The Paediatrics

HO Guide

Book of Paediatric Problems & Related Information for Your Assessment

compiled by Gerard Lob
2013
The Pediatrics HO Guide

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4) Common Neonatal Problems
5) Common Pediatric Problems

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- Immunization chart
- Growth Chart
- Post natal screening
- Ballard / Apgar score
- Developmental Milestone
- Formulae and calculations
- common drugs and doses

The pocket essentials:
1) Calculator  2) Scissors  3) Frank Shan  4) Peds Protocol  5) Pen torch

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- A House Officers Workshop Project-
www.myhow.wordpress.com
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References, images, tables
- Peds protocol 3rd edition
- various internet sources
Hospital Ampang Peds wards

NICU
1) Intensive (+ Isolation)
2) Semi-Intensive (intermediate)
3) Recovery / Mother’s Room

4B
1) Respiratory (Acute + non acute)
2) Medical (Acute + Non acute)
3) AGE
4) Isolation
5) Multi-discipline

4A
Neonates + General Peds
Hospital Ampang Setup

NICU HA MAP

Ward 4B Layout

4B

4A

Neonates + General Peds
Hospital Ampang Setup
**General Neonatal Clerking**

1) Age / Sex / Term/preterm, mode of delivery @ Gestational age / Apgar Score / Birth Weight / Current Weight  
- TSH / G6PD status  
  - any weight loss (%)  
  eg: Day 5 / FT SVD @ 38wks / AS 9/10 / BW 3kg / CW 2.9kg  
  G6PD normal, TSH 5.6

2) History of Presenting Illness  
- p/w jaundice since D3 of life …. etc or attended EMLSCS for fetal distress... events leading to admission (chronologically)

3) Maternal Hx:  
- Age / Gravidity & Parity / Gestation  
- Antenatal check up problems: PROM > 24 hours...HVS GBS...etc  
- Blood Group + Infectious Screening

4) Mother and Father’s Data  
Age / Occupation / Gravida/Para  
H/o abortion or consanguinity etc

5) Physical Examination  

**Anthropometry:** Weight / COH / Length  

**Respiratory:** clear? Air entry  
CVS: murmurs?  
**Abdomen:** soft/ distended  

**Genitalia:** normal? (testis descended in male)  

**Mouth:** cleft lip/palate  
**Eyes:** clear/discharge? Cataract?  
**Ears:** external meatus present? Skin tag? Discharges?  

**Neuro:** Spine normal/spina bifida? Skin tuft?  

**Reflexes:** Moros / Sucking / Grasp

**Radiology:** CXR findings  
**Impression:**  
**Management:**

---

![Diagram](image)
General Pediatrics Clerking

1) Problem:
Age / sex / Race
underlying medical illness /treatment/ follow up and TCA
any h/o admission?

Main complains: (short)
p/w fever 2/7, Cough + RN 1/7, rapid breathing 1/7

2) History of presenting illness (elaborate complains)
c/o:
1) Fever 2/7
– documented temperature..
- chills/rigor etc

2) Cough + RN 1/7
- chesty cough, sputum…etc

Important points:
- Sick contact? PTB contact?
- Visited GP? Antibx given? Completed course?
- Interval Symptoms? Atopy? (BA)
- Child sent to nursery? How many children there? Any sick children
- Recent travelling / swimming / jungle trekking (dengue/leptospirosis)
- feeding: Usual feeding and current feeding (in Oz)

Otherwise (negative symptoms)
- No URTI / UTI, vomiting/diarrhoea, fever ..etc

In ED: (short summary of mx)
- tachypnoic, RR ➔ given nebs x 2, IV hydrocort…etc

Medical / Surgical Hx: previous admissions? Surgery?

Allergies: food or drug allergies?

Birth Hx: Term? Mode of delivery / BW / admission to NICU?

Neurodevelopmental Hx: Gross Motor / Fine Motor / Speech / Social (refer appendix for dev milestone)

Family History: Fam hx of asthma? Fitting etc..

Social History: siblings, age, healthy / Parents age and occupation / living conditions

Physical Examination

anthropometry: weight / height / length

General examination:
alert, conscious…etc
Vital signs..

ENT: throat injected? Tonsils enlarged? Ears TM intact?
Respiratory: lungs clear / air entry
CVS: murmurs?
Abdomen: soft / distended? / liver and spleen
Others: genitalia? Skin rashes…LN etc

Diagnosis: Imp: AEBA 2 URTI
Lab: FBC/RP/LFT etc
Radiology: CXR…

Action plan: Management, investigations, medications
**1) Asthma**

**Defn:** Chronic airway inflammation leading to increase airway responsiveness, that leads to recurrent episodes of WHEEZING, BREATHLESSNESS, CHEST TIGHTNESS, COUGHING (Night/early morning)

<table>
<thead>
<tr>
<th>Hx:</th>
<th>Interval sx</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Precipitating factor (URTI, allergen etc)</td>
<td>Day/Nocturnal sx</td>
</tr>
<tr>
<td>- current mx, prev admission,</td>
<td>Cold/exercise induced</td>
</tr>
<tr>
<td>- home/school environment</td>
<td>Exacerbation frequency</td>
</tr>
<tr>
<td>- response prior to tx/compliance</td>
<td>Need for reliever/nebs</td>
</tr>
<tr>
<td>- atopy- eczema, rhinitis, conjunctivitis</td>
<td>Pets/ carpets at home</td>
</tr>
<tr>
<td>- Fam hx of Asthma</td>
<td></td>
</tr>
</tbody>
</table>

**Acute**
- tachypnoic / tachycardic
- hyperinflated chest
- wheeze/ronchi
- recession
- drowsy/cyanosed

**Chronic**
- Harrison sulci
- hyperinflated chest|
- eczema/dry skin
- hypertrophied turbinate

**Episodic (viral) wheeze – only wheeze during viral infections**

**Multiple trigger wheezer – smoke, allergen, crying, laughing, exercise**

**Interval sx**
- Cold/exercise induced
- Day/Nocturnal sx
- Exacerbation frequency
- Need for reliever/nebs
- Pets/ carpets at home

**Clinical index (to define Risk of asthma)**

> 3 wheezing episodes/year during first 3 years + 1 Major or 2 minor Criterion

**Major:**
- Eczema
- Parental asthma
- AERO Allergen skin test +

**Minor:**
- Skin test +
- Wheezing w/o URTI
- Eosinophilia > 4

**Classification**
1) Intermittent : - EIA
2) persistent : + EIA, + need for prophylaxis MDI

**Degree of Asthma severity**

<table>
<thead>
<tr>
<th></th>
<th>Intermittent</th>
<th>Mild persistent</th>
<th>Mod Persistent</th>
<th>Severe Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime sx</td>
<td>&lt; 1x / week</td>
<td>&gt; 1x /week</td>
<td>Daily</td>
<td>Daily</td>
</tr>
<tr>
<td>Nocturnal sx</td>
<td>&lt;1x / month</td>
<td>&gt;2x / month</td>
<td>&gt;1x / week</td>
<td>Daily</td>
</tr>
<tr>
<td>EIA</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>Daily</td>
</tr>
<tr>
<td>Exacerbations</td>
<td>Brief</td>
<td>&gt; 1x / month</td>
<td>&gt; 2x / month</td>
<td>&gt;2x / month frequent</td>
</tr>
<tr>
<td></td>
<td>Not affecting sleep</td>
<td>Affect sleep/activity</td>
<td>Affect sleep/activity</td>
<td>Affect sleep/activity</td>
</tr>
<tr>
<td>PEFR/FEV1</td>
<td>Normal</td>
<td>&gt;80%</td>
<td>60-80%</td>
<td>&lt; 60%</td>
</tr>
</tbody>
</table>

**GINA – Level of asthma control (after starting MDI)**

<table>
<thead>
<tr>
<th></th>
<th>Controlled</th>
<th>Partly controlled</th>
<th>Uncontrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime sx</td>
<td>-</td>
<td>&gt; 2x / week</td>
<td>&gt; 3 of partly controlled features</td>
</tr>
<tr>
<td>Nocturnal sx</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Limit activities /EIA</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Exacerbations</td>
<td>-</td>
<td>&gt; 1 / year</td>
<td></td>
</tr>
<tr>
<td>Lung Fn test</td>
<td>Normal</td>
<td>&lt; 80% predicted best</td>
<td></td>
</tr>
<tr>
<td>Need for reliever</td>
<td>-</td>
<td>&gt; 2x / week</td>
<td>1 in any week</td>
</tr>
</tbody>
</table>
Management
Assessment of severity
- Diagnosis = cough + wheezing + SOB / pneumonia
- Trigger factor = food, weather, exercise, infection, emotion, drugs, allergens
- Severity = RR, colour, respiratory effort, consciousness level

<table>
<thead>
<tr>
<th>Sx</th>
<th>mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altered Consciousness</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Physical Exhaustion</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Talks in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulsus paradoxous</td>
<td>NO</td>
<td>+/-</td>
<td></td>
</tr>
<tr>
<td>Central cyanosis</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>RONCHI</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use acc. muscles</td>
<td>-</td>
<td>Moderate</td>
<td>MARKED</td>
</tr>
<tr>
<td>Sternal Retraction</td>
<td>-</td>
<td>Moderate</td>
<td>MARKED</td>
</tr>
<tr>
<td>Initial PEF</td>
<td>&gt;60%</td>
<td>40-60%</td>
<td>&lt;40%</td>
</tr>
<tr>
<td>SpO2</td>
<td>&gt;93%</td>
<td>91-93%</td>
<td>&lt;90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>Discharge</th>
<th>May need admit</th>
<th>ADMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mx:</td>
<td>1) Neb Salb</td>
<td>1) Neb Combivent x 3</td>
<td>1) Neb Combivent x 3 / cont</td>
</tr>
<tr>
<td></td>
<td>&lt; 1 yo: 0.5 : 3.5</td>
<td>2) O2 8L/min</td>
<td>2) O2 8L/min</td>
</tr>
<tr>
<td></td>
<td>&gt;1yo : 1:3</td>
<td>3) Oral Prednisolone</td>
<td>3) IV Hydrocort 5mg/kg QID 1/7</td>
</tr>
<tr>
<td>MDI Salb in spacer</td>
<td>4-6 puffs (&lt;6yo)</td>
<td>Reasses after 60mins</td>
<td>Reasses after 60mins</td>
</tr>
<tr>
<td></td>
<td>8-12 puffs (&gt;6yo)</td>
<td>if no improvement</td>
<td>if no improvement,</td>
</tr>
<tr>
<td></td>
<td>or</td>
<td>Tx as moderate</td>
<td>Tx as severe</td>
</tr>
<tr>
<td>ventolin (blue)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200mcg 2 puff PRN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluticasone (orange)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125mcg 2 puff BD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budesonide (brown)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125mcg BD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seretide (purple)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25/125 1 puff BD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Montelukast /singulair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4mg granules (Chew @8pm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV hydrocort 4-5mg/kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QID for 1/7, then change to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syr Prednisolone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2mg/kg OD for 5/7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Criteria for admission
1) failure to respond to standard tx at home
2) failure to respond to NEB
3) Relapse within 4 hours of NEB

Asthma Action plan

<table>
<thead>
<tr>
<th>Healthy</th>
<th>Unhealthy</th>
<th>Exacerbation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDI Ventolin 100mcg</td>
<td>MDI Fluticasone 125mcg</td>
<td>MDI Ventolin 1puff ➔ 10 breaths, repeated up to 10times, may repeat every 20mins</td>
</tr>
<tr>
<td>Healthy</td>
<td>2 puff PRN</td>
<td>1 puff BD</td>
</tr>
<tr>
<td>Unhealthy</td>
<td>2 puff QID</td>
<td>1 puff BD</td>
</tr>
<tr>
<td>Exacerbation</td>
<td>MDI Ventolin 1puff ➔ 10 breaths, repeated up to 10times, may repeat every 20mins</td>
<td>Bring child to hospital immediately</td>
</tr>
<tr>
<td></td>
<td>* 10 puffs ventolin = 1 Neb</td>
<td></td>
</tr>
</tbody>
</table>
Management of Acute Exacerbation of Bronchial Asthma in Children

### Severity: MILD
- **Treatment:**
  - Nebulised Salbutamol or MDI Salbutamol + spacer
  - 4-6 puffs (<6 yrs), 8-12 puffs (>6 yrs)
  - Oral Prednisolone
  - 1 mg/kg/day (max 60 mg) x 3 - 5 days
- **Observation:**
  - Observe for 60 min after Last Dose
  - Review after 20 min, if No Improvement then treat as **Moderate**

### Severity: MODERATE
- **Treatment:**
  - Nebulised Salbutamol
  - ± Ipratropium Bromide (3 @ 20 min intervals)
  - Oral Prednisolone
  - 1 mg/kg/day x 3-5 days
  - Oxygen 8L/min by face mask
- **Observation:**
  - Observe for 60 min after Last Dose
  - Admission if No Improvement

### Severity: SEVERE/LIFE THREATENING
- **Treatment:**
  - Nebulised Salbutamol
  - Ipratropium Bromide (3x @ 20 mins intervals/continuously)
  - Oxygen 8L/min by face mask
  - IV Corticosteroid
  - IV Salbutamol continuous infusion 1 - 5 mcg/kg/min ± Loading 15 mcg/kg over 10 minutes
  - ± SC Terbutaline/Adrenaline
  - ± IV Magnesium sulphate 50% bolus 0.1 mL/kg (50 mg/kg) over 20 mins
  - Consider HDU/ICU admission
  - ± IV Aminophylline
  - ± Mechanical Ventilation
- **Observation:**
  - Continuous Observation
  - Review
<table>
<thead>
<tr>
<th>Drug Dosages for Medications used in Acute Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drug</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td><strong>β₂-agonists</strong></td>
</tr>
</tbody>
</table>
| • Salbutamol | Nebuliser solution 5 mg/ml or 2.5 mg/ml nebule Intravenous | 0.15 mg/kg/dose (max 5 mg) or  
< 2 years old: 2.5 mg/dose  
> 2 years old: 5.0 mg/dose  
Continuous: 500 mcg/kg/hr  
Bolus:  
5-10 mcg/kg over 10 min  
Infusion:  
Start 0.5-1.0 mcg/kg/min, increase by 1.0 mcg/kg/min every 15 min to a max of 20 mcg/kg/min |
| • Terbutaline | Nebuliser solution 10 mg/ml, 2.5 mg/ml or 5 mg/ml respule Parenteral | 0.2-0.3 mg/kg/dose, or  
< 20 kg: 2.5 mg/dose  
> 20 kg: 5.0 mg/dose  
5-10 mcg/kg/dose |
| • Fenoterol | Nebuliser solution | 0.25-1.5 mg/dose |
| **Corticosteroids** | | |
| • Prednisolone | Oral | 1-2 mg/kg/day in divided doses (for 3-7 days) |
| • Hydrocortisone | Intravenous | 4-5 mg/kg/dose 6 hourly |
| • Methylprednisolone | Intravenous | 1-2 mg/kg/dose 6-12 hourly |
| **Other agents** | | |
| Ipratropium bromide (250 mcg/ml) | Nebuliser solution | < 5 years old: 250 mcg 4-6 hourly  
> 5 years old: 500 mcg 4-6 hourly |
| Aminophylline | Intravenous | 6 mg/kg slow bolus (if not previously on theophylline) followed by infusion 0.5-1.0 mg/kg/hr |
| Montelukast | Oral | 4 mg granules  
5mg/tablet on night chewable  
10mg/tablet ON |
2) Febrile Seizures
Defn: Fit with fever in children aged 3 months – 6 yo (with no evidence of intracranial pathology/metabolic derangement) (24 hrs)

<table>
<thead>
<tr>
<th>Sx</th>
<th>Simple</th>
<th>Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>&lt;15 mins</td>
<td>&gt;15 mins</td>
</tr>
<tr>
<td>Type of convulsion</td>
<td>Generalized tonic-clonic</td>
<td>Focal</td>
</tr>
<tr>
<td>Occurrence</td>
<td>1 in 24 hours</td>
<td>&gt;1 in 24 hours</td>
</tr>
<tr>
<td>(does not recur during febrile episode)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Ictal Drowsiness</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Causes
- Otitis Media
- URTI / UTI (tonsilopharyngitis)
- gastroenteritis
- viral infection
- meningitis (irritability, full fontanelle, meningismus)

Risk factors
- Fam hx of febrile fits (% recur: none: <15% | 2: >30% | >3: >60%)
- age < 18 mo
- low degree fever (<40°C) during 1st episode
- < 1 hour btwn onset Fever & Fit

Criteria for admission
1) Fear of recurrent fits
2) To exclude intracranial pathology
3) investigate and treat cause
4) Allay parental anxiety (stay far from hospital)

Hx:
1) Duration of fitting, type of fitting (GTC/focal etc)
2) Family hx of fitting
3) Sx of infection
4) Neurological development

Management
1) Control fever – Syr PCM 15mg/kg or tepid sponging
2) Supp Diazepam 0.5mg/kg (if Fit >5min)
3) I/O
4) Encourage orally
5) Fit Education and diary

Ix: FBC, RP, RBS, CS blood/urine, UFEME
* LP if evidence of meningitis
* EEG if multiple recurrent/complex febrile fit

Fit education
- stay calm during onset
- loosen clothes, esp around neck
- Left Lateral Position
- Don’t insert anything into mouth
- Wipe any secretions from mouth
* Time the duration, if > 5 mins bring child to Clinic/Hospital
* During fever, give PCM/tepid sponging, encourage fluids intake, good aeration

What should I do if my child has a fit?
• Stay calm and do not panic.
• Do not force or put anything into the child’s mouth, including your fingers.
• Ensure your child is safe by placing them on the floor and removing any objects that they could hit against.
• Note the time the fit started and stopped, to tell the doctor.
• Once the fit has stopped place your child on their side and make them comfortable.

• Do not shake or slap your child to wake them up.
• Do not restrain your child.
• Have your child checked by your local doctor or health care professional as soon as possible.
**Status Epilepticus**

**Defn:** Any seizure > 30 mins or intermittent seizure w/o regaining full consciousness > 30 mins

Seizure:
- > 5 mins: Impending Status Epilepticus
- 5-30 mins: Established Status Epilepticus
- post phenytoin > 10 mins: Early Refractory Status Epilepticus
- > 60 mins: Established Refractory Status Epilepticus

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**Algorithm for Management of Status Epilepticus**

**Child with SEIZURE**

- **At Home, In Ambulance**
  - PR Diazepam
    - 0.2-0.5 mg/kg (Max 10mg)
    - 0.5mg/kg (2-5 yrs); 0.3mg/kg (6-11 yrs); 0.2mg/kg (12 yrs+)
  - Consider:
    - IV Diazepam 0.2mg/kg slow bolus (if not already given)

- **In Hospital**
  - Obtain IV access
  - IV Diazepam 0.2mg/kg slow bolus (at 2 mg/min; maximum 10mg)
  - IV Phenytoin 20 mg/kg (Max Loading dose 1.25 Gm)
    - Dilute in 0.9% saline; Max. conc. at 10 mg/ml; Infuse over 20-30 mins, with cardiac monitoring.
  - Consider:
    - Bedside Blood Sugar
    - If on maintenance Phenytoin, then give IV Phenobarbitone
    - Monitor blood sugar, electrolytes, blood counts, liver function, blood gases.
    - Consider blood culture, toxicology, neuroimaging, antiepileptic drug levels.
    - If <2 yrs old, consider IV Pyridoxine 100 mg.

**Seizure > 5 mins**
- Impending Status epilepticus

**Seizure 5-30 mins**
- Established Status epilepticus

**Early Refractory Status epilepticus**
- Seizures continue > 10 mins after Phenytoin

**Consider One of the following:**
- IV Midazolam 0.2 mg/kg bolus (at 2 mg/min; Max 10 mg), then infusion 3-5 mcg/kg/min up to a max of 15 mcg/kg/min
- IV Phenobarbitone 20 mg/kg (Max Loading dose 1 Gm)
  - Infusion at 25-50 mg/min
- IV Levetiracetam 40 mg/kg infused over 10 minutes, then 20 mg/kg 12 hourly
- IV Sodium Valproate 20 mg/kg (Max Loading 1.25 Gm, given over 1-5 mins, at 20-50 mg/min), then infusion 1-5 mg/kg/hour for 6-12 hours

**Seizure > 60 mins**
- Established Refractory Status epilepticus

- Discuss with Paediatric Neurologist and Intensivist about inducing coma

- Ensure:
  - Ventilation
  - Adequate Perfusion (ABC’s)

- Monitor BP, respiration
- Start inotropic support, esp. if given Midazolam or Phenobarbitone
- Arrange for ICU
- Secure airway, prepare to use mechanical ventilation
- Titrate Phenobarbitone to achieve burst-suppression pattern on EEG
- Avoid Sodium Valproate in metabolic encephalopathy
3) Acute GastroEnteritis

Abdomen turgor

General Condition
Eyes sunken, Turgor

Assess

<table>
<thead>
<tr>
<th>General Condition</th>
<th>Restless, irritable</th>
<th>Lethargic, unconscious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunken eyes</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Offer Fluid

| Drinks normally   | Drinks eagerly, thirsty | Not drinking, poor |

Pinch skin (abdomen)

| Skin goes back immediately | Skin goes back slowly | Skin goes back slow >2sec |

DEHYDRATION

| MILD (<5%) | Moderate (5-10%) | Severe (>10%) |

Treatment

<table>
<thead>
<tr>
<th>Plan A (Tx at home)</th>
<th>Plan B</th>
<th>ORS over 4 hours</th>
<th>Plan C</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Give extra fluid (ORS/H20)</td>
<td>- Give ORS over 4 hours</td>
<td>&lt;6kg : 200-400ml</td>
<td>- Start IVD immediately!</td>
</tr>
<tr>
<td>- Cont feeding on demand</td>
<td>- Reassess after 4 hours</td>
<td>6-10kg : 400-700ml</td>
<td></td>
</tr>
<tr>
<td>- Return when poor oral intake, fever, bloody stool</td>
<td></td>
<td>10-12kg : 700-900ml</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12-19kg : 900-1400ml</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.9 % NS bolus 20ml/kg then reassess</td>
<td></td>
</tr>
</tbody>
</table>

ORS 8 sachets at home

<table>
<thead>
<tr>
<th>&lt;2 yo : 50-100ml after BO</th>
<th>&gt;2yo : 100-200ml after BO</th>
</tr>
</thead>
<tbody>
<tr>
<td>- give frequent small sips from cup/spoon</td>
<td></td>
</tr>
<tr>
<td>* if vomit, wait 10mins then give slowly (1 spoon/2-3 mins)</td>
<td></td>
</tr>
</tbody>
</table>

ORS over 4 hours

<table>
<thead>
<tr>
<th>&lt;6kg : 200-400ml</th>
<th>6-10kg : 400-700ml</th>
<th>10-12kg : 700-900ml</th>
<th>12-19kg : 900-1400ml</th>
</tr>
</thead>
</table>

| 0.9 % NS bolus 20ml/kg then reassess |

| Correction +maintenance |

Fluid Management

Maintenance (over 24H)

<table>
<thead>
<tr>
<th>31 - 6 mo : 150cc/kg/day (1/5NSD5%)</th>
<th>6mo - 1 year : 120cc/kg/day (1/5NSD5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 1 yo : Holliday segar formula (1/2 NSD5%)</td>
<td></td>
</tr>
<tr>
<td>1st 10kg = 100ml/kg (10kg = 1000ml)</td>
<td></td>
</tr>
<tr>
<td>2nd 10kg = 50ml/kg (20kg = 1500ml)</td>
<td></td>
</tr>
<tr>
<td>&gt; 20kg = 20ml/kg</td>
<td></td>
</tr>
</tbody>
</table>

| IV 8.4% NaHCO3 = 1/3 base deficit x Wt |

Correction of Na

| Na deficit = (135 – Se Na) x 0.6 x Wt |
| Daily req Na = 2-3mmol/kg/day |

| 1pint = 500ml |
| 0.9% NS = 154 mmol / L |
| 1/2NS = 77mmol / L |
| 1/5 NS = 39mmol / L |

| Eg Na: 128 , BW 15 kg , 2yo |

| Deficit : (135 – 128) x 0.6 x 15 = 63mmol |

| Daily requirement = 3 x 15 = 45mmol |

| Total = 63+45 = 108 mmol |

| 1 pint ½ NS = 39 mmol Na |

| TF = 1150ml/ day ; 1150/24Hr = 48cc/hr (90mmol Na) |

Correction of K

| K deficit = (4- Se K) x 0.4 x Wt |
| Daily req K= 2-3mmol/kg/day |

| 1g KCL = 13.3mmol |
| 10ml Mist KCL = 1g K |
| 1g = 13.3mmol, 1 pint 500ml, 1 ml=0.02 |
| *no more than 0.05mmol/ml |

| Eg: Se K : 2.5 , weight 15 kg |

| Deficit: (4 - 2.5) x 0.4 x 15 = 9 mmol |

| Daily requirement = 2 x 15 = 30mmol |

| Total = 9 + 30mmol = 39 mmol |

| 39 mmol → g = 39/13.3 = 3g |
| therefore if |
| a) IVD = 1.5 g in each pint |
| check: no more than 0.05mmol/mL/min in each pint |
| (1.5g x 13.3mmol ) / 500ml = 0.03mmol/ml ( not more than 0.05) |
| b) Mist KCL = 3g x 10 = 30ml |

| Correction (fluid deficit) |

| % dehydration x BW in grams (= % x BW(kg) x 10) |
| Eg: 10% dehydration, BW 15kg |
| 5/100 x 15kg x 1000 = 5 x 15 x 10 = 750cc |
| Run over 12 / 24 / 48 hours |

Investigations

| Stool C&S, FEME and Rotavirus Antigen |
| Ddx lactose intolerance: stool reducing sugar (diarrhoea >14 days) |

4. Dengue Fever
New classification
1) Dengue with or without warning signs
2) Severe Dengue

<table>
<thead>
<tr>
<th>WARNING SIGNS</th>
<th>Probable Dengue</th>
<th>Severe DengueSx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water accm</td>
<td>Endemic area + Fever, and 2 of: Nausea/vomiting Rashes Muscular aches and pain Torniquet test + Any warning sx Lab: leucopenia / IgM</td>
<td>Severe plasma leakage (rising HCT) Fluid Accm (ascites/ pleural effusion) Respiratory Distress Severe bleeding Severe organ involvement Liver enzymes AST/ALT &gt;1000 CNS: impaired consciousness/seizures</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raised HCT/ decreased Plt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non stop vomiting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased Liver size &gt; 2cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal/mucosal bleed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General: lethargy, restlessness</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal Circulation</th>
<th>Compensated shock</th>
<th>Decompensated / Hypotensive shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear consciousness</td>
<td>Clear consciousness – shock can be missed if you do not touch the patient</td>
<td>Change of mental state – restless, combative or lethargy</td>
</tr>
<tr>
<td>Brisk capillary refill time (&lt;2 sec)</td>
<td>Prolonged capillary refill time (&gt;2 sec)</td>
<td>Mottled skin, very prolonged capillary refill time</td>
</tr>
<tr>
<td>Warm and pink extremities</td>
<td>Cool extremities</td>
<td>Cold, clammy extremities</td>
</tr>
<tr>
<td>Good volume peripheral pulses</td>
<td>Weak &amp; thready peripheral pulses</td>
<td>Feeble or absent peripheral pulses</td>
</tr>
<tr>
<td>Normal heart rate for age</td>
<td>Tachycardia</td>
<td>Severe tachycardia with bradycardia in late shock</td>
</tr>
<tr>
<td>Normal blood pressure for age</td>
<td>Normal systolic pressure with raised diastolic pressure Postural hypotension</td>
<td>Hypotension/unrecordable BP</td>
</tr>
<tr>
<td>Normal pulse pressure for age</td>
<td>Narrowing pulse pressure</td>
<td>Narrowed pulse pressure (&lt;20 mmHg)</td>
</tr>
<tr>
<td>Normal respiratory rate for age</td>
<td>Tachypnoea</td>
<td>Metabolic acidosis/ hyperpnoea/ Kussmaul’s breathing</td>
</tr>
<tr>
<td>Normal urine output</td>
<td>Reduced urine output</td>
<td>Oliguria or anuria</td>
</tr>
</tbody>
</table>

First encounter, determine:
1) Establish Dengue
2) Phase of illness
3) warning sx / severe dengue sx

Management goals
1) Replace plasma losses
2) Early recognition/tx of haemorrhage
3) Prevent fluid overload
Phases
1) Febrile T > 38
2) Critical (defervescent <38.5)
3) Recovery
History
1) Fever how many days? Last taken T PCM?
2) Alarm signs
3) Mental state
4) Urine output
5) relevant hx – fogging, recent travel, jungle trekking, swimming in waterfall, high risk behaviour etc

Physical
1) GCS
2) Hydration
3) Hemodynamics – skin, cold/warm limbs, CRT, pulse volume, BP, PR, pp
4) Respiration: tachy, pnoea, effusion
5) PA: abdominal tenderness? Ascites?Hepatomegaly
6) bleeding manifestations (tourniquet test)

Ix:
1) FBC – neutropenia, HCT rising, Plt decreasing
2) LFT – AST elevation > ALT (DHF)
3) Dengue serology Tests:
   a) Dengue IgM – taken ASAP when suspected, then repeat Day 7 (seroconversion)
   b) sero surveillance – taken for statistics purposes, before Day 5

Management
Hydration
5-7ml/kg/hr – 1-2hours
3-5ml/kg/hr – 2-4hours
2-3ml/kg/hr – adjust and taper
* according to clinical response and HCT

Compensated Shock
1) Obtain HCT level before fluid resus
  IVD 5-10ml/kg/hr x 1Hour
2) repeat: FBC/HCT/BUSE/LFT/RBS/CoAg/ Lactate/Bicarb / GXM
   - check HCT if no improvement repeat IVD 5-10ml/kg/hr (up to 2 cycles, if no improvement change to colloids)
* If HCT decrease, consider occult bleeding → Tx PC
* If persistent shock after x 3 cycles, consider other causes of shock = sepsis, cardiogenic shock
  * adjust fluids clinically, avoid overload = ascites/pleural effusion/APO

Decompensated shock
1) Obtain HCT level before fluid resus
2) IVD 10-20ml/kg/hr give over 15-30mins then repeat Ix: FBC/HCT/BUSE/LFT/RBS/CoAg/ Lactate/Bicarb / GXM
3) Check HCT if no improvement repeat 2nd bolus 10-20ml/kg/hr 30-60mins then repeat HCT,
   3rd Bolus 10-20ml/kg/hr over 1 hour (with colloids)
* if persistent shock after 3x fluid resus, other causes of shock must be considered→bleeding, sepsis, cardiogenic
* if after fluid resus HCT decrease, consider Tx with packed cell

Mx of bleeding
1) Gum bleeding → Tranexamic acid oral gargle TDS, monitor Hb
2) Occult bleed → when HCT drop without clinical improvement despite fluid resus, blood tx with PC is recommended

ICU care
Ind: persistent shock, respiratory support (mech ventilation), significant bleeding, encephalopathy/encephalitis

Discharge criteria (GO BACK LA)
1) General condition improves
2) Organ dysfn recovered
3) Bleeding episodes resolved
4) Afebrile >48hours
5) Clear lungs- pleural effusion/ascites
6) Kencing (good urine output)
7) Lab-Plt rising>50 000, Hct Stable
8) Appetite returns
Assess airway, breathing, obtain baseline hematocrit (HCT), insert urinary catheter.
Commence fluid resuscitation with Normal Saline or Ringer’s lactate at 5-10ml/kg over 1 hour for compensated shock.

If hemodynamics and HCT are stable, plan a gradually reducing IV fluid (IVF) regimen with serial monitoring of vitals, urine output and 6-8 hourly HCT
- IVF 5-7ml/kg/hr for 1-2 hours, then
- Reduce IVF to 3-5ml/kg/hr for 2-4 hours.
- Reduce IVF to 2-3ml/kg/hr for 2-4 hours.
- Continue to reduce if patient improves.
- Oral rehydration solutions may suffice when vomiting subsides and hemodynamic stable
- A monitoring fluid regimen may be required for 24-48 hours, until danger subsides.
- If oral intake tolerated, can reduce IVF more rapidly.

Stable hemodynamics, HCT and general well being

DISCHARGE
Neonatal Jaundice

**Etiology**
Liver immaturity / Hemolysis

- Bilirubin (present from breakdown of heme) >85 mcmol/L or 5 mg dL \[1 \text{mg/dL} = 17 \text{mcmol/L}\]
- Yellowish discolouration of skin, mucous membrane and sclera
- Normally direct <15%

**Pathophysiology**
1) Break down of HbF by increased biliverdin (+ heme) → accumulation of unconjugated bilirubin = clinical jaundice
2) Hemolysis → increased circulation of unconjugated bilirubin = jaundice

**Risk Factors**

<table>
<thead>
<tr>
<th>Maternal</th>
<th>Neonates</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABO/Rh incompatibility</td>
<td>Birth trauma, Cephalohematoma</td>
</tr>
<tr>
<td>Breast feeding volume/traditional medicine</td>
<td>Bruising (VAD, forceps)</td>
</tr>
<tr>
<td>Diazepam/oxytoxin</td>
<td>Excessive weight loss</td>
</tr>
<tr>
<td>Asian/native American</td>
<td>Infections</td>
</tr>
<tr>
<td>GDM</td>
<td>Decreased/infrequent feeding</td>
</tr>
<tr>
<td></td>
<td>Polycythemia</td>
</tr>
<tr>
<td></td>
<td>Prematurity</td>
</tr>
</tbody>
</table>

**Physiological (24-72H)**
- Marked physiological release of Hb (RBC life span decrease)
- Hepatic bilirubin metabolism less efficient

**Pathological (<24Hrs, 24-2weeks, >2weeks)**
1) Early onset (<24H)
- Unconjugated (Rh/ABO, G6PD, spherocytosis, pyruvate kinase deff, drugs)
- Congenital infection (TORCHES), sepsis
* Ix: TSB, G6PD, Mother and Baby ABO, Coombs Test, Retic Count, FBC
2) Late (24-2weeks)
- Physiological
- BF Jaundice
- Infection (UTI, septicaemia, meningitis)
- Hemolysis
* Crigler-Najiar Syndrome

Disorder of metabolism of bilirubin, autosomal recessive, consanguinity, TSB >345, no response to tx)

| Breast Feeding jaundice | Phototherapy as indicated, TSB stat, taper photo accordingly
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Caused by inadequate feeding leading to weight loss and increased enterobacterial circulation (deconjugation by B-glucuronidases in colon, hence unconjugated bilirubin is reabsorbed into circulation causing jaundice)</td>
<td>Encourage BFOD, try EBM and top up with supplemental formulated milk</td>
</tr>
<tr>
<td>- Weight loss &gt;10%</td>
<td></td>
</tr>
</tbody>
</table>

Breast Milk Jaundice (D4-7OL)
- Adequately breast feeding but certain enzymes/genetic problem, result in poor conjugation of bilirubin (exact mechanism still unknown)

<table>
<thead>
<tr>
<th>ABO/Rh incompatibility</th>
<th>Phototherapy as indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Usually early onset within 24 hours</td>
<td>Baby ABO, Coombs test, Retic Count, FBC, LFT, RP</td>
</tr>
<tr>
<td>- Mother BG O+ (anti A + anti B), Baby BG A or B</td>
<td></td>
</tr>
<tr>
<td>- Hemolysis result in increased bilirubin</td>
<td></td>
</tr>
</tbody>
</table>

Sepsis / Infection
- Poor feeding, lethargy, temperature instability, tachypnoeic
- Risk of maternal sepsis (PROM >24H, maternal pyrexia etc)

<table>
<thead>
<tr>
<th>Sepsis / Infection</th>
<th>Blood C&amp;S, FBC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Start antibiotics, strict I/O</td>
</tr>
</tbody>
</table>

Brusing / Cephalohematoma
- COH 4-hourly monitoring

<table>
<thead>
<tr>
<th>G6PD / Spherocytosis</th>
<th>G6PD observe 5/7, lifestyle advise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FBP</td>
</tr>
</tbody>
</table>

Hypothyroidism
- TFT

Polycythemia
- HCT > 65%, Hb > 20

Prolonged Jaundice
- >14 weeks
  - TFT, Urine C&S, UFEME, urine reducing sugar
  - FBP

Conjugated hyperbilirubinemia
- + TORCHES, IEM screening, HEP B/C
**Kramer’s rule**

The bilirubin range associated with each zone is:

<table>
<thead>
<tr>
<th>Zone</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBR (micromol/L)</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>&gt;250</td>
</tr>
</tbody>
</table>

**Phototherapy**
Conventional Phototherapy (single, double, triple)
Clinically jaundiced, start with single/double photo as indicated, take TSB and adjust accordingly
(refer to Photo level and ET Level)
When to stop Phototherapy: when TSB is 30mcmol below photolevel

**Intensive Phototherapy = 4 photo**
* cont rising TSB despite phototherapy suggests hemolysis (KIV Exchange Transfusion)
TSB monitoring: 1P: CM, 2P: 12Hrly, 3P: 6Hrly, 4P: 4Hrly

**Exchange Transfusion**
**Ind:**
When phototherapy fails (no decline in TSB (17-34mcmol/L) after 4-6H)
Sx of Acute bilirubin encephalopathy (hypertonus, retrocollis, opisthotonus, high pitch cry, fever)

- use RH isoimmunization / ABO compatible / Rh –ve Blood
- 2 x 80ml/kg/hr, use fresh whole blood (1 cycle 3-4mins: 1min In: 1min Out:1min rest; 90-120min – 30-35cycles)
- correct hydration / infection

**Pre ET:** Blood C&S, FBC, RP, LFT, Ca,mg, PO4, VBG, RBS, FBP, Retic count, Coombs test, ABO
Infectious Screening (HIV,Hep,VDRL), TORCHES

**Post ET:** Blood C&S, FBC, RP, LFT, Ca,mg, PO4, VBG, RBS

**6H post ET:** TSB,FBC,RP

**Kernicterus**
- Encephalopathy due to deposition of unconjugated bilirubin in basal ganglia and brainstem nuclei

**Sx:**
Acute: lethargy, poor feeding
Severe: irritable, high pitch cry, hypertonicity, opisthotonus, seizures, coma

Long term complications: learning difficulties, sensorineural deafness

Prolonged jaundice (jaundice for > 14 days in Term, > 21 days in Pre term)

<table>
<thead>
<tr>
<th>Unconjugated</th>
<th>Conjugated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septicaemia (UTI)</td>
<td>Biliary atresia, choledochal cyst,</td>
</tr>
<tr>
<td>Breast milk jaundice</td>
<td>Idiopathic neonatal Hepatitis</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>TORCHES infection</td>
</tr>
<tr>
<td>Hemolyss (G6PD, spherocytosis)</td>
<td>Metabolic diseases</td>
</tr>
<tr>
<td>Galactosemia</td>
<td>- Citrin deficiency, galactosemia, PFIC,</td>
</tr>
<tr>
<td>Gilbert’s syndrome</td>
<td>alpha-1-antitripsin deficiency</td>
</tr>
</tbody>
</table>
Neonatal Hypoglycemia

Defn: Glucose < 2.6 mmol/L after first 4 hours of life

Neonatal DXT 1.7mmol within 1-2 HOL is considered normal, then increase to more stable level >2.5mmol by 12 HOL

Sx
- Jitteriness and irritability
- Apnoea, cyanosis
- Hypotonia, poor feeding
- Convulsions
- * hypoglycaemia may be asymptomatic therefore monitor if risk present

High Risk:
- Infant of GDM mother
- Premature babies
- SGA and LGA (>4.0kg)
- Ill infants: sepsis, hypothermia, polycythemia, Rh dis, HIE

<table>
<thead>
<tr>
<th>DXT 1.5 – 2.5, asymptomatic</th>
<th>DXT &lt; 1.5 / Symptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Mx</td>
<td></td>
</tr>
<tr>
<td>1) Feeding: early BF / EBM / FSM</td>
<td></td>
</tr>
<tr>
<td>2) monitor DXT: 1H x 2, 2H x 2, then 4H if stable, DXT QID. Inform if DXT &lt; 2.6</td>
<td></td>
</tr>
<tr>
<td>If DXT remain &lt; 2.6 or baby refuse feed + start IVD 10%, can increase 2mg/kg/min till DXT stable &gt; 2.6 * Start feeding when DXT stable, reduce IVD</td>
<td></td>
</tr>
<tr>
<td>Persistent Hypoglycaemia Ddx</td>
<td></td>
</tr>
<tr>
<td>hyperinsulinemia adrenal insuff</td>
<td></td>
</tr>
<tr>
<td>Insulin, Cortisol, growth hormone level, Serum ketones, Urine for organic acids</td>
<td></td>
</tr>
<tr>
<td>PO Diazoxide 10 -25mg/kg/day (hyperinsulinemia reduces insulin secretion; Cl: SGA)</td>
<td></td>
</tr>
<tr>
<td>SC Octreotide 2-10mcg/kg/day BD/TDS (synthetic somatostatin)</td>
<td></td>
</tr>
</tbody>
</table>

Glucose req (mg/kg/min) = % Dextrose x Rate (ml/hr) / weight (kg) x 6

Rate = Glucose Req x Weight x 6 / % Dextrose
Management of Persistent Hypoglycaemia

Hypoglycaemia
Blood Glucose (BG) < 2.6 mmol/L

BG < 1.5 mmol/L or symptomatic
IV 10% Dextrose 2-3 ml/kg bolus
IV Dextrose 10% drip at 60 to 90 ml/kg/day

BG 1.5 – < 2.6 mmol/L and asymptomatic (0-4 hours of life)
Give supplement feeding ASAP
If refuses to feed, IV Dextrose 10% drip 60ml/kg/day

Repeat BG in 30 minutes

if still Hypoglycaemia:
Re-evaluate *
Increase Volume by 30ml/kg/day
Repeat BG in 30 minutes

if still Hypoglycaemia:
Re-evaluate *
Increase Concentration to D12.5%–D15%

* Give via a Central Line

If glucose delivery > 8 -10mg/kg/min and Persistent Hypoglycaemia:
• IV Glucagon 40 mcg/kg stat then 10-50mcg/kg/h. Not to be used in SGA or adrenal insufficiency.
• IV Hydrocortisone 2.5 - 5 mg/kg/dose bd in others, esp. SGA.
• PO Diazoxide 10 – 25 mg/kg/day in 3 divided doses Useful in hyperinsulinaemia, not to be used in SGA.
• SC Octreotide 2 – 10 mcg/kg/day 2 - 3 times/day or as infusion.

Consider further workup in Recurrent or Persistent Hypoglycaemia if:
• Failure to maintain normal BG despite Glucose infusion rate of 15mg/kg/min, or
• When stabilization is not achieved in 7 days of life.

Note: Once Blood Glucose level > 2.6mmol/L for 2 readings, monitor hourly x 2, then 2 hourly x 2, then 4 – 6 hourly.
The Premature Baby

Term: 37-42 weeks
Prem: < 37 weeks Gestation
Moderate Prem: 31/32 – 36 weeks
Severe prem: 24-30 weeks
LBW: < 2.5kg
VLBW: < 1.5kg
ELBW: < 1.0kg

Risk of prem
Pregnancy problem – multiple gestation, poly/oligohydramnios, placenta previa/abruptio, fetal abnormality
Risk Behaviour – smoking, substance abuse, poor nutrition
Early delivery – Rh Incompatibility, IUGR
Medical – Uterine/cervical abnormality, myoma, hypertension

Care of prem babies
1) Monitor temperature, Vital signs, DXT
2) I/O
3) Ventilation
4) IV line / Central Line
5) Feeding – trickle feeding, multivitamin, folic acid, FAC (6wks)
   - increase slowly, start 2.5cc/kg/feed, if tolerating x 2, increase slowly, maximum 200cc/kg/day
6) strict hand hygiene
7) antibx
8) aminophyline (<34wks)
9) Immunization – BCG (wt >1.8kg), Vit K (at birth)

Ix:
Routine bloods: FBC/LFT/RP/Ca/Mg/PO4
US Brain (< 32 weeks): 1st week (IVH) and 28days (PVL)
ROP @ 36weeks / 4-6weeks (if <1.5kg, < 32weeks, ventilated)

Hearing Assessment
Indications:
Fam hx of hearing loss
Ventilation > 5 days
Hyperbilirubinemia
Craniofacial abnormalities
Head Trauma
VLBW < 1.5kg
Ootoxic medication
Parental concern
In-Utero infections
Meningitis
Low Apgar Score
Early Complications (Hypo: thermia/glycemia/Ca/Na + Resp: RDS/apnea + CVS: PDA + CNS: IVH)

1) Hypothermia
   - large surface area, thin skin, less fat (less brown fat, more glycogen)
   mechanism of heat loss: radiation, conduction, convection, evaporation
   Mx: Incubator care

2) RDS (respiratory distress syndrome)
   - reduced surfactant (phospholipid protein)
   - 24-28wks, lungs mature at 35weeks
   - decreased surface tension, increases alveolar function
   Sx: Tachypnoea, labored breathing, recessions, nasal flaring, expiratory grunting, cyanosis
   CXR: ground glass appearance, larger airway outlined, no heart border, diffuse granular
   Mx:
   Prevention → IM Dexa, tocolytic agent, surfactant replacement
   Respiratory support → ETT ventilation, CPAP, SIMV (complications → pneumothorax), SEDATION
   Fluid & nutritional support
   Antibx

3) Hypoglycemia (RBS < 2.6mmol in first 4 hours)

4) Apnea of prematurity
   = pause of breathing > 20secs with brady or desaturation, HR drop 30bpm from baseline
   cause: Immaturity of respiratory centre, lack of pharyngeal muscle tone and collapsed upper airway
   - resolves at 36weeks
   Mx: Supportive O2, relieve obstruction (CPAP), aminophyline to inhibit adenosin receptor, mechanical ventilation

5) IVH (intraventricular hemorrhage)
   - fragile blood vessels in germinal matrix above caudate nucleus
   - occurs in < 32wks (within 5 days after birth)
   - Sx: pallor, shock, hypotonia, apnoea, seizure, hydrocephalus

6) Infection

7) PDA (patent ductus arteriosus)
   Sx: asymptomatic, brady/apnea, increased O2 requirement
   Systolic murmur at 2nd Left ICS
   Ix: CXR= cardiomegaly, pulmonary venous congestion

8) Hyponatremia — dehydration/transepidermal h2o loss, immature kidney

9) Hypocalcemia — Immature pancreas and reduced calcium from mother
Late Complications CNS – Eye- Resp – Bone – GIT – Blood - Sepsis

1) NEC (necrotising enterocolitis) - occurs within 1st week of life
   - immature gut → compromised gut circulation → bacterial invasion of ischemic bowel → serious intestinal injury

   **Sx:** Feeding intolerance, abdominal distension, hematochezia, vomit milkcurd / greenish bile, shiny skin abdomen, reduced BS
   **AXR:** distended loops of bowel, thick
   **Mx:** keep NBM, start paraenteral feeding (TPN/OGT), antibx

   **Complications:** bowel perforation, strictures, malabsorption

2) ROP (retinopathy of prematurity) retina working too early
   - Retina is formed but blood supply is limited → vascular proliferation to ischemic area → retina detachment
   **Sign:** white pupil (retinal detachment)
   **Tx:** laser therapy

   **ROP screening Indications:** < 1.5kg, < 32weeks, supplemental O2, hypoxemia, hypercarbia

3) BPD (bronchopulmonary dysplasia) / CLD
   - Lung damage from pressure and volume trauma (artificial ventilation/ O2 toxicity/ infection)
   **CXR:** widespread opacity and cystic changes
   **Mx:** prolonged artificial O2, Corticosteroids

4) PVL (Periventricular leucomalacia)
   - necrosis of white matter at dorsal and lateral
   **complications:** spastic displegia, coignitive and inelectual deficit, visual deficit, seizure disorder

5) Osteopenia of prem
   - rickets/chronic reduced Calcium
   **CXR:** Bone demineralization
   **Sx:** Poor wt gain, fracture, respiratory distress

6) GERD
7) Prolonged jaundice
8) Sepsis
9) Anemia : < 8 ( <12 if ventilated)]
   Hematinics, Folic Acid, appeton, FAC (ferrous amino citrate, after 42/7)

---

**Rickets**
- Slumped growth
- Large Forehead
- Odd curve to spine or back
- Odd shaped ribs & breast bones
- Large Abdomen
- Odd shaped legs
- Wide joints at elbow or wrist
- Wide Bones
- Wide ankles
### General Peds common problems guide

**Bronchial Asthma**

AEBA 2 to URTI/CAP/environmental factor underlying asthma – control? Intermittent / persistent

Determine severity and mx:

<table>
<thead>
<tr>
<th>Sx</th>
<th>mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altered Consciousness</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Physical Exhaustion</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Talks in</td>
<td>Sentences</td>
<td>Phrases</td>
<td>Words</td>
</tr>
<tr>
<td>Pulsusparadoxus</td>
<td>NO</td>
<td>+/-</td>
<td>PALPABLE</td>
</tr>
<tr>
<td>Central cyanosis</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>RONCHI</td>
<td>+</td>
<td>+</td>
<td>SILENT CHEST</td>
</tr>
<tr>
<td>Use acc. muscles</td>
<td>-</td>
<td>Moderate</td>
<td>MARKED</td>
</tr>
<tr>
<td>Initial PEF</td>
<td>&gt;60%</td>
<td>40-60%</td>
<td>&lt;40%</td>
</tr>
<tr>
<td>SpO2</td>
<td>&gt;93%</td>
<td>91-93%</td>
<td>&lt;90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>Discharge</th>
<th>May need admit</th>
<th>ADMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mx:</td>
<td>1) Neb Salb</td>
<td>1) Neb Combivent x 3 / cont</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 1 y/o: 0.3 : 3.5</td>
<td>2) O2 8L/min</td>
<td>3) Oral Prednisolone</td>
</tr>
<tr>
<td></td>
<td>&gt;1 y/o: 1:3</td>
<td>4) IV Hydrocort 4-5mg/kg QID 1/7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or MDI Salb in spacer</td>
<td>4) IV Salbutamol continous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-6 puffs (&lt;6yo)</td>
<td>Bolus: 5-10mcg/kg/10mins, then</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8-12 puffs (&gt;6yo)</td>
<td>Infusion: 0.5-1mcg/kg/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) Oral prednisolone</td>
<td>5mg in 50ml</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SyrPred 1mg/kg/day</td>
<td>1amp = 0.5mg (5mcg = x 10amp)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>for 3-5/7</td>
<td>0.6ml/kg = 1mcg/kg/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reasses after 60mins</td>
<td>max 20mcg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if no improvement</td>
<td>* S/C Bricanyl (terbutaline)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tx as moderate</td>
<td>0.005-0.01mg/kg (max 0.4mg) every</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reasses after 60mins</td>
<td>5-10mcg/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if no improvement,</td>
<td>15-20mins</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tx as severe</td>
<td>* IV MgSO4 50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bolus: 0.1ml/kg(50mg/kg) in 20mins</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*IV Aminophyline</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bolus: 0.5mg/kg bolus then</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infusion: 0.5-1.0mg/kg/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Mechanical ventilation and</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>observation in HDW/ICU</td>
<td></td>
</tr>
</tbody>
</table>

**Once stable, get full history:**

a) Medication - MDI compliance
b) Sick contact / travelling
c) Interval symptoms: need for reliever/nebs, EIA/CIA, Fam Hx asthma
d) Atopy, rhinitis, eczema
<table>
<thead>
<tr>
<th>Community Acquired Pneumonia</th>
<th>Lungs:</th>
<th>Mx:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C/o:</strong> chesty/productive cough + RN - sputum whitish/blood streak</td>
<td>coarse crepts?</td>
<td>1) Antibx IV C Pen 100 000U/kg QID 5-7 days</td>
</tr>
<tr>
<td><strong>Fever</strong> - chills/rigor? highest documented T?</td>
<td>air entry?</td>
<td>IV Azithromycin 15mg/kg (D1) / 5mg/kg (D2-5) → * cover for atypical</td>
</tr>
<tr>
<td><strong>Rapid breathing</strong> - Nebs given?</td>
<td>tachypnoe?</td>
<td>Syr Azithromycin 15mg/kg (D1) / 7.5mg/kg (D2-5)</td>
</tr>
<tr>
<td><strong>Less active/post tussive vomiting?</strong></td>
<td>+ recessions?</td>
<td>IV Azithro 15mg/kg D1, 5mg/kg D2-D5</td>
</tr>
<tr>
<td><strong>Sick contact?</strong></td>
<td>+ hyperventilated chest?</td>
<td>Syr EES 20mg/kg BD</td>
</tr>
<tr>
<td><strong>PTB contact?</strong></td>
<td>If start antibx</td>
<td>2) Oxygen (NP or Oxykid)</td>
</tr>
<tr>
<td><strong>Visit GP/KK?</strong></td>
<td>Blood C&amp;S</td>
<td>3) Nebs if indicated (tight chest, tachypnoe, rhonchi (broncospasm)</td>
</tr>
<tr>
<td><strong>Recent admission? Tx with antibx?</strong></td>
<td>Antimycoplasma IgM</td>
<td>4) +/- Syr bromhexine 0.3mg/kg</td>
</tr>
<tr>
<td><strong>(TRO nosocomial pneumonia)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chronic cough (TRO PTB)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lungs:</strong></td>
<td><strong>coarse crepts?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>FBC: WCC</strong></td>
<td><strong>air entry?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>CXR:</strong> patchy consolidation + perihilar haziness</td>
<td><strong>tachypnoe?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>If start antibx</strong></td>
<td><strong>+ recessions?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Blood C&amp;S</strong></td>
<td><strong>+ hyperventilated chest?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Antimycoplasma IgM</strong></td>
<td><strong>If start antibx</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Acute tonsilopharyngitis</strong></td>
<td>Throat injected?</td>
<td>1) start antibx if indicated</td>
</tr>
<tr>
<td><strong>c/o:</strong> Fever</td>
<td>tonsils enlarged?</td>
<td>IV C pen 25 000U/kg QID (throat dose)</td>
</tr>
<tr>
<td><strong>Fever</strong> - chills/rigor? highest documented T?</td>
<td>any exudates?</td>
<td>IV Cefuroxime 25mg/kg TDS (exudative)</td>
</tr>
<tr>
<td><strong>vomiting</strong></td>
<td><strong>Lungs:</strong> rhonchi?</td>
<td>2) IVD if dehydrated</td>
</tr>
<tr>
<td><strong>- food/blood/bile?</strong></td>
<td>+tachypnea, SCR/ICR, wheeze</td>
<td>3) Syr PCM 15mg/kg QID/PRN</td>
</tr>
<tr>
<td><strong>- a/w post tussive?</strong></td>
<td><strong>Ix:</strong> FBC: Wcc raised?</td>
<td>4) encourage orally</td>
</tr>
<tr>
<td><strong>Reduced oral intake</strong></td>
<td>Neu predominant</td>
<td>*Can treat at home with oral antibx</td>
</tr>
<tr>
<td><strong>- usual intake, current intake</strong></td>
<td><strong>RP:</strong> Urea &gt;4, Cr &gt;60</td>
<td>*Admit if poor oral intake, dehydrated</td>
</tr>
<tr>
<td><strong>Electrolytes imbalance</strong></td>
<td><strong>Admit:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Acute Bronchiolitis</strong></td>
<td>Lungs: rhonchi?</td>
<td>&lt;3mo, toxic looking, severe recessions, central cyanosis, wheeze, crepts, poor feeding, apnoea, Spo2 &lt;93%,</td>
</tr>
<tr>
<td><strong>- common in 1-6mo, etio- RSV</strong></td>
<td>+tachypnea, SCR/ICR, wheeze</td>
<td></td>
</tr>
<tr>
<td><strong>C/o:</strong> low grade fever + Coryza (nasal decongestion)</td>
<td><strong>Ix:</strong> FBC: Wcc raised?</td>
<td></td>
</tr>
<tr>
<td><strong>Cough + RN</strong></td>
<td><strong>CXR:</strong> (if severe RD) – hyperinflated, segmental/lobar consolidation</td>
<td></td>
</tr>
<tr>
<td><strong>Rapid breathing</strong></td>
<td><strong>Admit:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Febrile Fit</strong></td>
<td>?source of fever</td>
<td></td>
</tr>
<tr>
<td><strong>c/o:</strong> fitting</td>
<td>- tonsilopharyngitis</td>
<td>1) Syr Paracetamol 15mg/kg QID</td>
</tr>
<tr>
<td><strong>- first episode?</strong></td>
<td>- Otitis media</td>
<td>Supp Diazepam 0.5mg/kg</td>
</tr>
<tr>
<td><strong>- onset time and duration</strong></td>
<td>- AGE</td>
<td>2) Tepid Sponging</td>
</tr>
<tr>
<td><strong>- what was child doing</strong></td>
<td>- Meningitis (meningism)</td>
<td>3) antibx if indicated</td>
</tr>
<tr>
<td><strong>- nature: GTC/jerking limbs</strong></td>
<td><strong>Partial/complex</strong></td>
<td>4) Fit chart</td>
</tr>
<tr>
<td><strong>- uprolling eyeballs?</strong></td>
<td><strong>Ix:</strong></td>
<td>5) fit education</td>
</tr>
<tr>
<td><strong>- drooling of saliva</strong></td>
<td><strong>FBC/RP/electrolytes</strong></td>
<td>If 2nd onset, no need admission unless parents anxious, afebrile fit, complex seizure</td>
</tr>
<tr>
<td><strong>- post ictal drowsiness? Regain conscious?</strong></td>
<td><strong>Mx:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>fever</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>- how long? Given PCM?</strong></td>
<td></td>
<td>1) Syr Paracetamol 15mg/kg QID</td>
</tr>
<tr>
<td><strong>Fam Hx seizure? Sick contact?</strong></td>
<td></td>
<td>Supp Diazepam 0.5mg/kg</td>
</tr>
<tr>
<td><strong>Meningitis</strong></td>
<td>Photophobia</td>
<td>2) Tepid Sponging</td>
</tr>
<tr>
<td><strong>Seizure? Fever</strong></td>
<td>Neck stiffness</td>
<td>3) antibx if indicated</td>
</tr>
<tr>
<td><strong>Fam Hx seizure? Sick contact?</strong></td>
<td>raised ICP</td>
<td>4) Fit chart</td>
</tr>
<tr>
<td><strong>Meningitis</strong></td>
<td></td>
<td>5) fit education</td>
</tr>
<tr>
<td><strong>Seizure? Fever</strong></td>
<td></td>
<td>If 2nd onset, no need admission unless parents anxious, afebrile fit, complex seizure</td>
</tr>
<tr>
<td><strong>Fam Hx seizure? Sick contact?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Meningitis</strong></td>
<td>Photophobia</td>
<td>Keep NBM, IVD maintenance till conscious</td>
</tr>
<tr>
<td><strong>Seizure? Fever</strong></td>
<td>Neck stiffness</td>
<td>VS monitoring 4hrly</td>
</tr>
<tr>
<td><strong>Fam Hx seizure? Sick contact?</strong></td>
<td>raised ICP</td>
<td>COH monitoring</td>
</tr>
<tr>
<td>Neck/limb stiffness</td>
<td>Change in behaviour/ Irritability?</td>
<td>Poor feeding / Less Active</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>IX:</td>
<td>FBC/RP/LFT/e-</td>
<td>Blood C&amp;S</td>
</tr>
</tbody>
</table>

### Dengue Fever

**Fever day...?**

- Warning signs?:
  - vomiting, abd pain, bleeding gums etc

**Myalgia/arthritis?**

**Rashes → recovery phase**

**Recent travelling/jungle trekking/swim**

**Recent fogging in neighbourhood?**

**Ddx Leptospirosis / Viral fever**

**Hydration status?**

- pulse volume?

- Cold limbs? CRT

**Urine output**

**Temperature >38**

< 37.5 = defervescence

**IX: FBC / RP / LFT /**

**Dengue IgM**

* Plt and WCC reducing, HCT >20% off baseline

**Mx: rehydration**

5-7ml/kg/hr – 1-2 hours

3-5ml/kg/hr – 2-4 hours

2-3ml/kg/hr – adjust and taper

* according to clinical response and HCT

* FBC 4-hourly till stable

*refer to DF section for more in depth mx

### AGE

**c/o:**

**Diarrhoea**

- frequency/day

- mucous?blood?

**Vomiting**

- frequency/day

- food particles/blood/bile

**Reduced intake**

- usual feeding (Oz), current feeding

**Less active? Fever?**

**Outside food? Fam with similar sx?**

**General consciousness**

**Hydration**

**Sunken eyes/fontanel?**

**Tachycardia? (SHOCK)**

**Pulse volume**

**skin turgor**

**CRT prolonged?**

**cool peripheries? hypotension?**

**IX: VBG/RP/electrolytes**

**Stool FEME, C&S, rotaviral antigen**

**Determine degree of dehydration and treat per protocol * refer to chapter about AGE mx**

**Mx: rehydration**

- ORS per purge 10ml/kg

- repeat VBG/RP post correction

### Post infectious AGN

**c/o:**

**Edema (facial puffiness)**

**Hematuria**

**Hypertension**

- Headache, Blurry vision, vomiting

**UFEME-Hb+,Pro+**

**FBC/RP/Electrolytes**

**ASOT >200IU**

**Throat swab C&S**

**C3 low/C4 normal**

**Monitor BP**

**Strict I/O**

**Fluid restriction (control edema)**

**low salt diet**

**Antihypertensive**

- **Syr Nifedipine 0.25-0.5mg/kg or Syr Captopril 0.1-0.5mg/kg**

**Target of BP control:**

- Reduce BP to <90th percentile of BP for age, gender and height percentile .

- Total BP to be reduced = mean BP - Desired mean BP

- Reduce BP by 25% of target BP over 3 – 12 hours.

- The next 75% reduction is achieved over 48 hours

**Diuretics – Syr Frusemide 1mg/kg daily RP**
# Common Neonatal Problems

## Neonatal Jaundice

### Early onset (<24hours)
- ABO/Rh incompatibility
- G6PD deficiency
- spherocytosis
- sepsis

- **Ix:**
  - TSB,
  - Retic Count,
  - Coombs Test
  - FBC
  - ABO/Rh

- trace G6PD, TSH, Mother BG

### NNJ > 24hrs to 2 weeks
- exaggerated physiological
- inadequate feeding (wt loss?)
- dehydration (renal impairment)
- infection
- polycythemia
- traditional medication
- cephalohematoma

**Onset Day?**
- adequate breast feeding?
- PU/BO normal?
- sick contact?
- traditional medication (jamu?)
- h/o severe NNJ prev child?

- **Ix:**
  - TSB
  +/- FBC/RP

**ET Ix:**
Pre ET: Blood C&S , FBC, RP, LFT, Ca,mg, PO4, VBG, RBS, FBP, Retic count, Coombs test, ABO Infectious Screening (HIV,Hep,VDRL), TORCHES
Post ET: Blood C&S , FBC, RP, LFT, Ca,mg, PO4, VBG, RBS
6H post ET: TSB,FBC,RP

### Prolonged jaundice
- Term : > 14 days
- Preterm : > 21 days

**Ix:**
- FBP
- TFT
- Urine C&S, UFEME
- urine reducing sugar

### Conjugated hyperbilirubinemia
- Direct Bil > 15%
  - biliary atresia
  - congenital hepatitis
  - TORCHES infection
  - IEM

**Ix:**
+ TORCHES,
  - IEM screening,
  - HEP B/C

### Presumed Sepsis
- Maternal risk (PROM >18H, maternal pyrexia, HVS-GBS etc)
  - baby fever

**Ix:**
FBC/blood C&S

- if WCC > 25, Plt < 125 readmit for cont antbx

* Mother tx > 4hours= stat Dose only
  - IV C pen 100 000IU/kg BD
  - IV Gentamycin 5mg/kg OD

### Congenital Pneumonia TRO TTN
- signs of respiratory distress
  - tachypnoic, +SCR/ICR, + nasal flare grunting, hyperinflated chest,

**CXR:**
- fluid in fissure = TTN
- patchy / haziness = cong pneumonia

**Ix:**
FBC/blood C&S

**IV C pen 100 000IU/kg BD
  IV Gentamycin 5mg/kg OD 5/7
  NPO2 + Spo2 monitoring**

### GBS infection
- mother HVS : Grp B Streptococus

**Ix:**
FBC/blood C&S
Trace mother HVS

**IV C pen 100 000IU/kg BD
  IV Gentamycin 5mg/kg OD**

* Mother tx > 4hours= antibx 48Hours
* Mother not tx = antibx 5/7

### Hypoglycemia
- Within first 4 hours DXT ≤ 2.6 – 1.5
  - or symptomatic: jittery, less active, hypotonic

**Risk:**
- GDM mother, macrosomic baby

**Steps**
1: encourage feeding then rpt dxt
2: IV D10% bolus 2-3ml/kg
  + IV D10% maintenance
3: D 12.5-15% (via central line)
Examination of The Newborn (from head to toe)

- **General Observation**
  - Head circumference
  - Fontanel – normotenon or Depressed? Bulging?
  - Suture – overriding? Separated? Closed?
  - Exclude softening esp along suture (craniotabes)
  - Eye – cataract, coloboma, upslanting eye, epicanthic fold, hypertelorism, conjunctivitis
  - Nose – nasal flaring, choanal atresia?
  - Ear – abnormal shape, low set?
  - Mouth – cleft palate/lips, sucking, neonatal teeth/tears
  - Neck and jaw – micrognathia/retroglossia, neck masses/swelling, webbed neck
  - Clavicular fracture
  - Facial expression – symmetrical?

- **Head and Neck**
  - Shape – bell/hypersthenia
  - Pectus carinatum/pectus excavatum
  - Absence of pectoralis muscles (Poland syndrome)
  - Respiratory efforts – tachypnoea, grunting, recession, stridor
  - Nipple – Wide/narrow-spaced, accessory
  - Apex beat – position, thrills
  - Breath sound – basal creps, transmitted sound
  - Heart sound – murmurs? ESM/PSM/machine gun?
  - Abdomen – scaphoid, distended? Bowel sound?
  - Umbilicus – 2 or 1 v, umbilical flake, granularity
  - Wall defect – hernia, omphalocele, gastroschisis, exomphalos
  - Hepatomegaly, splenomegaly, ballotable kidney?

- **Chest and Abdomen**
  - Femoral pulses felt?
  - Hips stability – Ortolani’s and Barlow’s maneuvers
  - Ambiguous genitalia?
  - Vaginal opening? Clitoromegaly? Hypertrophied labia? Fused labia? Vaginal discharge?
  - Testes descended? Hydrocele? (transillumination test)
  - Cryptorchidism? Inguinal hernia? Hydrocele of (opening at dorsum of phallus)/epispadias (ventral of phallus)?
  - Perforated anus

- **Hip, Genital, Anus**
  - Digits: syndactyly, polydactyly, amniotic bands? Sandal toes?
  - Palms simian/single palmar crease
  - Feet: CTFE – positional/fixed
  - Brachial plexus injury – Erb’s palsy, Klumpke’s palsy
  - Pulses, perfusion
  - Sacral dimple (>2.5cm from anal verge, >5mm), bottom covered by skin?
  - Hypertrichosis, Meningocele, meningomyelocele
  - Spina bifida
  - Moro’s reflexes (complete?/asymmetrical?), sucking reflexes (good?/grasp reflex (present?))
  - Moving all limbs? Hypertonus, hypotonus?
**Erythema toxicum with septic spots**

Benign Skin lesion

- Common benign pigmentation
- Fades during the first few years of life
- Often confused with bruises of child abuse

**Mongolian spot**

- Includes clusters which contain trapped keratinised stratum corneum
- Commonly occur on the face and scalp

**Milia**

- Due to moisture in the nappy environment and from irritation of urine and stool
- May be superinfected with candida albicans

**Nappy rash**

- Also known as "necrotic skin"
- Due tovasomotor instability in immature infants
- May reflect underlying poor perfusion (clinically unwell - suspect other illness or sepsis)
- Common in Down syndrome patients

**Cutis marmorata**

- Also known as "eczema" in infancy
- Due to vasomotor instability in premature infants
- May reflect underlying poor perfusion (clinically unwell - suspect other illness or sepsis)
- Common in Down syndrome patients

---

**Neurofibromatosis**

- Present with seizures, learning disability, speech problem (ADHD)
- At least 5 spots that don't itch or hurt
- 2 types: type 1 (visual type 2 (auditory)

**Cafe-au-lait spot (coffee coloured)**

**Tuberous Sclerosis**

- Benign tubar in different part of body (Brain, Lung, Eye, Kidney, Heart Skin)
- Present with seizures, developmental delay, cognitive delay, mental retardation, kidney failure

**Hypopigmented patches**

**Sturge-Weber Syndrome**

- Unusual blood vessels growth in brain, glaucoma in 30% of patient or ipsilateral eye
- Affected eye can enlarge -> buphthalmos
- Can experience stroke
- US brain: look for AV malformation

**Port Wine Stain**

**Neurocutaneous Stigmata**

- **Ataxia telangiectasia**
  - The condition is difficult to diagnose
  - Can start when exposed to sunlight
  - May or may not have cancer problems (may not get skin infection)
  - Susceptible to develop lymphoma, leukemia
  - Neurovascular problem may affect vision, balance, and slurred speech

**Spider Nevi**

**Von Hippel Lindau Disease**

- Abnormal growth of vessels involving brain, retina, adrenal, kidney and pancreas
- May appear by 15-30 yrs old
- Diag thru MRI/CT, exam, blood test
- High risk of cancer in kidney
- Top depends on location
- May surgically remove if vascular
Dysmorphology Assessment

History Checklist

- Pregnancy hx - exposure to teratogen, amniotic fluid volume
- Results of US/amniocentesis/CVS
- Foetal movement
- Mother illness
- Delivery hx
- History of abnormalities
- Consanguinity

Overall Examination

- Birth weight, height, COH (a/c to centile)
- Skin: texture, colour, birthmark, redundancy, defect
- Hair: scalp/body hair >= colour, distribution, anti-post scalp hairline
- Skull - shape, symmetry, overriding/widely open suture, fontanelle size and numbers
- Face - overall impression (down?): Shape, symmetry, facial muscles movement

Dysmorphic Checklist

- Forehead - broad, bitemporal narrow/small
- Eye: palpebral fissure length (short/long), ptosis, epicanthic fold
- Eye spacing: Palpebral fissure shape, iris, colour, palpebral fissure, retina, globe position (prominence, deep set)
- Nose: root, bridge (depressed/broad/prominent), tip, nostrils (patency, position)
- Ear: position, lateral view (low set?), ear rotation, shape, structure
- Mouth - size, shape
- Lip - shape and thickness, cleft
- Oral - gum thickness, palate shape (high arched, cleft)
- Cavity - neonatal teeth, pearl, frenulum, tongue site
- Jaw position - pro / retro /micrognathia
- Hand & feet - overall shape, size, number of digits
- Webbing between digit
- Plantar, palmar, digit crease
- Nail morphology
- CTEV (positional/lived)
- Joint & skeleton - contracture, shortening of limb, range of movement
- Pectus carinatum, excavatum, shape of thoracic cage
- Spine length, straight/curved
- Neck length, webbing
- Genitalia - phallic size, scrotum, testes, labia, opening of vagina
- Anus - position of anus relative to genitalia, patency
- Sacral pit - floor covered by skin, hair in dimple, a/w other problem, how close to anal verge
Basic ventilator Settings
By Dr Goh Kiam Seong

Assist-control ventilation (Maquet ventilator/ IPPV – Drager ventilator)

Flow = \frac{Volume}{Time}

- Regardless ventilator/patient initiates breath, every breath the same (operator set tidal volume and minimal ventilator rate)
- Ventilator just functions to compensate patient’s effort
  - Time cycled ventilator
    - Tidal volume and Resp rate set + Time set
    - Maquet (Siemen)/ Drager ventilator
  - Volume cycled ventilator
    - Tidal volume and Resp rate set + Flow set
    - Puritan-Vennett Bear ventilator

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative simple to set</td>
<td>No synchrony between patient-ventilator, ventilator initiate come on top</td>
</tr>
<tr>
<td>Guarantee minimum ventilation</td>
<td>Patient may lead ventilator</td>
</tr>
<tr>
<td></td>
<td>Inappropriate trigger = hiccough</td>
</tr>
<tr>
<td></td>
<td>Fall in lung compliance =&gt; risk of barotrauma</td>
</tr>
<tr>
<td></td>
<td>Require sedation to achieve synchrony</td>
</tr>
</tbody>
</table>

Pressure control ventilation

- Time cycled assisted control ventilation in which inspiratory pressure is set instead of tidal volume
- High initial flow => fall to zero by end of inspiration
- Inspiratory pause is effectively built into the breath
- Tidal volume not set if inspiratory time short then tidal volume lower

Synchronized Intermittent Mandatory Ventilation (SIMV)

- Patient receives a set number of mandatory breaths, synchronized with any attempts by the patient to breath
- Patient can take additional breath between mandatory breaths (pressure supported)
- For improve patient-ventilator synchrony

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better patient-ventilator synchrony</td>
<td>Complicated</td>
</tr>
<tr>
<td>Guarantee minimum minute ventilation</td>
<td></td>
</tr>
</tbody>
</table>
Continuous Positive Airway Pressure (CPAP)

- **Constant pressure** both inspiratory and expiratory phase - splint open alveoli, therefore to decrease shunting
- Inspiration initiate from baseline pressure and airway pressure decrease to baseline at the end of respiration
- Patient controls rate and tidal volume himself (totally dependent on patient’s inspiration effort)
- Allow spontaneous breathing at an elevated baseline pressure

Non-invasive PPV – without invasive artificial airway (Endotracheal tube/ETT)

- Due to face mask seal not perfect, usually use with ventilator (BiPAP) to provide some degree of compensation for leaks around the mask
- Require patient to be alert, cooperate, able to protect his airway, haemodynamically stable
- Low level of support initially then gradually increase to improve patient tolerance
- BiPAP = pressure support + PEEP
  - Inspiratory pressure = 8-10 cmH$_2$O
  - Expiratory pressure = 4-6 cmH$_2$O
- Effective for patient with chronic obstructive airway diseases/ cardiogenic pulmonary oedema
- Less effective for pneumonia/ARDS
**Formulae and calculations**

<table>
<thead>
<tr>
<th>Correction of Na</th>
<th>Eg Na: 128, BW 15 kg, 2yo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na deficit</td>
<td>Deficit: (135 – 128) x 0.6 x 15 = 63 mmol</td>
</tr>
<tr>
<td>Daily req Na = 2-3 mmol/kg/day</td>
<td>Daily requirement = 3 x 15 = 45 mmol</td>
</tr>
<tr>
<td>1 pint = 500 ml</td>
<td>Total = 63 + 45 = 108 mmol</td>
</tr>
<tr>
<td>0.9% NS = 154 mmol/L</td>
<td>1 pint ½ NS = 39 mmol Na</td>
</tr>
<tr>
<td>1/2NS = 77 mmol/L</td>
<td>TF = 1150 ml/day; 1150/24 Hr = 48 cc/hr (90 mmol Na)</td>
</tr>
<tr>
<td>1/5 NS = 39 mmol/L</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correction of K</th>
<th>Eg: Se K: 2.5, weight 15 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>K deficit = (4 - Se K) x 0.4 x Wt</td>
<td>Deficit: (4 - 2.5) x 0.4 x 15 = 9 mmol</td>
</tr>
<tr>
<td>Daily req K = 2-3 mmol/kg/day</td>
<td>Daily requirement = 2 x 15 = 30 mmol</td>
</tr>
<tr>
<td>1 g KCL = 13.3 mmol</td>
<td>Total = 9 + 30 mmol = 39 mmol</td>
</tr>
<tr>
<td>10 ml Mist KCL = 1 g K</td>
<td>39 mmol → g = 39/13.3 = 3 g</td>
</tr>
<tr>
<td>1 g = 13.3 mmol, 1 pint 500 ml, 1 ml = 0.02</td>
<td>therefore if</td>
</tr>
<tr>
<td>*no more than 0.05 mmol/ml</td>
<td>a) IVD = 1.5 g in each pint</td>
</tr>
<tr>
<td><strong>Hyperkalaemia</strong></td>
<td>check: no more than 0.05 mmol/mL/min in each pint</td>
</tr>
<tr>
<td>• Definition: serum K⁺ &gt; 6.0 mmol/l (neonates) and &gt; 5.5 mmol/l (children).</td>
<td>(1.5 g x 13.3 mmol) / 500 ml = 0.03 mmol/mL/min (not more than 0.05)</td>
</tr>
<tr>
<td></td>
<td>b) Mist KCL = 3 g x 10 = 30 ml</td>
</tr>
</tbody>
</table>

**Correction (fluid deficit)**

% dehydration x BW in grams (= % x BW(kg) x 10)

- Eg: 10% dehydration, BW 15 kg
- 5/100 x 15 kg x 1000 = 5 x 15 x 10 = 750 cc
- Run over 12/24/48 hours depending on clinical condition

**Metabolic acidosis**

- Treat if pH < 7.2 or symptomatic or contributing to hyperkalaemia
- **Bicarbonate deficit = 0.3 x body weight (kg) x base excess (BE)**
- IV 8.4% NaHCO₃ = 1/3 base deficit x Wt

### ETT Size

<table>
<thead>
<tr>
<th>Size</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;3kg</td>
<td>3.5-4mm</td>
</tr>
<tr>
<td>2-3kg</td>
<td>3.5mm</td>
</tr>
<tr>
<td>1-2kg</td>
<td>3mm</td>
</tr>
<tr>
<td>&lt;1kg</td>
<td>2.5mm</td>
</tr>
</tbody>
</table>

**ETT length = 6 + Wt**

<table>
<thead>
<tr>
<th>Size</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2kg</td>
<td>5</td>
</tr>
<tr>
<td>2-3.5kg</td>
<td>8</td>
</tr>
<tr>
<td>&gt;3.5kg</td>
<td>10</td>
</tr>
</tbody>
</table>

**UVC Size**

<table>
<thead>
<tr>
<th>Size</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>UVC length = (Wt x 3) + 9</td>
<td></td>
</tr>
<tr>
<td>UAC length = ½ UVC length</td>
<td></td>
</tr>
</tbody>
</table>

### AA ratio:

\[
\frac{\text{PaO}_2}{713 \text{ (FiO}_2 - \text{PaCO}_2)} < 0.22 \rightarrow \text{indication for surfactant}
\]

**Peak flow = (Ht x 4) – 400**

<table>
<thead>
<tr>
<th>TFT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
</tr>
<tr>
<td>CORD</td>
</tr>
<tr>
<td>Day 1-3</td>
</tr>
<tr>
<td>&lt; 4/52</td>
</tr>
<tr>
<td>&gt; 4/52</td>
</tr>
</tbody>
</table>
Neonatology

Feeding

<table>
<thead>
<tr>
<th>Day</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>60cc/kg/day</td>
<td>D10%</td>
</tr>
<tr>
<td>Day 2</td>
<td>90cc/kg/day</td>
<td>1/5 NS D10%</td>
</tr>
<tr>
<td>Day 3</td>
<td>120cc/kg/day</td>
<td>1/5 NS D10%</td>
</tr>
<tr>
<td>Day 4-31</td>
<td>150cc/kg/day</td>
<td>1/5 NS D10%</td>
</tr>
<tr>
<td>1 mo – 6mo</td>
<td>150cc/kg/day</td>
<td>1/5 NS D5%</td>
</tr>
<tr>
<td>6mo – 1 year</td>
<td>120cc/kg/day</td>
<td>1/2 NS D5%</td>
</tr>
</tbody>
</table>

> 1 yo : Holliday segar formula (1/2 NSD5%)

<table>
<thead>
<tr>
<th>kg</th>
<th>Amount</th>
<th>Per kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st 10kg</td>
<td>100ml/kg</td>
<td>(10kg = 1000ml)</td>
</tr>
<tr>
<td>2nd 10kg</td>
<td>50ml/kg</td>
<td>(20kg = 1500ml)</td>
</tr>
<tr>
<td>&gt; 20kg</td>
<td>20ml/kg</td>
<td></td>
</tr>
</tbody>
</table>

Energy Expenditure

<table>
<thead>
<tr>
<th>Stage</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term</td>
<td>= 110kcal/kg/day</td>
</tr>
<tr>
<td>Prem</td>
<td>= 120-140kcal/kg/day</td>
</tr>
</tbody>
</table>

Prem Babies

Max TF : 180cc/kg/day,
start feeding with 1-2ml/kg/day + IVD, if tolerating x 3 to increase slowly
* weight gain 10-25g/kg/day (too much feeding can cause overload sx, monitor weight gain daily)
* increase feeding 20-30cc/day

Method: < 34 weeks → OG tube / > 34 weeks → Syringe/cup

Calculation of total feeding

Eg: Term Baby, Weight 3kg, day 1 of life
Day 1 TF = 60cc/kg/day = 60 x 3kg = 180cc

Per feed (3 hourly) = 180cc/8 = 22.5cc/3hourly

Calculation of total kcal

<table>
<thead>
<tr>
<th>Type of Feeding</th>
<th>kcal</th>
<th>Per 1 ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>100ml Prem</td>
<td>80 kcal</td>
<td>0.80 kcal</td>
</tr>
<tr>
<td>100ml EBM</td>
<td>67 kcal</td>
<td>0.67 kcal</td>
</tr>
<tr>
<td>50ml HMF</td>
<td>4 kcal</td>
<td>0.08 kcal</td>
</tr>
<tr>
<td>100ml FSM</td>
<td>67 kcal</td>
<td>0.67 kcal</td>
</tr>
<tr>
<td>Carborie 1 scoop</td>
<td>8 kcal</td>
<td>8 kcal/scoop</td>
</tr>
<tr>
<td>1ml MCT oil</td>
<td>8 kcal</td>
<td>8 kcal</td>
</tr>
</tbody>
</table>

Eg:
Prem baby, Weight 1.8kg

Current regime : 30cc/3hourly + 1 scoop Carborie + 0.5 ml MCT oil

Prem requirement : 120-140cc/kg/day
120 to 140kcal x 1.8kg = 216 -252 kcal/day

Total kcal = 8 [(30cc x 0.67 kcal EBM ) + 8kcal 1scp Carborie + 4kcal MCT oil 0.5ml ] = 256 kcal
(8 times = 3 hourly feeding over 24hours)

Total kcal/kg/wt = 256/1.8 = 142 kcal/wt ( requirement = 120-140kcal/bw)

TF = 30 x 8 / 1.8 = 133cc/kg/day (max TF 180cc/kg/day for prem)
### Photolevel and Exchange Transfusion Level

<table>
<thead>
<tr>
<th>Hours</th>
<th>PTL</th>
<th>ETL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>52</td>
<td>150</td>
</tr>
<tr>
<td>10</td>
<td>75</td>
<td>165</td>
</tr>
<tr>
<td>15</td>
<td>90</td>
<td>195</td>
</tr>
<tr>
<td>20</td>
<td>112</td>
<td>210</td>
</tr>
<tr>
<td>24</td>
<td>135</td>
<td>225</td>
</tr>
<tr>
<td>29</td>
<td>150</td>
<td>255</td>
</tr>
<tr>
<td>34</td>
<td>165</td>
<td>270</td>
</tr>
<tr>
<td>39</td>
<td>180</td>
<td>285</td>
</tr>
<tr>
<td>44</td>
<td>195</td>
<td>300</td>
</tr>
<tr>
<td>48</td>
<td>210</td>
<td>315</td>
</tr>
<tr>
<td>53</td>
<td>225</td>
<td>330</td>
</tr>
<tr>
<td>58</td>
<td>240</td>
<td>337</td>
</tr>
<tr>
<td>63</td>
<td>255</td>
<td>345</td>
</tr>
<tr>
<td>68</td>
<td>270</td>
<td>345</td>
</tr>
<tr>
<td>72</td>
<td>285</td>
<td>345</td>
</tr>
</tbody>
</table>

### Neonatal Jaundice

**Early onset (<24 hours)**
- ABO/Rh incompatibility
- G6PD deficiency
- Spherocytosis
- Sepsis

**NNJ > 24hrs to 2 weeks**
- Exaggerated physiological
- Inadequate feeding (wt loss?)
- Dehydration (renal impairment)
- Infection
- Polycythemia
- Traditional medication
- Cephalohematoma

**Onset Day?**
- Adequate breast feeding?
- PUBO normal?
- Sick contact?
- Traditional medication (jamu?)
- H/o severe NNJ prev child?

**Prolonged jaundice**
- Term: > 14 days
- Preterm: > 21 days

**Conjugated hyperbilirubinemia**
- Direct Bil > 15%
  - Biliary atresia
  - Congenital hepatitis
  - TORCHES infection
  - IEM

### Exchange Transfusion Levels

<table>
<thead>
<tr>
<th>Hours</th>
<th>PTL</th>
<th>ETL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;2500g</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2500-2000g</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1500-2000g</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>&lt;1500g</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Ix:**
- TSB
- Retic Count
- Coombs Test
- FBC
- ABO/Rh

**- Trace G6PD, TSH, Mother BG**

**ET Ix:**
- Pre ET: Blood C&S, FBC, RP, LFT, Ca, mg, PO4, VBG, RBS, FBP, Retic count, Coombs test, ABO
- Infectious Screening (HIV, Hep, VDRL), TORCHES

**Post ET:**
- Blood C&S, FBC, RP, LFT, Ca, mg, PO4, VBG, RBS

**6H post ET:**
- TSB, FBC, RP

### Bilirubin Range

<table>
<thead>
<tr>
<th>Zone</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBR (µmol/L)</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>&gt;250</td>
</tr>
</tbody>
</table>
EVALUATION OF A CHILD’S LEVEL OF PHYSICAL DEVELOPMENT

Note: Although on these guides physical and mental skills are separated, the two are often closely interrelated. These charts show roughly the average age that a normal child develops different skills. But there is great variation within what is normal.

<table>
<thead>
<tr>
<th>PHYSICAL DEVELOPMENT</th>
<th>Average age skills begin</th>
<th>3 months</th>
<th>6 months</th>
<th>9 months</th>
<th>1 year</th>
<th>2 years</th>
<th>3 years</th>
<th>5 years</th>
<th>What to do if a child is behind</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head and trunk control</td>
<td>lifts head part way up</td>
<td>holds head up briefly</td>
<td>holds head up high and well</td>
<td>holds up head and shifts weight</td>
<td>turns head and shifts weight</td>
<td>holds head up well when lifted</td>
<td>moves and holds head easily in all directions</td>
<td>moves and holds head easily in all directions</td>
<td>Activities to improve head and trunk control (see p. 302). Activities to develop rolling and twisting (see p. 304). Work on sitting, Special seating if needed (p. 308).</td>
</tr>
<tr>
<td>Rolling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Activites to improve balance (see p. 306). Eye-hand activities. Use toys and games to develop hand and finger control (see p. 305). Have eyes checked (see p. 452). If poor, see Chapter 30.</td>
</tr>
<tr>
<td>Sitting</td>
<td>sit only with full support</td>
<td>sits with hand support</td>
<td>sits with hand support</td>
<td>sits well with support</td>
<td>sits well with support</td>
<td>sits well with support</td>
<td>sits well with support</td>
<td>sits well with support</td>
<td>Activities to improve balance (see p. 306). Eye-hand activities. Use toys and games to develop hand and finger control (see p. 305). Have eyes checked (see p. 452). If poor, see Chapter 30.</td>
</tr>
<tr>
<td>Crawling and walking</td>
<td>grips finger put into hand</td>
<td>begins to creep</td>
<td>begins to reach towards objects</td>
<td>reaches and grasps with whole hand</td>
<td>passes object from one hand to other</td>
<td>looks at small things/pictures</td>
<td>plays with small objects</td>
<td>takes steps</td>
<td>Activities to improve balance (see p. 306). Eye-hand activities. Use toys and games to develop hand and finger control (see p. 305). Have eyes checked (see p. 452). If poor, see Chapter 30.</td>
</tr>
<tr>
<td>Arm and hand control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Activities to improve balance (see p. 306). Eye-hand activities. Use toys and games to develop hand and finger control (see p. 305). Have eyes checked (see p. 452). If poor, see Chapter 30.</td>
</tr>
<tr>
<td>Seeing</td>
<td>follows close object with eyes</td>
<td>enjoys bright colors/shapes</td>
<td>recognizes different faces</td>
<td>eyes focus on far object</td>
<td>enjoys rhythmic music</td>
<td>understands simple words</td>
<td>hears clearly and understands most simple language</td>
<td>hears clearly and understands most simple language</td>
<td>Activities to improve balance (see p. 306). Eye-hand activities. Use toys and games to develop hand and finger control (see p. 305). Have eyes checked (see p. 452). If poor, see Chapter 30.</td>
</tr>
<tr>
<td>Hearing</td>
<td>moves or cries at a loud noise</td>
<td>turns head to sounds</td>
<td>responds to mother’s voice</td>
<td>enjoys rhythmic music</td>
<td>understands simple words</td>
<td>hears clearly and understands most simple language</td>
<td>hears clearly and understands most simple language</td>
<td>hears clearly and understands most simple language</td>
<td>Activities to improve balance (see p. 306). Eye-hand activities. Use toys and games to develop hand and finger control (see p. 305). Have eyes checked (see p. 452). If poor, see Chapter 30.</td>
</tr>
</tbody>
</table>
## EVALUATION OF A CHILD'S LEVEL OF MENTAL AND SOCIAL DEVELOPMENT

<table>
<thead>
<tr>
<th>MENTAL DEVELOPMENT</th>
<th>Average age skills begin</th>
<th>3 months</th>
<th>6 months</th>
<th>9 months</th>
<th>1 year</th>
<th>2 years</th>
<th>3 years</th>
<th>5 years</th>
<th>What to do if a child is behind</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication and language</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cries when wet or hungry</td>
<td>coos when comfortable</td>
<td>makes simple sounds</td>
<td>uses certain sounds for different things</td>
<td>begins to use simple single words</td>
<td>begins to use words together</td>
<td>likes to be praised after completing simple tasks</td>
<td>interacts with both adults and children</td>
<td>uses simple sentences</td>
<td></td>
</tr>
<tr>
<td>Social Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>smiles when smiled at</td>
<td>smiles when smiled at</td>
<td>brief interest in toys and sounds</td>
<td>develops strong attachments to caretakers</td>
<td>takes longer interest in toys and activities</td>
<td>sorts different objects</td>
<td>builds playthings with several pieces</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sucks breast</td>
<td>takes everything to mouth</td>
<td>chews solid food</td>
<td>begins to feed self</td>
<td>drinks from glass</td>
<td>takes off simple clothes</td>
<td>toilet trained</td>
<td>helps with simple work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention and interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Guidelines for Evaluation:***

1. **Put a circle around the level of development that the child is now at in each area.**
2. **Put a square around the skill to the right of the one you circled, and focus training on that skill.**
3. **If the child has reached an age and has not mastered the corresponding level of skill, special training may be needed.**

---

*Note: This is an example of a chart used for assessing a child's level of mental and social development. The chart includes various milestones and recommendations for educators and caregivers.*
ENT findings:

**OTOSCOPY**

- Normal Ear (no fluid)
- Some Fluid (air-fluid levels)
- Effusion (full of fluid)
- Ear Canal Swollen Shut
- Earwax and Wet Debris

**TONSILS**

<table>
<thead>
<tr>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Grade 1" /></td>
<td><img src="image2.png" alt="Grade 2" /></td>
<td><img src="image3.png" alt="Grade 3" /></td>
<td><img src="image4.png" alt="Grade 4" /></td>
</tr>
</tbody>
</table>

- 0: Surgically removed tonsils
- 1: Tonsils hidden within tonsil pillars
- 2: Tonsils extending to the pillars
- 3: Tonsils are beyond the pillars
- 4: Tonsils extend to midline
### NEUROMUSCULAR MATURITY

<table>
<thead>
<tr>
<th>SIGN</th>
<th>SCORE</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>SIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posture</td>
<td></td>
<td><img src="image_url" alt="Posture Image" /></td>
<td><img src="image_url" alt="Posture Image" /></td>
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<td><img src="image_url" alt="Posture Image" /></td>
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<td><img src="image_url" alt="Posture Image" /></td>
<td><img src="image_url" alt="Posture Image" /></td>
<td></td>
</tr>
<tr>
<td>Square Window</td>
<td></td>
<td><img src="image_url" alt="Square Window Image" /></td>
<td><img src="image_url" alt="Square Window Image" /></td>
<td><img src="image_url" alt="Square Window Image" /></td>
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<td><img src="image_url" alt="Square Window Image" /></td>
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</tr>
<tr>
<td>Arm Recoil</td>
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<td><img src="image_url" alt="Arm Recoil Image" /></td>
<td><img src="image_url" alt="Arm Recoil Image" /></td>
<td><img src="image_url" alt="Arm Recoil Image" /></td>
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<td><img src="image_url" alt="Arm Recoil Image" /></td>
<td></td>
</tr>
<tr>
<td>Popliteal Angle</td>
<td></td>
<td><img src="image_url" alt="Popliteal Angle Image" /></td>
<td><img src="image_url" alt="Popliteal Angle Image" /></td>
<td><img src="image_url" alt="Popliteal Angle Image" /></td>
<td><img src="image_url" alt="Popliteal Angle Image" /></td>
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</tr>
<tr>
<td>Scarf Sign</td>
<td></td>
<td><img src="image_url" alt="Scarf Sign Image" /></td>
<td><img src="image_url" alt="Scarf Sign Image" /></td>
<td><img src="image_url" alt="Scarf Sign Image" /></td>
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<td><img src="image_url" alt="Scarf Sign Image" /></td>
<td><img src="image_url" alt="Scarf Sign Image" /></td>
<td><img src="image_url" alt="Scarf Sign Image" /></td>
<td></td>
</tr>
<tr>
<td>Heel To Ear</td>
<td></td>
<td><img src="image_url" alt="Heel To Ear Image" /></td>
<td><img src="image_url" alt="Heel To Ear Image" /></td>
<td><img src="image_url" alt="Heel To Ear Image" /></td>
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<td><img src="image_url" alt="Heel To Ear Image" /></td>
<td><img src="image_url" alt="Heel To Ear Image" /></td>
<td></td>
</tr>
</tbody>
</table>

### TOTAL NEUROMUSCULAR SCORE

| MATURITY RATING |
|-----------------|---|---|
| TOTAL SCORE | WEEKS | 25 | 34 |
| -10 | 20 | 30 | 36 |
| -5 | 22 | 35 | 38 |
| 0 | 24 | 40 | 40 |
| 5 | 26 | 45 | 42 |
| 10 | 28 | 50 | 44 |
| 15 | 30 | | |
| 20 | 32 | | |
Respiratory Distress
+Cyanosis
+Nasal Flaring
+Grunting
+Hyperventilated Chest
+Recessions SCR/ICR/Suprasternal/Tracheal Tug

+Tachypnoea
< 1 week up to 2 months: 60 or more
2 to 12 months: 50 or more
12 months to 5 years: 40 or more
### Asthma Acute Mx

<table>
<thead>
<tr>
<th>Sx</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altered Consciousness</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Physical Exhaustion</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Talks in</td>
<td>Sentences</td>
<td>Phrases</td>
<td>Words</td>
</tr>
<tr>
<td>Pulsusparadoxus</td>
<td>NO</td>
<td>+/-</td>
<td>PALPABLE</td>
</tr>
<tr>
<td>Central cyanosis</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

### Outcome

<table>
<thead>
<tr>
<th>Mx</th>
<th>Discharge</th>
<th>May need admit</th>
<th>ADMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Neb Salb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;1yo: 1:3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1yo: 0.5 : 3.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDI Salb in spacer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-6 puffs (&lt;6yo)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-12 puffs (&gt;6yo)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Oral prednisolone</td>
<td></td>
<td>Reasses after 60mins</td>
<td>Reasses after 60mins</td>
</tr>
<tr>
<td>SyrPred 1mg/kg/day</td>
<td></td>
<td>if no improvement</td>
<td>if no improvement</td>
</tr>
<tr>
<td>for 3-5/7</td>
<td></td>
<td>Tx as moderate</td>
<td>Tx as severe</td>
</tr>
<tr>
<td>3) Oral Prednisolone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Neb Combivent x 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) O2 8L/min</td>
<td>1) Neb Combivent x 3 / cont</td>
<td>1) Neb Combivent x 3 / cont</td>
<td></td>
</tr>
<tr>
<td>3) IV Hydrocort 5mg/kg QID 1/7</td>
<td>2) O2 8L/min</td>
<td>2) O2 8L/min</td>
<td></td>
</tr>
<tr>
<td>4) IVI Salbutamol continuous</td>
<td>3) IV Hydrocort 5mg/kg QID 1/7</td>
<td>3) IV Hydrocort 5mg/kg QID 1/7</td>
<td></td>
</tr>
<tr>
<td>Bolus: 5-10mcg/kg/10mins, then</td>
<td>4) IVI Salbutamol continuous</td>
<td>4) IVI Salbutamol continuous</td>
<td></td>
</tr>
<tr>
<td>Infusion: 0.5-1mcg/kg/min</td>
<td>5) in 50ml</td>
<td>5) in 50ml</td>
<td></td>
</tr>
<tr>
<td>5mg in 50ml</td>
<td>1amp = 0.5mg (5mcg = x 10amp)</td>
<td>1amp = 0.5mg (5mcg = x 10amp)</td>
<td></td>
</tr>
<tr>
<td>0.6ml/kg = 1mcg/kg/hr</td>
<td>max 20mcg</td>
<td>max 20mcg</td>
<td></td>
</tr>
<tr>
<td>* S/C Bricanyl (terbutaline)</td>
<td>0.005-0.01mg/kg (max 0.4mg) every</td>
<td>0.005-0.01mg/kg (max 0.4mg) every</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5-10mcg/kg</td>
<td>5-10mcg/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15-20mins</td>
<td>15-20mins</td>
<td></td>
</tr>
<tr>
<td>* IV MgSO4 50%</td>
<td>0.1mg/kg(50mg/kg) in 20mins</td>
<td>0.1mg/kg(50mg/kg) in 20mins</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1mg/kg(50mg/kg) in 20mins</td>
<td>0.1mg/kg(50mg/kg) in 20mins</td>
<td></td>
</tr>
<tr>
<td>*IV Aminophyline</td>
<td>Bolus: 0.1mg/kg bolus then</td>
<td>Bolus: 0.1mg/kg bolus then</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infusion: 0.5-1.0mg/kg/hr</td>
<td>Infusion: 0.5-1.0mg/kg/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Mechanical ventilation and observation in HDW/ICU</td>
<td>* Mechanical ventilation and observation in HDW/ICU</td>
<td></td>
</tr>
</tbody>
</table>

### Medications

- **MDI**
  - **Ventolin** (blue)
    - 200mcg 2 puff PRN
  - **Fluticasone** (orange)
    - 125mcg 2 puff BD
  - **Budesonide** (brown)
    - 125mcg BD
  - **Seretide** (purple)
    - 25/125 1 puff BD
  - **Montelukast / Singulair**
    - 4mg granules
      - Chew @ 8pm
  - **IV Hydrocort 4-5mg/kg**
    - QID for 1/7,
      - then change to
    - **Syr Prednisolone**
      - 1-2mg/kg OD for 5/7
  - **IV hydrocort 4-5mg/kg**
    - QID for 1/7,
      - then change to
    - **Syr Prednisolone**
      - 1-2mg/kg OD for 5/7
Commonly used Rx

**Antibx**

IV Amoxycilin 15mg/kg QID

Syr Augmentin 18mg/kg BD
IVAugmentin 30mg/kg TDS

Syr Azithromycin 15mg/kg (Day1) , 7.5mg/kf (D2-5) OD
IVAzithro 15mg/kg (D1) , 5mg/kg (D2-5) OD

IV C penicillin :
Throat dose 25000iu/kg QID,
Pneumonia 50 000IU QID,
meningitis 100000IU/kg QID,
neonates 100 000IU/kg BD

IV Gentamycin 5mg/kg OD
IVAmincin 15mg/kg OD
IVAfortum 25mg/kg TDS

IV Cefotaxime 25mg/kg BD
IVAcephine 25-50mg/kg BD

Syr Pen V 15mg/kg QID
Syr Cefuroxime 15mg/kg QID
Syr Clarithromycin (Klaccid) 10mg/kg BD
Syr Unasyn 15mg/kg BD
Syr EES 20mg/kg BD

**Gastro**

Syr Domperidone 0.25mg/kg TDS
Syr Omeprazole 0.4mg/kg BD
Syr Ranitidine 2mg/kg / IV ranitidine 1mg/kg
ORS 10ml/kg

**Respiratory**

Syr prednisolone 1mg/kg OD
Syr Salbutamol 0.1mg/kg TDS
Syr Bromhexine 0.3mg/kg TDS
Singulair Granules 4mg ON

**CVS**

Syr Nifedipine 0.25-0.5mg/kg or
Syr Captopril 0.1-0.5mg/kg (up to 1mg)
Syr/IV Frusemide 1mg/kg OD/QID
Syr Spironolactone 1mg/kg BD

PR Resonium 0.25mg/kg QID

**Sedation**

Chloral Hydrate 50mg/kg
Midazolam 0.1-0.5mg/kg → Antidote Flumazenil 0.01-0.02mg/kg
Pethidine 0.5-1mg/kg
Morphine 0.1-0.2mg/kg
Ketamine 1-2mg/kg

Adrenaline IV 0.1 – 0.3ml/kg , ET 0.5-1ml/kg
Surfactant 4mg/kg
Kindly note that this compilation serves as an early guide for your paediatrics posting only. The management in this guide does not necessarily reflect the method of management by Hospital Ampang. Always refer to your Malaysian Paediatrics Protocol for concise management.

A House Officers Workshop Project
www.myhow.wordpress.com
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