The Resuscitation Sequence

- Ineffective breathing
- Heart rate < 100 bpm
- Central cyanosis

Yes

Call for help
Access equipment
Provide warmth
Position
Clear airway (^
Stimulate
Administer oxygen
Establish monitors:
- oximetry
- cardiorespiratory
- blood pressure

Ineffective breathing
HR < 100 bpm

No

Resuscitation Sequence

Initiate/continue positive pressure ventilation (^

Yes

HR < 60 bpm

No

Initiate chest compressions (^

HR > 60 bpm

Consider intubation at any point indicated by a caret (^

HR < 60 bpm

Administer epinephrine (^

HR < 60 bpm

Ensure positive pressure ventilation, chest compressions, and epinephrine are being correctly administered (^

Repeat epinephrine
Ensure vascular access
Consider volume expansion
Draw venous blood gas

HR < 60 bpm

Consider pneumothorax

Transillumination
Consider needle aspiration

ACoRN Primary Survey
The Respiratory Score:

<table>
<thead>
<tr>
<th>Score</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory rate</strong></td>
<td>40 to 60/minute</td>
<td>60 to 80/minute</td>
<td>&gt; 80/minute</td>
</tr>
<tr>
<td><strong>Oxygen requirement</strong></td>
<td>None</td>
<td>≤ 50%</td>
<td>&gt; 50%</td>
</tr>
<tr>
<td><strong>Retractions</strong></td>
<td>None</td>
<td>Mild to moderate</td>
<td>Severe</td>
</tr>
<tr>
<td><strong>Grunting</strong></td>
<td>None</td>
<td>With stimulation</td>
<td>Continuous at rest</td>
</tr>
<tr>
<td><strong>Breath sounds on auscultation</strong></td>
<td>Easily heard throughout</td>
<td>Decreased</td>
<td>Barely heard</td>
</tr>
<tr>
<td><strong>Prematurity</strong></td>
<td>&gt; 34 weeks</td>
<td>30 to 34 weeks</td>
<td>&lt; 30 weeks</td>
</tr>
</tbody>
</table>

1 A baby receiving oxygen prior to the setup of an oxygen analyzer should be assigned a score of “1”


**Total score:**  

- **Mild respiratory distress**  
  - Respiratory Score < 5, starting at birth and lasting < 4 hours.

- **Moderate respiratory distress** (Babies are at risk of progressing to respiratory failure.)  
  - Respiratory Score of 5 to 8  
  - mild respiratory distress (Respiratory Score < 5), but persisting over 4 hours  
  - babies who were previously well but develop new respiratory distress.

- **Severe respiratory distress**  
  - Respiratory Score > 8  
  - babies with severe apnea or gasping  
  - babies who are already receiving ventilation due to respiratory failure (initiated during the Resuscitation Sequence or a previous passage through the Respiratory Sequence).

- **Note:**  
  Babies with persistent or new respiratory distress may be symptomatic due to other causes such as infection.
The Cardiovascular Sequence

Cardiovascular

- Pale, mottled, or grey
- Weak pulses or low BP
- Cyanosis unresponsive to O₂
- Heart rate > 220 bpm

No

Problem List

Yes

Cardiovascular Sequence

Administer O₂ as needed
Establish/continue monitors:
- pulse oximetry
- cardiorespiratory
- blood pressure

- Pale, mottled, or grey
- Weak pulses or low BP

Consider IV access/volume expansion

- Cyanosis unresponsive to O₂

Perform hyperoxia test

- HR > 220 bpm

Record ECG

- Focused history
  - Physical examination
  - Chest radiograph
  - Blood gas and CBC

Establish working diagnosis
  Obtain immediate consult

- Shock

- Hypovolemic
  Consider:
  - Volume expansion
  - Inotropes or vasoconstrictors

- Distributive (suspected sepsis)
  Consider:
  - Volume expansion
    - Inotropes or vasoconstrictors

- Cardiogenic
  Consider:
  - Inotropes Prostaglandin

- Cyanotic heart disease

- SVT
  Consider:
  - Other tachyarrhythmia

- Review ECG
  - Adenosine
  - Digoxin
Assuming a normal hemoglobin level and adequate cardiac output, how are various degrees of desaturation (hypoxemia) tolerated?

<table>
<thead>
<tr>
<th>SpO\textsubscript{2}</th>
<th>Degree of desaturation</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 75%</td>
<td>mild to moderate</td>
<td>usually well tolerated</td>
</tr>
<tr>
<td>65 to 75%</td>
<td>marked</td>
<td>may be less well tolerated if baby otherwise sick</td>
</tr>
<tr>
<td>&lt; 65%</td>
<td>severe</td>
<td>poorly tolerated</td>
</tr>
</tbody>
</table>

Clinical signs of cardiovascular instability:

<table>
<thead>
<tr>
<th>Stable</th>
<th>Unstable</th>
</tr>
</thead>
<tbody>
<tr>
<td>alert, active and looking well, normal tone</td>
<td>listless or lethargic and/or distressed, decreased tone</td>
</tr>
<tr>
<td>capillary refill &lt; 3 seconds centrally and peripherally</td>
<td>capillary refill &gt; 3 seconds</td>
</tr>
<tr>
<td>pulses palpable and full</td>
<td>pulses weak</td>
</tr>
<tr>
<td>heart sounds normal</td>
<td>gallop</td>
</tr>
<tr>
<td>no edema or signs of third space fluid</td>
<td>edema or signs of other third space fluid</td>
</tr>
<tr>
<td>clear lungs and normal-sized heart on chest radiograph</td>
<td>congested lungs or pleural effusions, and/or enlarged heart on chest radiograph</td>
</tr>
</tbody>
</table>
The Neurology Sequence

Neurology Sequence

- Abnormal tone*
- Jitteriness
- Seizures*

No

Problem List

Recheck airway and breathing
- Administer O₂ as needed
- Check blood glucose
- Establish/continue monitors:
  - pulse oximetry
  - cardiorespiratory

- No seizures at present
- Abnormal tone
- Jitteriness
- Seizures at present

Glucose

- ≥ 2.6 mmol/L
- < 2.6 mmol/L

- If Glucose < 2.6 mmol/L
  - D10%W bolus 2 mL/kg
  - Initiate D10%W infusion at 4 mL/kg/hr

- If Glucose ≥ 2.6 mmol/L
  - Phenobarbital 20 mg/kg

History and focused physical examination
- Investigations:
  - CBC and differential
  - Glucose
  - Sodium, calcium, potassium, and magnesium
  - Blood gas
  - Blood culture

- Establish working diagnosis
- Consider consultation

Perinatal brain injury:
- HIE
- Stroke
- Intracranial hemorrhage

- Specific evaluation
- Consider anticonvulsants

CNS infection

- Antibiotics ± antivirals
- Anticonvulsants
- Consider LP

Other:
- Abstinence syndrome
- Brain abnormality
- Metabolic
- Neuromuscular

- Specific evaluation and therapy

Blood glucose conversion: 2.6 mmol/L is equivalent to 47 mg/dL

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The Surgical Conditions Sequence

Surgical conditions
- Anterior abdominal wall defect
- Vomiting or inability to swallow
- Abdominal distension
- Delayed passage of meconium or imperforate anus

Surgical Conditions Sequence

- Cardiorespiratory monitoring, oximetry
- Continue core steps from other Sequences

- Anterior abdominal wall defect
  - Wear sterile latex free gloves
  - Avoid mask ventilation
  - Minimize handling of affected area
  - Apply protective cover
  - Insert Replogle tube for continuous suction OR single lumen gastric tube for low intermittent suction

- No anterior abdominal wall defect
  - Insert NG tube
    - Unable to pass NG tube
      - Insert Replogle tube and apply continuous suction
    - Able to pass NG tube
      - Apply low intermittent suction

- Focused history and physical examination
- Chest and abdomen radiographs
- Blood chemistry
- Fluid balance sheet

- Establish working diagnosis
- Obtain consultation
- Specific management

Problem List

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The Fluid & Glucose Management Sequence

Fluid & Glucose Management Sequence

- Box: Fluid & Glucose Management
  - Blood glucose < 2.6 mmol/L
  - At risk for hypoglycemia
  - Not feeding or should not be fed

- Box: Fluid & Glucose Management
  - Check point of care glucose. OR send blood glucose to lab
  - Weigh the baby

- Box: Working diagnosis of symptomatic hypoglycemia

- Box: Cannot feed
  - Continue IV D10%W at 4 mL/kg/hr
  - Check blood glucose in 30 minutes

- Box: Can feed
  - Glucose < 1.8
    - Feed measured volumes 8 mL/kg every 2 hours, or 12 mL/kg every 3 hours
    - Check blood glucose after 1 hour
  - Glucose 1.8 to 2.5
  - Glucose ≥ 2.6
    - Feed ad lib
    - Check glucose prior to next feed

- Box: D10%W infusion at 3 mL/kg/hr
  - Check blood glucose in 30 minutes

- Box: Focused history and physical examination
  - Calculate fluid requirements
  - Check BUN, creatinine, Na, K, Ca if baby older than 12 to 24 hours and requiring intravenous therapy
  - Initiate fluid balance sheet in babies on intravenous therapy
  - Establish working diagnosis
  - Consider consultation

- Box: Glucose < 2.6
  - Continue the "suggested steps for increasing intake if blood glucose checks remain < 2.6"
  - Monitor glucose hourly after each change until ≥ 2.6
  - Consider consult

- Box: Persistent hypoglycemia
  - Consider central venous access if administering >10% dextrose solution
  - Rule out endocrine or metabolic disease
  - Obtain consult

- Box: Glucose ≥ 2.6
  - Monitor pre-feed or every 3 to 4h until two consecutive samples are > 3.3

- Box: Blood glucose conversions
  - 1.8 mmol/L is equivalent to 32 mg/dL
  - 2.6 mmol/L is equivalent to 47 mg/dL
  - 3.3 mmol/L is equivalent to 60 mg/dL

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**Maintenance fluid**

<table>
<thead>
<tr>
<th>Postnatal age</th>
<th>Baseline oral intake (if not breastfed on cue)</th>
<th>Baseline intravenous intake (if not feeding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>Up to 12 mL/kg every 3 hours</td>
<td>D10%W at 3 mL/kg/hour</td>
</tr>
<tr>
<td>Day 2</td>
<td>Up to 12 mL/kg every 3 hours</td>
<td>D10%W at 4 mL/kg/hour</td>
</tr>
<tr>
<td>Day 3</td>
<td>Up to 15 mL/kg every 3 hours</td>
<td>D10%W with 20 mmol/L of NaCl at 5 mL/kg/hour</td>
</tr>
<tr>
<td>≥ Day 4</td>
<td>Up to 18 to 20 mL/kg every 3 hours</td>
<td>D10%W with 20 mmol/L of NaCl at 6 mL/kg/hour</td>
</tr>
</tbody>
</table>

**Glucose monitoring guidelines to ensure normal values are achieved after treatment is initiated:**

<table>
<thead>
<tr>
<th>Blood glucose level</th>
<th>Monitoring guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2.6 mmol/L (&lt; 47 mg/dL)</td>
<td>One hour after enteral feed and prior to the next feed, or 30 minutes after an IV bolus or starting an IV infusion.</td>
</tr>
<tr>
<td>2.6 to 3.3 mmol/L (47 to 60 mg/dL)</td>
<td>Prior to feeds; or every 4 to 6 hours if on an IV infusion</td>
</tr>
<tr>
<td>&gt; 3.3 mmol/L (&gt; 60 mg/dL)</td>
<td>Every 2&lt;sup&gt;nd&lt;/sup&gt; to 3&lt;sup&gt;rd&lt;/sup&gt; feed or every 6 to 8 hours if on an IV infusion. Transition to enteral feeds: discontinue monitoring after two consecutive glucose levels &gt; 3.3 mmol/L (&gt; 60 mg/dL).</td>
</tr>
</tbody>
</table>

**Suggested steps for increasing glucose intake if blood glucose checks remain < 2.6 mmol/L (< 47 mg/dL)**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Enterally fed</th>
<th>IV dextrose infusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>Breastfeed on cue, or Feed every 2 to 3 hours</td>
<td>D10%W, 3 mL/kg/hour (= 5 mg/kg/minute of glucose)</td>
</tr>
<tr>
<td>Step 1</td>
<td>Feed measured volume 8 mL/kg every 2 hours or 12 mL/kg every 3 hours, or Start IV dextrose infusion at baseline</td>
<td>D10%W, 4 mL/kg/hour (= 6.7 mg/kg/minute of glucose)</td>
</tr>
<tr>
<td>Step 2</td>
<td>Go to IV dextrose infusion step 1, and proceed from there</td>
<td>D12.5%W, 4 to 5 mL/kg/hour (= 8.3 to 10.4 mg/kg/minute of glucose) Obtain consultation and investigations Consider central access Consider glucagon or other pharmacological intervention</td>
</tr>
</tbody>
</table>
The Thermoregulation Sequence

Thermoregulation

- T < 36.3°C or > 37.2°C axillary
- Increased risk for temperature instability

No

Problem List

Yes

Thermoregulation Sequence

Ensure the baby is in an environment where temperature can be controlled

Yes

Hypothermia

T < 36.3°C axillary

Term/near-term well-baby

No

Yes

Position baby skin-to-skin with mother
Provide warm blanket and hat
Recheck temperature

T < 36.3°C axillary

Yes

Hypothermia

T < 36.3°C axillary

Place in pre-warmed incubator OR
Place on radiant warmer with servocontrol probe set to 36.5°C

Yes

Hyperthermia

T > 37.2°C axillary

Undress baby
Remove extra blankets
Decrease incubator/radiant warmer skin or air temperature setting by 0.5°C q15 minutes

No

Normothermia

T 36.3 to 37.2°C axillary

No

Maintain thermally controlled environment

History & physical examination, if not already done
Check temperature q15 to 30 minutes until stable

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The Infection Sequence

Infection
- Risk factor for infection
- ACoRN alerting sign with *
- Clinical deterioration

ACoRN Primary Survey

Yes

Infection Sequence

- Continue Sequences in the Problem List
- Observe using repeated ACoRN Primary Surveys

No

ACoRN alerting sign with *
- Clinical deterioration
- Preterm baby
- Mother with signs of infection

Obtain blood culture
- CBC, differential and platelets
- Establish venous access
- Initiate antibiotic therapy

Risk factors only in a well term baby with an asymptomatic mother

Observe in hospital for 24 to 48 hours
- Vital signs every 4 hours

Suspected early onset sepsis
- Suspected community acquired sepsis

Suspected nosocomial sepsis
- Suspected NEC

Usually ampicillin and gentamycin

Usually cloxacillin or vancomycin and gentamicin or cefotaxime

Focused history and physical examination
- Consider lumbar puncture
- Obtain urine culture if older than 3 days
- Consider other cultures, specific sites if indicated

Establish working diagnosis
- Consider consultation

Add cefotaxime for suspected or confirmed meningitis
- Adjust or discontinue antibiotics according to culture results and overall evaluation

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Transport

Neonatal Pre-Transport Information Sheet

Date of call: ________________________ Time of call: ________________________

Local facility physician’s name: ________________________ Tel number: ________________________
Consultant physician/Transport coordinator’s name: ________________________ Tel number: ________________________

Information about the baby

Name: ________________________ Diagnosis/reason for consult: ________________________

<table>
<thead>
<tr>
<th>Birth date</th>
<th>Time</th>
<th>Sex</th>
<th>Birth wt.</th>
<th>Gestation</th>
<th>Apgar score</th>
<th>Eye prophylaxis?</th>
<th>Vitamin K given?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Resuscitation:

Spontaneous: Yes ( ) No ( )
Bag ventilation: Yes ( ) No ( )
O₂: Yes ( ) _____% No ( )
Intubated: Time _____ ETT size _____
Suction meconium below cords: Yes ( ) No ( )

Congenital anomalies: ________________________

Postnatal course:

Current status:

Heart rate: ______ RR: _____ BP: ________ Perfusion: ________ SaO₂: ________

FiO₂: __________

Physical exam: ________________________

Feeding/intravenous:

X-rays – results: ________________________

Laboratory – results: ________________________

Cord/other blood gases: ________________________

Information about the mother

Name: ________________________ Age: _____ G: _____ P: ______ LMP/EDC: ______ / ______

Blood group ____ Rh ____ VDRL ____ Rubella ____ HBsAG ____ TB ____ HIV ______

Group B Strep: Pos ( ) Neg ( ) Unknown/not done ( ) Date ______ / ______ / ______

Past obstetric history: ________________________

Labour & delivery

Fetal monitoring: Yes ( ) No ( ) Internal ( ) External ( ) Auscultation ( ) Scalp pH ______

Length of labour: 1st stage ______ 2nd stage ______

AROM ( ) SROM ( ) Date ________ Time ________ Colour ________ Amount ________

Medications: ________________________ Anesthesia/analgesia: ________________________

Type of delivery: C. Section ( ) Vaginal ( ) Forceps ( ) Vacuum ( ) Presentation ______

Complications: ________________________

Date: ______ / ______ / ______ Signature and title: ________________________


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