I. Purpose
To provide a standard protocol and premedication options for non-emergent endotracheal intubations in neonates.

II. Exclusions
Intubation without premedication may be acceptable during the following situations: resuscitation in the delivery room, an intubation that is required following an acute deterioration or critical illness that is defined as emergent by the physician, and/or infants with upper airway anomalies.

III. Recommendations provided by American Academy of Pediatrics (Pediatrics 2010; 125: 608-15.)
- Premedication should be used for all non-emergent endotracheal intubations in newborns
- Every health care facility caring for neonates implement a pain-prevention program utilizing pharmacologic and nonpharmacologic therapies
- Recommended approach
  - Nonpharmacologic interventions (swaddling and positioning)
  - Analgesia ± sedative medications should be used for all non-emergent intubations
  - Vagolytic agent should be considered
  - Muscle relaxant should be considered
- Agents
  - Analgesia – reduce pain of intubation, first-line therapy, often adequate as monotherapy
    - Fentanyl
      - More rapid onset than morphine (immediate vs. 5 minutes)
      - Morphine not effective in placebo controlled clinical trials
      - Morphine inferior to short acting agents in clinical trials
  - Sedation – reduce discomfort of intubation
    - Midazolam
      - Recommended for term or older infants only
      - Avoid in any infant with hypotension, depressed myocardial function, and/or severe pulmonary hypertension
  - Vagolytic agents – prevent bradycardia during intubations and decrease bronchial and salivary secretions, infrequently used because of the concern for masking hypoxia-induced bradycardia during intubation; however, most episodes of bradycardia during intubation are due to vagal stimulation, not hypoxia
    - Atropine
      - More experience in newborns than glycopyrrolate
  - Muscle relaxants - eliminate or minimize the increase in intracranial pressure that occurs during awake intubation
- **Rocuronium**
  - Preferred agent due to more benign adverse effect profile compared to depolarizing neuromuscular blockers
  - Preferred over vecuronium due to faster onset and shorter duration of action

- **Succinylcholine**
  - For patients without IV access only
  - Rare, serious adverse effects include hyperkalemia, myoglobinemia, and cardiac arrhythmias

<table>
<thead>
<tr>
<th>Medication Class</th>
<th>Medication</th>
<th>Route</th>
<th>Dose</th>
<th>Conc</th>
<th>Vol</th>
<th>Onset</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analgesia</td>
<td>Fentanyl</td>
<td>IV</td>
<td>1 mcg/kg Give on pump over 3-5 min to avoid chest wall rigidity</td>
<td>5 mcg/mL</td>
<td>0.2 mL/kg</td>
<td>1-2 min</td>
<td>30-60 min</td>
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<tr>
<td></td>
<td></td>
<td>Intranasal</td>
<td>2 mcg/kg</td>
<td>50 mcg/mL</td>
<td>0.04 mL/kg</td>
<td>10 min</td>
<td>60-120 min</td>
</tr>
<tr>
<td>Sedation</td>
<td>Midazolam</td>
<td>IV</td>
<td>0.1 mg/kg Give on pump over 5 min</td>
<td>1 mg/mL</td>
<td>0.1 mL/kg</td>
<td>5 min</td>
<td>20-30 min</td>
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<tr>
<td></td>
<td></td>
<td>Intranasal</td>
<td>0.2 mg/kg May burn on administration</td>
<td>5 mg/mL</td>
<td>0.04 mL/kg</td>
<td>10 min</td>
<td>30-60 min</td>
</tr>
<tr>
<td>Vagolytic</td>
<td>Atropine</td>
<td>IV, IM</td>
<td>0.02 mg/kg Rapid IV push</td>
<td>0.05 mg/mL</td>
<td>0.4 mL/kg</td>
<td>2 min</td>
<td>30-120 min</td>
</tr>
<tr>
<td>Muscle relaxants</td>
<td>Rocuronium</td>
<td>IV</td>
<td>0.6 mg/kg</td>
<td>10 mg/mL</td>
<td>0.06 mL/kg</td>
<td>1-2 min</td>
<td>20-30 min</td>
</tr>
<tr>
<td></td>
<td>Succinylcholine</td>
<td>IM</td>
<td>2 mg/kg</td>
<td>20 mg/mL</td>
<td>0.1 mL/kg</td>
<td>2-3 min</td>
<td>10-30 min</td>
</tr>
</tbody>
</table>

1. Chest wall rigidity may be treated with naloxone 0.1 mg/kg IV or rocuronium 0.6 mg/kg IV. Naloxone is available in the neonatal code cart and on override in the omnicell; rocuronium is available on override in the omnicell. Both are administered undiluted IV push.
2. To prepare 0.05 mg/mL dilution, combine 1 mL (0.4 mg) atropine + 7 mL sterile water for injection = 8 mL
3. Only to be ordered by NICU attending or fellow; patient must be supportable with bag mask ventilation before paralytic administration

Implemented: March 3, 2015