input type="checkbox"/> ≤32 & 6/7 OR ≤1500g place wet baby in skin wrap & stimulate <input type="checkbox"/> ≥33 & 0/7 AND ≥1500g dry with blankets & stimulate <input type="checkbox"/> Apply pulse-ox and temp probe <input type="checkbox"/> Change bed to servo control (37°) <input type="checkbox"/> Record skin & axillary temp

NICU Admission Thermoregulation Practice



- Transition infant in plastic wrap with warm blanket into isolette
- Infant to remain on thermal mattress during umbilical line placement
- Monitor skin temp during line placement
- Increased temp monitoring:
 - Q 15 min until $\geq 36.5^\circ$ for 2 consecutive readings, then q 30 min x2
- Increased attention on infant temperature and interventions to optimize normothermia
- Isolette closed as soon as possible: < 4h

Goal Admission Temperatures in NICU



- Minimum of ≥ 36.0
- Ideal ≥ 36.5 to ≤ 37.5



Important changes



- Initiation of hypothermia bundle for all infants ≤ 32 & $6/7$ OR $\leq 1500g$
- Elimination of premie box – all supplies to be kept in NRP Cart in OR/DR
 - Thermometer to be added to DR/OR set up
- Axillary temp to be taken before placing infant in transport carrier and leaving DR
 - Attempting to determine the point at which infants are becoming cool
- Axillary & skin temp within 15mins of NICU arrival

Hypothermia bundle go live: Monday May 2nd!

NRP guidelines website



- <http://www2.aap.org/nrp/>
- <https://eccguidelines.heart.org/index.php/circulation/cpr-ecc-guidelines-2/part-13-neonatal-resuscitation/>

Questions?
Thank you!

