Pediatric Standard Treatment Guidelines

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RESPIRATORY DISEASES

ADD OXYGEN IF O_2SAT<94%

CROUP (ACUTE LARINGOTRACHEOBRONCHITIS)	
Viral infection in children 3 months to 4 years Clinical signs • **Typical barking cough** • **Inspiratory stridor** Severity score: see annex in page 86	
MILD	**PREDNISOLONE PO** 2 mg/kg/day OD PO 3 days (max 60mg/day)
MODERATE	**DEXAMETHASONE** po 0,5mg/kg STAT (max 10 mg) Or **HYDROCORTISONE** IM, IV 10 mg/kg/STAT (max 250mg)
SEVERE	**ADRENALINE nebulized with O2 at 4-5 litres/min** 0,5ml/kg (min 0'5ml and max 4 ml) + complete up to 5 mL with Normal Saline If necessary repeat every 20-30 minutes. Maximum 3 rounds After maintain nebulization every 4 or 6 or 8 hours, according severity and ADD **DEXAMETHASONE** 0.5mg/kg po STAT <u>If Suspect of Bacterial Croup</u> **ADD CEFTRIAXONE** IV or IM 75 mg/kg/day OD x 5 days

ACUTE BRONCHITIS/ASTHMA	
Viral infection Clinical signs: Wheezing **See severity score in page 87**	
MILD	**SALBUTAMOL inhalation** Number of puff: 2 -4 puffs If necessary repeat every 20-30 minutes (maximum 3 rounds) After maintain 2-4 puff every 4 or 6 or 8 hours, according severity
MODERATE/SEVERE	**Salbutamol pufs** **Num pufs = weight/3 (min 3 puffs, max 10 puffs)** **Or if Hb Sat <93%** **SALBUTAMOL nebulized with oxygen 6-8 litres/min** 0,15mg/kg or 0,03 mL/kg + complete up to 3-4 mL with NS (1ml=5mg) max 5mg If necessary repeat every 20-30 minutes. Maximum 3 rounds After maintain nebulization every 4, 6 or 8 h, according severity **PLUS** **PREDNISOLONE PO** 2 mg/Kg/day BID for 3 days (maximum 60mg/day) **Or** **HYDROCORTISONE IM, IV** 10 mg/kg/dose (maximum 250 mg/day)

NON RESPONDERS SEVERE	**ADRENALINE nebulized** 0,2ml/kg + complete up to 5 mL with Normal Saline (min 0'5ml and max 3ml) If necessary repeat every 20-30 minutes Maximum 3 rounds After maintain nebulization every 4 or 6 or 8 hours, according severity OR **ADRENALINE IM** 0.1ml/Kg Max 1 ml **PLUS** **HYDROCORTISONE IM, IV** 10 mg/kg/dose (max 250 mg)

BRONCHIOLITIS	
Viral infection in childs < 12 months Clinical signs: • Wheezes • Chest indrawing, nasal flaring	
MILD	**Clean nose with Normal Saline**
MODERATE AND SEVERE	**Salbutamol 2 puffs and reases if not improving** **Oxigen if Sat<94%** **ADRENALINA nebulized** 0,2ml/kg + complete up to 5 mL with Normal Saline (min 0'5ml and max 3ml) If necessary repeat . Maximum 3 rounds If worsening after first nebulization stop and give just supplementary oxygen After maintain nebulization every 4 or 6 or 8 hours, according severity

UPPER RESPIRATORY TRACT INFECTION (URTI)
Common Cold

Acute self-limiting viral infection

Clinical signs:

- Sneezing
- Cough
- Nasal congestion
- Sore throat
- Low grade fever

MILD	Clean the nose with Normal Saline If breastfeeding continue breastfeeding For older children give plenty of fluids If fever Paracetamol

PERTUSSIS (WHOOPING COUGH)

Bacterial infection produced by Bordetella pertussis

Clinical signs:

- **Paroxysm of cough**
- **Inspiratory whoop**
- **Post-tussive vomiting**
- **Apnea**

	ISOLATION <u>1st Line</u> **AZITHROMYCIN** 10 mg/kg/dose PO OD for 5 days (max 500 mg/day) <u>2nd Line</u> **ERYTHROMYCIN** 12,5 mg/kg/dose PO QID for 10 days (avoid in <1 month of age)

PNEUMONIA

Pneumonia is an acute inflammation of the lung, usually (but not always) caused by infections.

Definition:
Cough or difficulty in breathing + 1 of:

- Fast breathing
  - >60 breaths/min in <2 month age
  - >50 breaths/min in a child 2-11 months
  - >40 breaths/min in a child 1-5 years
  - >30 breaths/min in child >5 years
- Chest auscultation signs
  - Decreased breath sounds
  - Bronchial breath sounds
  - Inspiratory crackles, crepitations

SEVERE PNEUMONIA
Pneumonia plus any of the following:

- Oxygen saturation < 94% or central cyanosis
- Inability to breastfeed or drink
- Vomiting everything (all foods and liquids)
- Lethargy or reduced level of consciousness
- Appears severely ill of toxic
- Respiratory distress (nasal flaring, chest indrawing, abdominal breathing, grunting, abnormal positioning)

Causes – Etiology

Major Bacterial causes	If SAM, HIV or low immunity	Viral causes	Other bacteria
Haemophilus influenza Streptococcus pneumoniae Salmonella spp Klebsiella pneunoniae Staphylococcus aureus	Pneumocystis jirovecii Mycobacterium tuberculosis	Influenza virus Measles virus	Mycoplasma pneumoniae (atypical pneumonia, in children older than 5 years) Chlamydia trachomatis (in afebrile infants 1-4 months of age)

Treatment Severe Pneumonia

Children < 2 months

Children 0-7 days	**< 2Kg**	**AMPICILLIN** 100mg/kg/day BID IV for 7 days + **GENTAMICIN** 3 mg/kg OD IV for 7 days
	≥ 2 Kg	**AMPICILLIN** 100mg/kg/dose BID IV for 7 days + **GENTAMICIN** 4 mg/kg OD IV for 7 days
Children 8 days to < 1 month		**AMPICILLIN** 150mg/kg/day TID IV for 7 days + **GENTAMICIN** 4mg/kg OD IV for 7 days
Children 1 month to 2 month		**AMPICILLIN** 200mg/kg/dose QID IV for 7 days + **GENTAMICIN** 5mg/kg OD IV for 7 days

<u>If no improvement in 72h:</u>

SWITCH AMPICILLIN BY **CLOXACILLIN** IV for 10-14 days

If improving , after 7 days consider to extend treatment with oral antibiotics for 3 more days

<u>Improvement criteria includes:</u>

Fever reduction, diminished respiratory distress, improve oxygen saturation, improved appetite or activity

Children **>2 months**	**CEFTRIAXONE** 50 mg/kg/day OD IV,IM for 3 days - <u>If no improvement or deteriorates</u>: ADD **CLOXACILLIN** 100mg/kg/day QID IV x 10 days - <u>If HIV or Measles:</u> **ADD CLOXACILLIN** 200 mg/kg/day QID IV x 10 days - <u>If high suspicion of Aspiration Pneumonia</u> ADD **METRONIDAZOL** 40mg/kg/day TID po x 10 days - <u>If no improvement after 1 week consider</u>: TB, empyema, HIV and refer for Chest X-Ray. **If > 5 years add AZITHROMYCINE** 10 mg/kg/dose OD PO (max 500 mg/day) for 3 days Or **ERYTHROMICN** 10mg/kg/dose QID PO x 7 days - <u>If improvement after 3 days switch to PO</u> **AMOXICILIN-CLAVULANIC** 80 mg/kg/day TID until complete 7-10 days of treatment <u>OR in as a second line:</u> **AMPICILLIN** 50 mg/kg/dose QID IV + **GENTAMICINE** 5mg/kg/dose ID IV - <u>If no improvement or deteriorates:</u> ADD **CLOXACILLIN** 25mg/kg/dose QID IV - <u>If HIV or Measles:</u> ADD **CLOXACILLIN** 50 mg/kg/dose QID IV - <u>If high suspicion of Aspiration Pneumonia</u> ADD **METRONIDAZOL** 10 mg/kg/dose TID - <u>If improvement after 3 days switch to PO</u> **AMOXICILIN- CLAVULANIC** 80 mg/kg/day TID until complete 7-10 days of treatment

NON SEVERE PNEUMONIA
AMOXICILIN 50-80 mg/kg/day TID x 7-10 days, if no improving switch to **AMOXICILLIN-CLAVULANIC 80 mg/kg/d TID**

DIPHTERIA	
Bacterial infection due to *Corynebacterium diphteriae*: Clinical signs: • **Pseudomembranous tonsillitis** (grey, tough and very sticky membranes) with dysphagia and cervical adenitis. • Airway obstruction • Fever	
	Isolation and refer to a Hospital **AZITHROMYCIN** 20 mg/kg/dose OD PO for 14 days (max 500mg) (max 2 g/day) Or **ERYTHROMYCIN** 50 mg/kg/day BID for 14 days If unable to swallow: **BENZYLPENICILLIN PROCAINE** IM (NEVER IV) ≤ 10 Kg: 300 000 IU OD >10 Kg: 600 000 IU OD

EPIGLOTITIS	
Bacterial infection due to *Haemophilus influenza* Clinical signs: • High Fever • **Tripod or sniffing position** • **Difficulty swallowing** • **Stridor** • Critically ill appearing	
SEVERE	Allow the child to sit in a comfortable position Do not force to lie down (may precipitate airway obstruction) Avoid examination of the mouth and throat IV Fluid **CEFTRIAXONE** IV 50 mg/kg/dose and refer to Hospital

ENT
EAR, NOSE AND THROAT PROBLEMS

ACUTE OTITIS MEDIA (AOM)

Acute inflammation of the middle ear due to viral or bacterial infection.
Clinical signs:

- Ear pain, otorrhea, bulging and erythema of tympanic membrane
- Otoscopy: bright red tympanic membrane
- Fever, rhinorrhea, cough…
- Complications:
  - Chronic Supurative Otitis Media
  - Meningitis
  - Mastoiditis
  - Brain Abscess

Treatment	**AMOXICILLIN** PO 80-100mg/kg/day TID for 7-10 days - <u>If no improvement in 48 hours</u> Switch to **AMOXICILLIN-CLAVULANIC** PO 50 mg/kg/day TID for 7 days **Ear irrigation is contraindicated** **Ear drops are not indicated**

CHRONIC SUPPURATIVE OTITIS MEDIA (CSOM)

Is the result of an initial episode of AOM and is characterized by a persistent (>14 days) discharge from the middle ear through a tympanic perforation.
<u>Suspect TB</u>: If child does not respond to Ciprofloxacin ear drop for more than 30 days

Treatment	Dry the ear by wicking **GENTAMICIN EAR DROPS OR CIPROFLOXACIN** ear drops 2-3 drops in the affected ear BID for 2-4 weeks If not improving add **DEXAMETHASONE** ear drops 2-3 drops in the affected ear BID for 2-4 weeks **No oral antibiotics**

ACUTE OTITIS EXTERNA	
Acute inflammation of the external ear canal due to bacterial or fungal infection	
Treatment	Dry the discharge and keep it clean **Gentamicin ear drops 2-3 drops** 5-7 days.

MASTOIDITIS	
Complication of AOM in which purulent material accumulates within the mastoid cavities. Clinical signs • Tenderness, erythema, swelling, fluctuance, mass and protrusion of the auricle. • Fever • Ear pain	
Treatment	**To consider referral to a hospital** **CEFTRIAXONE** IV 75 mg/kg/dose OD for 7-10 days - <u>If no improvement in 48 h</u> ADD **CLOXACILLIN** IV 200 mg/kg/day QID Switch to PO when there is improvement: **AMOXICILLIN-CLAVULANIC** PO 80 mg/kg/day TID for 2-3 weeks

TONSILLITIS	
Viral or bacterial infection due to *Streptococcus group A* Acute inflammation of the tonsil and pharynges Complication • Acute Rheumatic Fever: due to due to Streptococcus group A • Peritonsillar abscess <u>Bacterial signs</u> • Tender cervical node • Headache • Petechial on the palate <u>Viral signs</u> • Conjunctivitis	
Treatment	**AMOXICILLIN** PO 50 mg/kg/day BID for 10 days

PERITONSILLAR ABSCESS	
Complication of tonsillitis Fever Intense pain Hoarse voice Trismus Unilateral deviation of the uvula	
Treatment	**Amoxi-clavulanate 60mg/kg/day TID and consider to refer to Adama for drainage**

OPHTALMOLOGICAL DISEASES

CONJUCTIVITIS

Acute inflammation of the conjunctiva due to bacterial or viral infection, allergy, or irritation.

Clinical signs

- **Redness of the eye**
- **Irritation**
- Visual acuity is not affected

Bacterial conjunctivitis signs

- **Purulent secretion**
- Eyelids stuck together
- Unilateral infection

Viral conjunctivitis signs

- **Watery (serous) secretion**
- No itching

Allergic conjunctivitis

- Excessive secretion
- Eyelid oedema
- Intensive itching

In endemic areas turn off both upper eyelids to check for signs of trachoma.

Suspect keratitis: intense pain plus photophobia

Always check for foreign bodies.

Treatment	**<u>Bacterial conjunctivitis</u>** Clean eyes 4 to 6 times/day with cold boiled water **TETRACYCLINE EYE OINTMENT** BID 7 days in both eyes **<u>Viral Conjunctivitis</u>** Clean eyes 4 to 6 times/day with cold boiled water **<u>Allergic conjunctivitis</u>** Clean eyes 4 to 6 times/day with cold boiled water **Dexamethasone eye drops 1-2 drop BID x 3 days** or if rhinitis or sneezing→ **CHLORPHENIRAMINE** PO 1-2 years: 1mg BID 2-6 years. 1mg QID 6-12 years: 2mg QID >12 years: 4mg QID

PERIORBITAL AND ORBITAL CELLULITIS

<u>Periorbital cellulitis</u>: is a bacterial infection of the eyelids.
Clinical signs:

- Acute eyelid erythema and oedema. The oedema has a **violaceous** hue if secondary to *H.influenzae*.

<u>Orbital cellulitis</u>: serious infection involving the contents of the orbit that may lead to loss of vision or a brain abscess.
Clinical signs:

- **Pain with eye movements**
- **Ophthalmoplegia** (paralysis of eye movements): often with diplopia (double vision)
- Protrusion of the eye
- High fever, systemic signs
- Acute eyelid erythema and oedema. The oedema has a violaceous hue if secondary to *H.influenzae*.

Management and treatment	**<u>Criteria of Admission</u>** Orbital cellulitis, children less than 1 year, critically ill appearing child, local complications. **<u>In Patient Management</u>** **CEFTRIAXONE** IV 100 mg/kg/day IV or IM OD for 5 days + **CLOXACILLIN** IV 200 mg/kg/day QID x 5 days - <u>If clinical</u> improvement Afebrile and erythema and oedema have improved after 5 days, change to **AMOXICILLIN/CLAVULANIC** 80mg/kg/day TID to complete 7-10 days of treatment. **<u>Out Patient Management</u>** **AMOXICILLIN-CLAVULANIC** PO for 7-10 days 80 mg/kg/day TID

PURULENT NEONATAL CONJUNTIVITIS	
Conjunctivitis in newborns less than 28 days of life due to *Neisseria gonorrhoeae* or *Chlamydia trachomatis*. **<u>Gonococcal conjunctivitis</u>**: • 2 to 7 days after birth • Bilateral • Highly contagious • Severe corneal lesions and blindness **<u>Chlamydial conjunctivitis</u>** • 5 to 14 days after birth • Unilateral	
Prevention	Clean eyelids with Normal Saline **TETRACYCLINE EYE OINTMENT** STAT

Treatment	Isolation 48 hours **CEFTRIAXONE** IM 50 mg/kg/dose STAT (max 125 mg) + Clean eyes with Normal Saline + **TETRACYCLINE EYE OINTMENT** QID in both eyes x 14 days - If symptoms persists 48 hours after CEFTRIAXONE or appears after 7 days of life: ADD AZYTROMICYN 20 mg/kg/day PO STAT **Refer the mother and partner to the Health Center for treatment**

TRACHOMA

Highly contagious keratoconjunctivitis due to *Chlamydia trachomatis*.

5 stages

- **Stage I: Trachomatous inflammation – follicular (TF)**
  Presence of five or more follicles in the upper tarsal conjunctiva. Follicles are whitish, grey or yellow elevations, paler than the surrounding conjunctiva.
- **Stage II: Trachomatous inflammation – intense (TI)**
  The upper tarsal conjunctiva is red, rough and thickened. The blood vessels, normally visible, are masked by a diffuse inflammatory infiltration or follicles.
- **Stage III – Trachomatous scarring (TS)**
  Follices disappear, leaving scars: scars are white lines, bands or patches in the tarsal conjunctiva.
- **Stage IV – Trachomatous trichiasis (TT)**
  Due to multiple scars, the margin of the eyelid turns inwards (entropion); the eyelashes rub the cornea and cause ulcerations and chronic inflammation.
- **Stage V – Corneal opacity (CO)**
- Cornea gradually loses its transparency, leading to visual impairment and blindness

Stage I and II	Clean eyes and face several times per day **AZYTHROMYCIN** 20 mg/kg PO STAT + **TETRACYCLINE EYE OINTMENT** 1% BID 2 weeks
Stage III	No treatment
Stage IV	Surgical Treatment
Stage V	No treatment

VITAMIN A DEFICIENCY (XEROPHTALMIA)

Ocular manifestations of vitamin A deficiency.
Can progress to irreversible blindness without treatment.
Clinical Signs

- **Crepuscular blindness**
- **Conjunctival xerosis: dry conjunctiva**
- **Bitot's spots: greyosh foamy patches on the bulbar conjunctiva**
- **Corneal xerosis**
- **Corneal ulcerations**
- **Keratomalacia: the last and most severe sign of xerophtalmia**.

Treatment	**VITAMIN A** PO 6-12 month or < 8Kgs 100 000 IU OD on day1-2-8 >1 year or > 8Kg 200 000 IU OD on days 1-2-8 If corneal lesions **TETRACYCLINE EYE OINTMENT** 1% BID 7 days

Vitamin A Overdose	**Signs** • **Raise intracranial pressure** • **Bulging fontanel** • **Vomiting** • **Nausea** • **Convulsions**

VIRAL DISEASES

MEASLES	
Transmitted by inhalation of respiratory droplets spread by infected individuals. **Contagious 5 days before appears rash and 5 days after** Clinical signs: • **Fever + rash (erythematous maculopapular) + 1 of the next:** ○ **Cough OR conjunctivitis OR coryza (runny nose)** • Koplik's spots	
Treatment	**VITAMIN A PO** <u>6-12 month or < 8Kgs</u> 100 000 IU OD on day1 and 2 <u>>1 year or > 8Kg</u> 200 000 IU OD on days 1 and 2 Simptomatic treatment for: Diarrhoea, conjunctivitis, pneumonia, fever… Isolation

BACTERIAL DISEASES

MENINGITIS

Acute bacterial infection of the meninges.
MEDICAL EMERGENCY
EMPIRICAL ANTIBIOTIC, NOT WAIT LABORATORY RESULTS
Clinical Signs

- Fever
- **Stiff neck**
- **Kernig's signs**
- **Brudzinski's sign**
- **Bulging fontanella**
- Nausea, vomiting
- **Petechiae**: in fulminant meningococcical sepsis

Treatment	See Table

	Pressure	Aspect	WBC (leucocytes/mm^3)	Protein	Other tests
Normal CSF		Clear	< 5	Pandy – < 40 mg/dl	–
Bacterial meningitis	++++	Cloudy, turbid	100-20 000 mainly neutrophiles In neonates: > 20 In immunocompromised, the WBC may be < 100	Pandy + 100-500 mg/dl	Gram stain +
Viral meningitis	Normal to +	Clear	10-700 mainly lymphocytes	Pandy –	–
TB meningitis	+++	Clear or yellowish	< 500 mainly lymphocytes	Pandy +	AFB
Cryptococcal meningitis	++++	Clear	< 800 mainly lymphocytes	Pandy –	India ink

Suggested table for meningitis (according our currents resources)

<1 Month:

<2 kg*: **AMPICILLIN** 200mg/kg/day BID iv or im x 14 days**
+
GENTAMICIN 3 mg/kg/day OD iv or im x 14 days**

>2 kg*: **AMPICILLIN** 300 mg/kg/day TID iv or im x 14 days**
+
GENTAMICIN: 4 mg/kg/day OD iv or im x 14 days**

1 to 3 months:

CEFTRIAXONE 100 mg/kg/day OD iv or im x 14 days**

> 3 months:

CEFTRIAXONE: 100mg/kg/day OD iv or im x 14 days**

* If meningitis associated with skin or clinical cord infection replace ampicillin for cloxacillin

****If CSF gram stain is available the length of treatment can be adjusted to:**

Neisseria meningitis 5-7 days,
Haemophilus influenzae: 7–10 days
Streptococcus pneumoniae: 10–14 days
Group B streptococcus and Listeria: 14–21 days
Gram---negative bacilli: 21 days

SEPTICEMIA

Is a clinical syndrome resulting from severe infection. It includes inflammation, immune dysfunction, impaired circulation in the capillaries and oxygen debt and can therefore lead to major or multiple organ failure (MOF) and death.
Sepsis can lead to septic shock, which consequently leads to a severe risk of death.

Systemic Inflammatory Response (SIRS)

- Fever or hypothermia (> 38,5ºC or < 36ºC), or elevated WBC
- Tachycardia, bradycardia or tachypnea

Shock (if presents 3 or more than this)

- Cold hands and feet
- Fast pulse
- Capillary refill >2 seconds
- Weak or absent pulse

Septic shock: Sepsis+shock

Treatment	**CEFTRIAXONE** IV 100 mg/kg/day OD **Oxygen** **Fluid bolus of Ringer Lactate** **20 mL/kg**

TETANUS

Severe infection due to *Clostridium tetani*, which is found in soil and human and animal excrements.
Clinical signs:

- **Muscular rigidity**
- **Trismus**
- **Muscular spasm**
- **Trigger by stimulus**
- **Opistotonos**

Treatment	• Avoid stimulus: avoid light, sounds… • Dark and calm room • Refer to Health Center/hospital

RELAPSING FEVER (BORRELIOSIS)

Caused by spirochetes of the genus *Borrelia*, transmitted to humans by arthropod vectors.
Clinical signs:

- **Febrile episodes separated by afebrile periods of approximately 7 days**
- The initial febrile episode lasts up to 6 days:
  - High Fever (>39ºC), severe headache, asthenia, diffuse pin, gastrointestinal disturbance
  - Splenomegaly, bleeding

Diagnose: confirmed by detection of *Borrelia* in blood film always during febrile episode.

***JARISCH-HERXHEIMER reaction:**
Reaction after antibiotic therapy that causes high fever, chills, fall in blood pressure and sometimes shock. It is recommended to monitor the patient for 2 hours after the first dose of antibiotic.

Treatment Louse-borne relapsing fever (LBRF)	**DOXYCICLINE** PO Children: 100 mg PO STAT OR **ERYTHROMYCIN** PO Children ≤5 years: 250 mg STAT Children > 5 years: 500 mg STAT Elimination of body lice is essential

ERUPTIVE RICKETTSIOSES

Eruptive fevers caused by bacteria of the genus *Rickettsia* and transmitted to human by arthropod vector.

Clinical signs:

- High Fever (>39ºC), severe headache, myalgia.
- 3 to 5 days later onset of generalized cutaneous eruption (maculopapular rash)
- Inoculation scar: painless, black crusted lesion surrounded by a erythematous halo at the site of the bite (always check for this sign)
- Typhoid state: prostration, obnubilation, confusion and extreme asthenia

Group	**Typhus**	
Form	**Epidemic typhus**	**Murine typhus**
Pathogen	*R.prowasekii*	*R.typhi*
Vector	Body lice	Rat fleas
Reservoir	Man	Rats
Occurrence	Epidemic	Endemic
Geographical distribution	Worldwide, Ethiopia	Wordwide
Rash	Maculopapular	Maculopapular
Eschar	0	0
Typhoid state	+++	+++
Extra-cutaneous signs	Cough, myalgia, meningeal signs	Gastrointestinal signs
Case fatality (%)	30% (without treatment)	5%

Complications:

Encephalitis, myocarditis, hepatitis, acute renal failure…

Treatment	**DOXYCICLINE** PO (check for patients under 8y) - < 45 Kg: 4 mg/kg/day BID for 5-7 days - > 45 Kg: 200 mg/day BID for 5-7 days

TYPHOID FEVER

Systemic infection due to *Salmonella typhi*.

Transmission: Ingestion of contaminated water and food or by direct contact

Clinical signs:

- Fever
- Headache
- Asthenia
- Abdominal pain
- Rose spot

Widal's agglutination reaction is not used (poor sensitivity and specificity)

Fever persists 4-5 days after the starts of treatment, even if the antibiotic is effective.

Treatment	**Isolation** **<u>1st line</u>** **CIPROFLOXACIN** PO 30 mg/kg/day BID for 5-7 days Is the first line also in child, because the benefits of treatment with Ciprofloxacin are bigger than the side effects **<u>2nd line</u>** **CEFTRIAXONE** IV 75 mg/kg/day OD for 7-10 days

GASTROINTESTINAL DISORDERS

ACUTE DIARRHOEA

Defined as at least 3 liquid stools per day for less than 2 weeks.

2 clinical types:

Diarrhoea without blood	Diarrhoea with Blood (Dysentery)
Virus (60%): Rotavirus, enterovirus Bacteria: Vibrio cholerae, Escherichia coli, Salmonella non typhy, Yersinia Parasite; Giardia	Bacteria Shigella (50%), Campylobacter, Escherichia coli Parasites: Amoebiasis

Manage dehydration state (not for SAM patients)

Classify the grade of dehydration: if presents 2 or more of the next:

	MILD	MODERATE	SEVERE
Condition	Well, alert	Restless, irritable	Lethargic, unconscious
Eyes	Normal	Sunken eyes	Sunken eyes
Thirst	Drinks normal	Thirsty	Drinks poorly, not able to drink
Skin pinch	Goes back quickly	Goes back slowly	Goes back very slowly > 2 seconds
Decide	No signs of dehydration	Moderate Dehydration	Severe dehydration
Treat	Plan A At home	Plan B Observation	Plan C Admission

Diarrhoea without blood

Evaluate and Manage the grade of dehydration

Zinc Tablet

- < 6months: 10 mg OD PO for 10 days
- > 6 months: 20 mg OD PO for 10 days

Diarrhoea with Blood (Dysentery)

Evaluate and Manage the grade of dehydration **AND**

COTRIMOXAZOL (see Annex Table pag ….)

Cholera	**ISOLATION** **DOXYCYCLINE** PO 4 -6mg/kg STAT (1 dose STAT doesn't produce any side effect in children) Or **AZYTHROMYCIN** PO 20 mg/kg STAT

Chart 15. Diarrhoea treatment plan A: Treat diarrhoea at home

COUNSEL THE MOTHER ON THE FOUR RULES OF HOME TREATMENT: GIVE EXTRA FLUID. GIVE ZINC SUPPLEMENTS. CONTINUE FEEDING. KNOW WHEN TO RETURN TO THE CLINIC.

1. Give as much extra fluid as the child will take.

- Tell the mother to:
  - Breastfeed frequently and for longer at each feed.
  - If the child is exclusively breastfed, give ORS or clean water in addition to breast milk
  - If the child is not exclusively breastfed, give one or more of the following: ORS solution, food-based fluids (such as soup, rice water and yoghurt drinks) or clean water.

It is especially important to give ORS at home when:
- the child has been treated according to plan B or plan C during this visit.
- the child cannot return to a clinic if the diarrhoea gets worse.

- Teach the mother how to mix and give ORS. Give the mother two packets of ORS to use at home.
- Show the mother how much fluid to give in addition to the usual fluid intake:
  ≤ 2 years: 50–100 ml after each loose stool
  ≥ 2 years: 100–200 ml after each loose stool

Tell the mother to:
- Give frequent small sips from a cup.
- If the child vomits, wait 10 min. Then continue, but more slowly.
- Continue giving extra fluid until the diarrhoea stops.

2. Give zinc supplements.

- **Tell the mother how much zinc to give:**
  ≤ 6 months: half tablet (10 mg) per day for 10–14 days
  ≥ 6 months: one tablet (20 mg) per day for 10–14 days
- **Show the mother how to give zinc supplement:**
  - For infants, dissolve the tablet in a small amount of clean water, expressed milk or ORS in a small cup or spoon.
  - Older children can chew the tablet or drink it dissolved in a small amount of clean water in a cup or spoon.
- **REMIND THE MOTHER TO GIVE THE ZINC SUPPLEMENT FOR THE FULL 10–14 DAYS.**

3. Continue feeding.

4. Know when to return to the clinic.

See mother's card (p. 322)

Chart 14. Diarrhoea treatment plan B: Treat some dehydration with oral rehydration salts

GIVE THE RECOMMENDED AMOUNT OF ORS IN THE CLINIC OVER 4 H

▶ **Determine amount of ORS to give during first 4 h:**

Age[a]	≤ 4 months	4 to ≤ 12 months	12 months to ≤ 2 years	2 years to ≤ 5 years
Weight	< 6 kg	6–< 10 kg	10–< 12 kg	12–19 kg
	200–400 ml	400–700 ml	700–900 ml	900–1400 ml

[a] Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) by 75.

If the child wants more ORS than shown, give more.

▶ **Show the mother how to give ORS solution.**

- Give frequent small sips from a cup.
- If the child vomits, wait 10 min, then continue, but more slowly.
- Continue breastfeeding whenever the child wants.

■ **After 4 h:**

- Reassess the child and classify him or her for dehydration.
- Select the appropriate plan to continue treatment.
- Begin feeding the child in the clinic.

▶ **If the mother must leave before completing treatment:**

- Show her how to prepare ORS solution at home.
- Show her how much ORS to give to finish the 4-h treatment at home.
- Give her enough ORS packets to complete rehydration. Also give her two packets as recommended in plan A.
- Explain the four rules of home treatment:

1. **Give extra fluid.**
2. **Give zinc supplements.**
3. **Continue feeding.**
4. **Know when to return to the clinic.**

See diarrhoea treatment plan A (p. 138) and mother's card (p. 322)

Chart 13. Diarrhoea treatment plan C: Treat severe dehydration quickly

→ Follow the arrows. If the answer is **YES**, go across. If **NO**, go down.

START HERE

Can you give intravenous (IV) fluid immediately?

YES →

- Start IV fluid immediately. If the child can drink, give ORS by mouth while the drip is being set up. Give 100 ml/kg Ringer's lactate solution (or, if not available, normal saline), divided as follows:

Age	First give 30 ml/kg in:	Then give 70 ml/kg in:
Infants (< 12 months)	1 h[a]	5 h
Children (12 months to 5 years)	30 min[a]	2.5 h

[a] Repeat once if radial pulse is still weak or not detectable

- Reassess the child every 15–30 min. If hydration status is not improving, give the IV drip more rapidly. Also watch for over-hydration.
- Also give ORS (about 5 ml/kg per h) as soon as the child can drink: usually after 3–4 h (infants) and 1–2 h (children).
- Reassess an infant after 6 h and a child after 3 h. Classify dehydration. Then choose the appropriate plan (A, B or C) to continue treatment.

NO ↓

Is IV treatment available nearby within 30 min?

YES →

- Refer **urgently** to hospital for IV treatment.
- If the child can drink, give the mother ORS solution, and show her how to give frequent sips during the trip.

NO ↓

Are you trained to use a nasogastric tube for rehydration?

YES →

- Start rehydration by tube (or mouth) with ORS solution: give 20 ml/kg per h for 6 h (total, 120 ml/kg).
- Reassess the child every 1–2 h:
  - If there is repeated vomiting or increasing abdominal distension, give the fluid more slowly.
  - If hydration status is not improving after 3 h, send the child for IV therapy.
- After 6 h, reassess the child and classify dehydration. Then, choose the appropriate plan (A, B or C) to continue treatment.

NO ↓

Can the child drink?

YES →

- Start rehydration by tube (or mouth) with ORS solution: give 20 ml/kg per h for 6 h (total, 120 ml/kg).
- Reassess the child every 1–2 h:
  - If there is repeated vomiting or increasing abdominal distension, give the fluid more slowly.
  - If hydration status is not improving after 3 h, send the child for IV therapy.
- After 6 h, reassess the child and classify dehydration. Then, choose the appropriate plan (A, B or C) to continue treatment.

NO ↓

Refer urgently to hospital for IV or nasogastric treatment.

Note: *If possible, observe the child for at least 6 h after rehydration to be sure the mother can maintain hydration by giving the child ORS solution by mouth.*

PROTOZOAN INFECTIONS

MALARIA

Parasitic infection due to protozoa of the genus Plasmodium.
Transmitted to human by the bite of mosquitoes Anopheles
5 species: *P.falciparum, P.vivax, P.ovale, P.malariae, P. knowlesi*

Diagnose: Blood film or RDT

Uncomplicated Malaria

Clinical signs:

- Fever, chills, sweating, headache, muscular ache, malaise, anorexia, nausea, abdominal pain, diarrhoea, vomit, anemia

Severe malaria

Clinical signs	Laboratory signs
• **Severe pallor (anemia ≤ 5 g/dL)** • **Impaired consciousness** • **Prostration** • **Multiple convulsions** • **Respiratory distress** • **Shock** • **Jaundice** • **Hemoglobinuria (dark or red urine)** • **Abnormal bleeding in skin** • **Acute renal failure**	• **Hypoglycemia** • **Anemia ≤ 5 g/dL** • **Hemoglobinuria (urine dip stick positive for blood)** • **Hyperparasitemia (>10% of RBC or 500000 parasites /mcl)** • **Renal impairment**

Non Severe Malaria

P. vivax
CHLOROQUINE (see table page 34)
+
PRIMAQUINE for 14 days (see table page 35) refer to Health center

P. falciparum
ARTHEMETER-LUMEFANTRINE (CO-ARTEM)
(See table page 33)
+
PRIMAQUINE STAT refer to Health center

Mixed
ARTHEMETER-LUMEFANTRINE (CO-ARTEM)
+
PRIMAQUINE for 14 days (see table next page)

SEVERE MALARIA

ARTESUNATE IV (see table page 35-36)

ARTEMETHER-LUMEFANTRINE TREATMENT SCHEDULE

Tablet containing 120 mg artemether plus 20 mg lumefantrine in a fixed dose

Weight	Dosage	Color code
<14 Kg	1 tablet BID x 3 days	Yellow*
15-24 Kg	2 tablets BID x 3 days	Blue*
25-34 Kg	3 tablets BID x 3 days	Brown
> 35 Kg	4 tablets BID x 3 days	Green

*(yellow, blue) Flavored pediatric formulation (dispersible tablets) of artemether-lumefantrine (AL) is available for enhancing its use in young children.

Side effects:

The following adverse effects have been reported; dizziness and fatigue, anorexia, nausea, vomiting, abdominal pain, palpitations, myalgia, sleep disorders, arthralgia, headache and rash.

Contraindications:

- Artemether-lumefantrine should not be used as malaria prophylaxis either alone or in combination;
- Persons with a previous history of reaction after using the drug;

  Persons with severe and complicated malaria should not be treated with oral medications.

Note: Artemether-lumefantrine has a shelf life of only two years. The drug should be stored at temperatures of below 30^{o}C and should not be removed from the blister if it is not going to be used immediately. One form of presentation of artemether-lumefantrine is shown below.

ANNEX CHLOROQUINE TREATMENT SCHEDULE

Tablets of chloroquine 150 mg base or syrup 50 mg base per 5 ml (Note, one 250 mg chloroquine phosphate salt tablet contains 150 mg chloroquine base). Total dose of 25 mg base per kg over 3 days (10 mg base per kg on Day 1, 10 mg base per kg on day 2, and 5 mg base per kg on day 3). (Never take more than four 250 mg chloroquine phosphate tablets in one day.)

Weight (Kg)	**Day 1**	**Day 2**	**Day 3**
5-6	½ tablet *OR* 5 ml syrup	¼ tablet *OR* 5 ml syrup	¼ tablet *OR* 2.5 ml syrup
7-10	½ tablet *OR* 7.5 ml syrup	½ tablet *OR* 7.5 ml syrup	½ tablet *OR* 5 ml syrup
11-14	1 tablet *OR* 12.5 ml syrup	0.5 tablet *OR* 12.5 ml syrup	0.5 tablet *OR* 12.5 ml syrup
15-18	1 tablet *OR* 15 ml syrup	1 tablet *OR* 15 ml syrup	1 tablet *OR* 15 ml syrup
19-24	1 ½ tablets *OR* 20 ml syrup	1 ½ tablets *OR* 20 ml syrup	1 tablets *OR* 15 ml syrup
25-35	2 ½ tablets	2 tablets	1 tablet
36-50	3 tablets	2 tablets	2 tablets
51+	4 tablets	4 tablets	2 tablets

Side effects:
Dizziness, skeletal muscle weakness, mild gastrointestinal disturbances (nausea, vomiting, abdominal discomfort and diarrhea) and pruritus. Pruritus may be severe but usually passes within 48-72 hours.

Contraindications:
persons with known hypersensitivity
persons with a history of epilepsy
persons suffering from psoriasis

ANNEX PRIMAQUINE TREATMENT SCHEDULE

Primaquine is used for radical *P. vivax* cure.
Primaquine phosphate dose: 0.25 mg base per kg daily for 14 days

Weight (Kg)	**Number of tablets per day for 14 days**	
	7.5 mg tablet	15 mg tablet
19 – 24	¾	-
25 – 35	1	½
36 – 50	1 ½	¾
50 +	2	1

Side effects:
Anorexia, nausea, vomiting, abdominal pain and cramps are dose related and relatively rare at daily doses up to 0.25 mg base/kg. They may also be accompanied by vague symptoms such as weakness and uneasiness in the chest.

Contraindications:

- Pregnancy
- Lactation mother of less than 6 months
- Children under 6 month years
- Any condition that predisposes to granulocytopenia, such as active rheumatoid arthritis & systemic lupus erythematosus.

ANNEX ARTESUNATE IV OR IM TREATMENT SCHEDULE

Artesunate IV or IM treatment for severe malaria.

Artesunate dosing is 2.4 mg/kg IV or IM given on admission (time = 0), then at 12h and 24h, then daily for up to five days; From 60mg vials, artesunate must be reconstituted in two steps: initially with sodium bicarbonate solution, then with either normal saline or glucose (D5W) solution. Full reconstitution results in either 6ml (intravenous concentration 10mg/ml) or 3ml (for intramuscular injection concentration 20mg/ml) of injectable artesunate dosed by weight.

Weight (Kg) (approximate)	IV 10 mg/mL	IM 20 mg/mL
2 – 8	1 mL	0.5 mL
9 to 12	2 mL	1 mL
13 – 16	3 mL	1.5 mL
17 – 18	4 mL	2 mL
19 – 21	5 mL	2.5 mL
22 – 25	6 mL	3 mL
26 – 29*	7 mL	3.5 mL
30 – 33 *	8 mL	4 mL
34 – 37*	9 mL	4.5 mL
38 – 41*	10 mL	5 mL
42 – 46*	11 mL	5.5 mL
47+*	12 mL	6 mL

The injectable artesunate (Guilin Pharmaceutical Co, Guanxi, China) contains 60 mg powder within a 7 ml glass vial that must first be reconstituted by mixing with a 1 ml glass ampoule of 5% sodium bicarbonate solution (provided) prior to administration and then shaken 2-3 minutes for better dissolution. To prepare an IV infusion of artesunate (10 mg/ml), next add 5 ml of 5% glucose (D5W) or Normal saline to the just-reconstituted 7 ml vial then infuse slowly intravenously (i.e. 3-4 ml per minute IV). To prepare artesunate for IM injection, add 2 ml of 5% glucose (D5W) or normal saline to the reconstituted 7 ml vial to make 3 ml of artesunate (20 mg/ml) for IM injection. One reconstituted vial provides a single dose for a person weighing up to 25 kg. A second vial must be prepared and reconstituted for persons weighing more than 26 kg, since they will need one full vial and at least a fraction of the second vial; adults over 50 kg weight need two full reconstituted and diluted vials at each dose, whether preparing for IV or IM injections. Complete doses are up to 360-480 mg artesunate over as many as five days for adults. * Note that for persons weighing more than 25 kg, a second artesunate vial must be completely reconstituted as above for each dose, and then each dose administered determined by the chart. Each artesunate dose is 2.4 mg/kg BW IV or IM.

INTESTINAL PROTOZOAN INFECTIONS

PARASITIC DIARRHOEA	
Transmitted by fecal-oral route. Clinical signs Amoebiasis (due to *Entamoeba hystolitica*) • **Bloody diarrhoea** Clinical signs Giardiasis (due to *Giardia lamblia*) • **Watery diarrhoea**	
GIARDIASIS	**TINIDAZOLE** PO 50-75 mg/kg (max 2 g) STAT po Or **METRONIDAZOLE** PO 30 mg/kg/day TID for 5 days
AMOEBIASIS Amebic dysentery	**TINIDAZOLE** PO 50 -75 mg/kg/day OD (max 2 g) for 3 days Or **METRONIDAZOLE** PO 45 mg/kg/day TID for 5 days
AMOEBIASIS Amebic liver abscess	**TINIDAZOLE** PO 50 mg/kg/day OD (max 2 g) for 5 days Or **METRONIDAZOLE** PO 45 mg/kg/day TID for 5-10 days

<table>
<tr><th colspan="2">SCHISTOSOMIASIS</th></tr>
<tr><td colspan="2">Acute or chronic parasitic diseases due to 5 speciaes of trematodes:

• S. haematobium
• S. mansoni
• S. japonicum
• S. mekongi
• S.intercalatum

Humans are infected bathing in fresh water infested with Schistosoma larvae.

Symptoms during parasite invasion: allergic reactions, rash, fever</td></tr>
<tr><td>S. haematobium (genito-urinary schistosomiasis)</td><td>Urinary manifestations:
• Macroscopic hematuria
• Polyuria
• Dysuria

If left untreated:
• Recurrent urinary tract infections
• Fibrosis/calcification of bladder and ureters
• Bladder cancer

Differential Diagnosis: genito-urinary TB

Diagnostic: ova of Schistosoma detected on Urinary sediment</td></tr>
<tr><td>S.mansoni (Intestinal schistosomiasis)</td><td>Intestinal manisfestations:
• Abdominal pain
• Diarrohea intermittent or chronic with or without blood
• Hepatomegaly

If left untreated:
• Hepatic fibrosis
• Portal hypertension
• Cirrhosis
• Gastrointestinal haemorrahage

Diagnostic: ova of Schistosoma detected on Stool Examination</td></tr>
<tr><td>Treatment</td><td>PRAZIQUANTEL PO
40 mg/kg STAT only in children > 2 years (max dose 1200mg)</td></tr>
</table>

HELMINTHIASIS

TAENIASIS	
Cestode *Taenia saginata* *Taenia solium* Clinical signs: Asymptomatic Gastrointestinal symptoms	
Treatment	<u>If > 2 years</u> **PRAZIQUANTEL** PO 5-10mg/kg STAT (max 600 mg) <u>If < 2 years</u>: **NICLOSAMIDE** PO 50 mg/kg STAT (max 2g)

HYMENOLEPIASIS	
Cestode. *Hymenolepis nana*	
Treatment	<u>If > 2 years</u> **PRAZIQUANTEL** PO 15-25 mg/kg STAT (do not administer in < 2years) <u>If < 2 years</u>: **NICLOSAMIDE** • <u>Under 2 years</u>: 500 mg on the first day, then 250mg/day OD for 6 days • <u>2 years-6 years</u>: 1g on 1st day, then 500 mg OD PO for 6 days • <u>>6 years</u>: 2 g on 1st day, than 1 g OD for 6 days

ASCARIASIS
Ascaris lumbricoides (round worm) Clinical signs: • **Loeffler's syndrome**: transient pulmonary symptoms: dry cough, dyspnea, wheezing • Abdominal pain and distension

Treatment	**ALBENDAZOLE** PO Not for children < 6 month Children >6 months but less than 10 kg: 200 mg STAT Children >6 months but >10 kg: 400mg STAT Or **MEBENDAZOLE** PO Not for children < 6 months Children > 6 months and >10 kg: 200 mg/day BID for 3 days Children > 6 months but less than 10 kg: 100 mg/day BID for 3 days

TRICHURIASIS	
Trichuris thiciura (whipworm) Clinical signs: • Abdominal pain and diarrhoea • Chronic bloody diarrhoea • Tenesmus • Rectal prolapse	
Treatment	**ALBENDAZOLE** PO Not for children < 6 month Children >6 months but less than 10 kg: 200 mg for 3 days Children >6 months but >10 kg: 400mg for 3 days Or **MEBENDAZOLE** PO Children > 6 months and >10 kg: 200 mg/day BID for 3 days Children >6 months but less than 10 kg: 100 mg/day BID for 3 days

ANCYLOSTOMIASIS	
Ancylostoma duodenale (hookworm) Clinical signs: • **Cutaneous signs**: pruritic papulo-vesicular rash on the site of penetration, usually the feet • Pulmonary symptoms: dry cough, dyspnea, wheezing • **Chronic aneamia**	
Treatment	**ALBENDAZOLE** PO Children >6 months and >10 kg: 400 mg STAT Children >6 months but less than 10 kg: 200 mg STAT

STRONGYLOIDIASIS

Strongyloides stercolaris

Clinicals signs

- **Cutaneous signs**: pruritic papulo-vesicular rash on the site of penetration, usually the feet
- Pulmonary symptoms: dry cough, dyspnea, wheezing
- Gastrointestinal symptoms
- Chronic strongyloidiais
- **Larva currens** on anal region

Treatment	**ALBENDAZOLE** PO Children >6 months and >10 kg: 400 mg for 3 days Children >6 months but less than 10 kg: 200 mg for 3 days Treat concomitant Anemia

ENTEROBIASIS

Enterobious vermicularis (pinworm)

Clinical signs

- **Anal pruritus** more intensive at **night**

Treatment	**ALBENDAZOLE** PO Children >6 months and >10 kg: 400 mg STAT Children >6 months but less than 10 kg: 200 mg STAT OR Or **MEBENDAZOLE** PO Children > 6 months and >10 kg: 200 mg/day BID for 3 days Children >6 months but less than 10 kg: 100 mg/day BID for 3 days

FILARIASIS

Species	Location of microfilariae	Location of microfilariae	Pathogenic stage	Presence of Wolbachia
Onchocerca Volvulus (onchocerciasis-river blindness)	Subcutaneous nodules	Skin and eye	Microfilariae	Yes
Loa Loa (loiasis)	Subcutaneous tissue	Blood	Macrofilariae	No
Wuchereria bancrofti Brugia malayi Brugia timori (lymphatic filariasis)	Lymph vessels	Blood	Macrofilariae	Yes

Onchocerca Volvulus (onchocerciasis-river blindness)	Clinical signs **Onchocercoma**: painless subcutaneous nodules containing adult worms Acute popular onchodermatitis: papular rash Intensely itchy Ocular lesions Diagnose Detection of microfilariae in the skin biopsy Treatment **DOXYCYCLINE** 200 mg/day for 4 weeks Contra-Indicated in children < 8 years Or **IVERMECTIN** 150 mcg/kg STAT 2nd Dose: after 3 months if clinical signs persists Not recommended in children less 5 years or less 15 Kg
Loa Loa (loiasis)	Clinical signs **Subconjuntival migration** of an adult worm Diagnose Detection of microfilariae in the peripheral blood film (thick film with Giemsa)
Wuchereria bancrofti Brugia malayi Brugia timori (lymphatic filariasis)	Clinical signs **Adenolymphangitis** Diagnose Detection of microfilariae in the peripheral blood film (thick film with Giemsa). Performed at night Treatment **DOXYCICLINE** PO 200 mg/day for 4 weeks Contraindicated in children < 8 years

RENAL DISORDERS

ACUTE CISTITIS

Lower Urinary Tract Infection of the bladder in a child older than 2 years without fever.
Most common pathogen: Escherichia coli

Clinical signs
Lower urinary tract symptoms: dysuria, palachiuria, incontinence, urgency, enuresis, abdominial or suprapubic pain and haematuria

Diagnosis
Urine dipstick:

- Nitrites indicated the presence of enterobacteria
- Leucocytes indicates infection in the urine

If dipstick is negative for both nitrites and leucocytes, a urinary tract infection is excluded.

Uncomplicated Cystitis if > 2 years	**COTRIMOXAZOL PO** (see dosage in page…..) 5 days Or **AMOXICILLIN-CLAVULANIC PO** 50 mg/kg/day TID for 5 days Or **CEFIXIME PO** 8mg/kg OD PO for 5 days
If < 2 years	**AMOXICILLIN-CLAVULANIC PO** 50 mg/kg/day TID for 7 days

PYELONEPHRITIS / FEBRIL URINARY TRACT INFECTION

Children ≤ 2 years is difficult to differentiate Pyelonephritis and Urinary Trac infection. So if presents fever we consider and treat as a Pyelonephritis.

Clinical signs
Unexplained crying in the young child
Dysuria or polachiuria
Malodorous urine
Abdominal pain
Decreased appetite
Fever
Sick looking

Diagnosis
Urine dipstick:

- Nitrites indicated the presence of enterobacteria
- Leucocytes indicates infection in the urine
- If dipstick is negative for both nitrites and leucocytes, a urinary tract infection is excluded.

Suspect Schistosomiasis if macrohaematuria or microhaematuria

Children < 6 month	Treat as a Neonatal Septicemia: **AMPICILLIN+GENTAMICIN IV** if improves (no fever for at least 24h) switch to **AMOXICILLIN-CLAVULANIC PO** 50 mg/kg/day TID for to complete 10-14 days
Children > 6 m	**GENTAMICIN IM or IV** 5mg/kg OD x 3 days, if improves (no fever for at least 24h) switch to **AMOXICILLIN-CLAVULANIC PO** 50 mg/kg/day TID for to complete 10-14 days

POST INFECTIOUS GLOMERULONEPHRITIS

Acute post infectious glomerulonephritis is a reactive immunological process against the kidney secondary to an infection (faringitis, impetigo or erisipela).
Caused by Streptococcus spp.
Most common in children 5-12 years

Clinical signs
Acute nephritic syndrome with macro/microscopic haematuria, proteinuria, hypertension, oedema and renal function affected

Diagnose
Urine dipstick positive for blood and protein
Microscopic urinalysis
Creatinine

Treatment	If hypertension and oedema: **FUROSEMIDE** PO 1mg/kg/day BID Repeat the dose in 6 hours if the child has no urinated Monitor Blood Pressure and Urinary output daily Check Creatinine weekly **AMOXICILLIN** PO 50 mg/kg/day BID x 7 days For persistent Streptococcal infection. To eradicate carriers

NEPHROTIC SYNDROME

Excretion of excessive amounts of protein into the urine.
Minimal change disease (MCD) is a very common form of Nephrotic syndrome in children.

Clinical signs

- Oedema
- Hyperproteinuria
- Normal renal function
- No hypertension
- No severe haematuria

Differential diagnose

	Nephrotic Syndrome	**Kwashiorkor**
Oedema	Oedema of the face. Followed by legs Ascites common Generalised oedema frequent	Oedema of the hands/feet Followed by face Ascites rare Generalised oedema depends on severity
Urine dipstick	Protein +++	Protein negative or +
Skin/hair changes	No	Common
Mental state	Clear, attentive	Irritable, inanttentive, apathetic

Diagnose
Urine dipstick for protein +++

TREATMENT

<u>≤1 year:</u> Refer
<u>1-10 years:</u> With nephrotic range of proteinuria, haematuria less than ++, no macroscopic haematuria, blood pressure normal, non bactiral infection and non active TB treat with:

PREDNISOLONE or PREDNISONE
2 mg/kg OD PO in the morning for 6 weeks (max 60 mg/day)

and

OMEPRAZOL
<10 kg: 10 mg OD x 6 weeks
>10 kg: 20mg OD x 6 weeks

And then tapper as follow*:

PREDNISOLONE or PREDNISONE
1.5mg/kg PO every other day (in the morning) x 4 weeks

And then
PREDNISOLONE or PREDNISONE
1mg/kg PO every other day (in the morning) x 2 weeks

And then
PREDNISOLONE or PREDNISONE
0.5mg/kg PO every other day (in the morning) x 2 weeks

* If proteinuria has not disappeared in 4 weeks refer

BONE AND JOINT

OSTEOMYELITIS and SEPTIC ARTHRITIS

Acute osteomyelitis is an infection of bone that is usually caused by bacteria

Clinical signs

Fever, constitutional symptoms, focal findings of bone inflammation and limitation of function

Diagnose

Any child with spontaneous pain or a persistent limp and tenderness has osteomyelitis or septic arthritis until proven otherwise

Clinical

Classification	Characteristics	Treatment
Acute osteomyelitis (<2 weeks)	Local and systemic signs but not dead bone (no sequestrum on X ray)	Antibiotics 4-6 weeks
Subacute osteomyelitis (2-6 weeks)		
Subactute osteomyelitis (2-6 weeks)	Local and systemic signs with dead bone (sequestrum on X ray)	Surgical drainage
Chronic localized osteomyelitis (>6 weeks)	History of untreated or inadequately treated osteomyelitis, Abscess or sinus tract formation plus sequestrum on X ray	Surgical wide drainage and removal of sequestra. Antibiotics not required
Chronic systemic osteomyelitis (>6 weeks)	Chronic osteomyelitis plus systemic symptoms	Surgical wide drainage and removal of sequestra PLUS Antibiotics

Treatment <5 years

Initial treatment	Switch to oral antibiotic if not immunocompromised	Switch to oral antibiotic if immunocompromised (SAM or HIV)
CLOXACILLIN 50mg/kg/dose QID IV + **CEFTRIAXONE** 50mg/kg/dose BID IV (until no symptoms)	**AMOXICILLIN CLAVULANIC** 80mg/kg/day TID PO To complete 4 weeks	**AMOXICILLIN CLAVULANIC** 80mg/kg/day TID PO + **CIPROFLOXACINE** 15 mg/kg/dose BID PO To complete 4 weeks

>5 years

SITUATION	FIRST-LINE TREATMENT	SWITCH TO ORAL THERAPY
Fully immunized	**CLOXACILLIN** 200mg/kg/day QID IV until no symptoms	CLOXACILLIN 200mg/kg/day QID
Not fully immunized	**CLOXACILLIN** 200mg/kg/day QID IV until no symptoms + **CEFTRIAXONE** 50mg/kg/dose BID IV (until no symptoms)	**AMOXICILLIN CLAVULANIC** 80mg/kg/day TID PO

DERMATOLOGY

Dermatology examination

Type of lesions	Definition
Macule	Flat, no palpable lesion that is different in color than the surrounding skin
Papule	Small (<1cm) slightly elevated, circumscribed, solid lesion
Vesicle (<1cm) Bulla (>1 cm)	Clear fluid-filled blisters
Pustule	Vesicle containing pus
Nodule	Firm, elevated, palpable lesion (>1 cm) that extend into the dermis ir subcutaneous tissue
Erosion	Loss of epidermis that heals without leaving a scar
Excoriation	Erosion caused by scratching
Ulcer	Loss of the epidermis and at least part of the dermis that leaves a scar.
Scale	Flake of epidermis that detaches from the skin surface
Crust	Dried serum, blood, or pus on the skin surface
Atrophy	Thinning of the skin
Lichenification	Thickening of the skin with accentuation of normal skin markings

Distribution	Isolated, clustered, linear, annular. Ask if the lesions are itchy
Causes	Insect bites, scabies, lice, other parasitic skin infections, contact with plants, animals, jewelry, detergents, etc.

Treatments	Topical, oral, parenteral
Signs	Local or regional signs: secondary infection, lymphangitis, adenopathy, erysipelas Systemic signs: fever, septicemia, distant infectious focus
Sanitary family condition	Contagious skin diseases: scabies, scalp ringworm, lice
Vaccination	Check tetanus status

IMPETIGO	
Contagious bacterial infection of the skin caused by beta-hemolytic streptococcus (group A) or staphylococcus aureus. Common in children 2-5 years. **Non-bullous impetigo** Most common Flaccid vesicles on erythematous skin which becomes pustular and form a yellowish crust. Sites: around nose and mouth, limbs or on the scalp. **Bullous impetigo** Common in young children The vesicles enlarge to form flaccid bullae with clear yellow fluid which later becomes darker and more turbid; ruptured bullae leaves a thin brown crust. **Ecthyma** An ulcerative form of impetigo that leaves scar. Most common in immunocompromised patients.	
Localized non bullous impetigo (< 3 lesion)	Wash with water+soap Clean the crust **NITROFURAZONE** cream TID for 7 days Keep finger nails short
Extensive impetigo, bullous impetigo or ecthyma	Treat locally as above + **CEPHALEXINE PO** 50 mg/kg/day BID for 7 days Or **CLOXACILLIN** 50- 100 mg/kg/day QID x 7 days

SCABIES

Is an infestation of skin due to *Sarcoptes scabiei*
Transmission: prolonged skin to skin contact

Clinical signs

- Severe itching: worst at night
- Typical skin lesions: erythematous papules, vesicular eruption, scabies burrows and nodules
- Characteristic distribution:
  - Sides and webs of the fingers
  - Wrists
  - Extensor aspects of the elbows
  - Axillary folds
  - Akin around the nipples
  - Periumbilical areas, waist
  - Male genitalia
  - Surface of the knees
  - Buttocks and adjacent thighs
  - Lateral and posterior aspects of the feet

Secondary lesion resulting from scratching (excoriations, crust) or super-infection (impetigo)

Diagnosis
Clinical and affecting other member of family

Treatment of secondary bacterial infection	Initiate 24-48 hours before using topical scabicides. **CEPHALEXINE** PO 25 mg/kg/dose BID for 7 days Or **CLOXACILLIN** 50- 100 mg/kg/day QID x 7 days 2on line **AMOXICILLIN-CLAVULANIC** PO 50 mg/kg/day TID for 7 days

Treatment with scabicides **In children > 2 months**	**PERMETRINE 5%** From head to toe After 12 hours wash with water. Second application: 2 weeks laters If Permetrine is not available, use: **BENZYL BENZOATE 25% lotion (BBL 25%)** • Children 2- 6 months: o 1 part 25% lotion + 3 parts of water o After 6 hours wash with water o Second application is not recommended • If < 2 years: o 1 part 25%lotion + 3 parts of water o After 12 hours wash with water. o Second application is not recommended • If 2 years-12 years: o 1 par t25%lotion + 1 part of water o After 24 hours wash with water. o Second application in 24 hours • If >12 years o Use undiluted 25% lotion o After 24 hours wash with water o Second application in 24 hours If BBL is not available use **SULPHUR 10%** Only If children >2 years old. Apply to entire body for 3 nights. Bath before each new application and 24 h after the last. Treat itching with **CHLORPHENIRAMINE PO** 1-2 years: 1 mg BID 2-6 years: 1 mg QID > 6 years: 2 mg QID **Cloths and bedding washed and exposed to the sun light** **Or** **Sealed in a plastic bag for 72 hours**

FORUNCLES AND CARBUNCLES

Necrotizing perifollicular infection, usually due to Staphylococcus aureus.

Clinical signs

Foruncle

Red warm, painful nodule with a central pustule, usually a hair follicle. No fever. Leaves a depressed scar.

Carbuncle

A cluster of interconnected furuncles, sometimes with fever and peripheral lymphadenopathy. Leaves a depressed scar.

Single furuncle	Water+soap Warm compresses to encourage to drain
Furuncle on face, multiple furuncles, carbuncles, immunocompromised patients	Water+soap **CEPHALEXIN** PO for 7 days - **< 7 days of life:** 50 mg/kg/day BID - **Neonates 7-28 days:** 75 mg/kg/day TID - **1month-12 years**: 25-50 mg/kg/day BID - **12 years**: 2 g/day BID Or **CLOXACILLIN** 50- 100 mg/kg/day QID x 7 days **AMOXICILLIN-CLAVULANIC** PO 50 mg/kg/day BID for 7 days

ERYSIPELAS AND CELLULITIS

Acute skin infections, most often due to Group A beta-haemolytic streptococcus, and at times *S.aureus*.

Clinical signs

- skin erythema, oedema with well demarcated margins, warmth, pain, usually on the lower limbs and at times the face.
- Often with fever, lymphadenopathy and lymphangitis
- look for a portal of entry
- Rare systemic complications (acute glomerulonephritis, septicaemia)

OUTPATIENT	**CEPHALEXIN** PO 1 month-12 years: 25-50 mg/kg/day BID >12 years: 2g/day BID Or **AMOXICILLIN-CLAVULANIC** PO 50 mg/kg/day BID for 7 days

In-PATIENT	All children < 3 months old, failure of outpatient treatment or risk of non-compliance. **CLOXACILLIN** IV 1 month-12 years: 50-100 mg/kg/day QID >12 years: 4g/day QID If not improvement in 48 hours, add metronidazol po

ECZEMA	
Acute eczema	Erythematous plaque, pruritic, vesicular with poorly demarcated and crumbly borders **Treatment** Clean with water+soap If intensive pruritus treat with chlorpheniramine
Chronic eczema	Erythematous plaque, scaly, dry, poorly demarcated and pruritic **Treatment** Clean with water + soap **HIDROCORTISONE** 1% cream BID for max 7 days (face, neck, axillar) OR **BETAMETHASONE** cream BID for max 7 days (arms, legs) If intensive pruritus treat with chlorpheniramine

SEBORRHEIC DERMATITIS	
Seborrheix dermatitis is an inflammatory chronic dermatosis that can be localized on rich areas rich with sebaceous glands Clinical signs Erythematous plaques covered by greasy yellow sacles that can be localized on the scalp, face, sternum, spine, perineum and skin folds	
Treatment	Water+ soap **HYDROCORTISONE 1%** BID maximum 7 days Don't apply if bacterial infection (impetigo). Treat first the bacterial infection.

URTICARIA
Papules: transient, erythematous, oedematous, pruritic, resembling nettle signs Look for a cause: food or drug allergy, insect bites…

Treatment	**CHLORPHENIRAMINE** PO 1-2 years: 1mg BID 2-6 years. 1mg QID 6-12 years: 2mg QID >12 years: 4mg QID

PELLAGRA	
Pellagra is a dermatitis resulting from niacin or tryptophan deficiency Clinical signs 3 "D" **Dermatitis + Diarrhoea +Dementia** Dark red plaques well demarcated, symmetric, located on exposed areas of the body	
Treatment	**NICOTINAMIDE** (VITAMIN PP) PO Children and adults: 300mg-500mg/day BID Give diet rich in proteins

ANIMAL BITES	
Treatment	**AMOXICILLINE-CLAVULANIC** 50mg/kg/day TID 7 days Refer to Health Center for tetanus and antirabies vaccine Don't close the wound by suture

LICES (PEDICULOSIS)

Is a benign contagious parasitic infection
Transmission: person to person through direct or indirect contact.
Body lices are potential vectors of relapsing fever, typhus and trench fever.

Clinical signs

Head lices

Itching and scratch marks (nape of neck and around the ears) which may become secondarily infected (impetigo)

Body lices

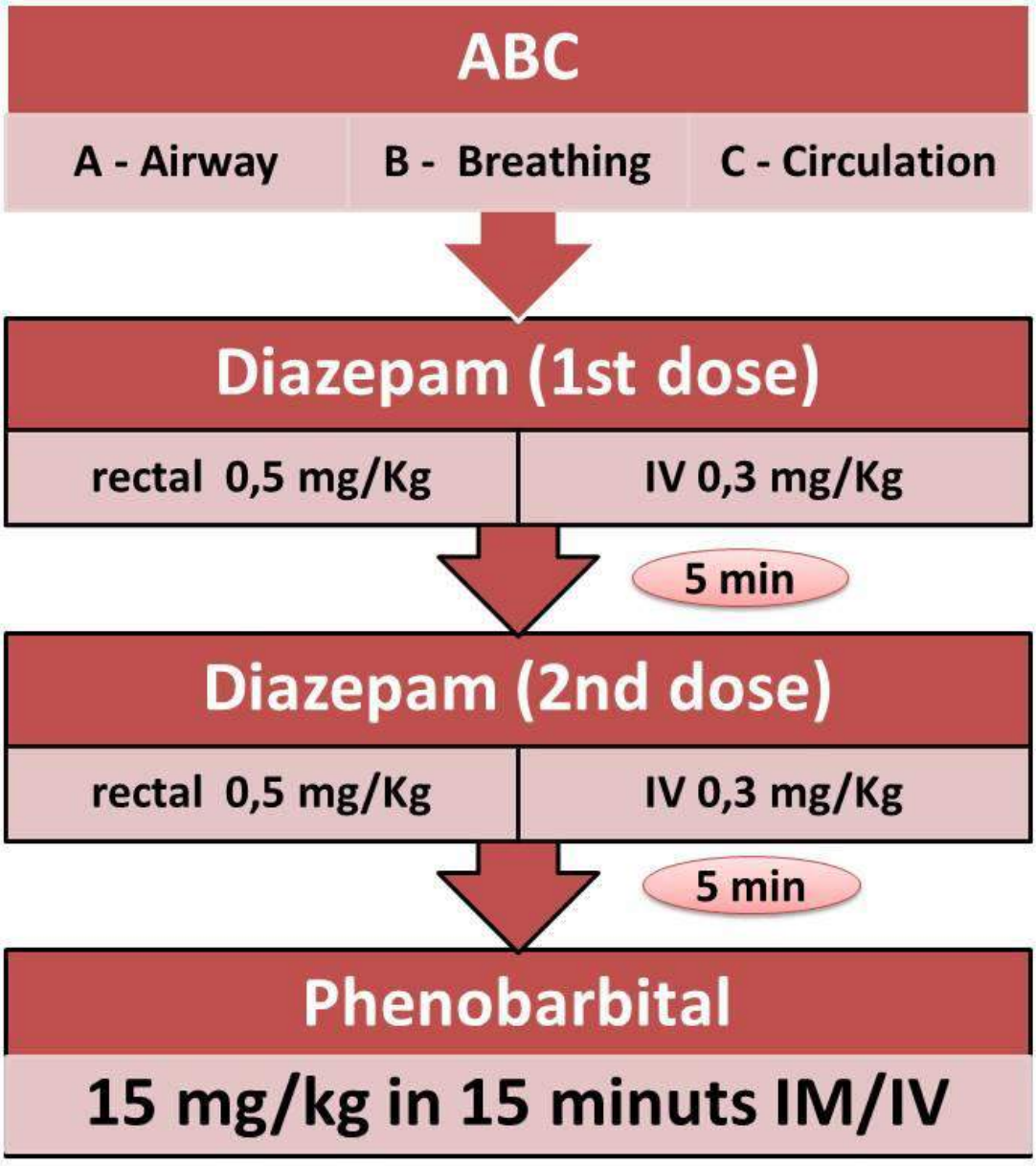
Itching and scratch marks on the back, belt line and armpits
The lices are on the clothes, not on the body

Head lices	**PERMETRINE 1%** lotion apply to dry hair and wash after 10 minuts Or **MALATHION 0,5%** lotion 6m – 2 years. Wash after 8 hours >2 years: Wash after 12 hours Repeat the application after 10 days **Cloths and bedding washed and exposed to the sun light** **Or** **Sealed in a plastic bag for 2 weeks**
Body lices	Cloths and bedding washed and exposed to the sun light Or Sealed in a plastic bag for 2 weeks
FUNGAL INFECTIONS	
CANDIDIASIS	
Oral candidiasis: white patches on the tongue, inside the cheeks **MICONAZOL ORAL GEL** or **NYSTATIN** PO 100.000 UI/QID Diaper dermatitis: erythema of the perianal area with peripheral desquamation and sometimes pustules. Treatment: avoid humidity, expose buttocks to air. Protect the skin with zinc oxide ointment if diarrhoea is present.	
DERMATOPHYTOSES	
Tinea capitis	**Scalp ringworm.** Inflammation, suppuration, crusting, peripheral lymphadenopathy <u>Treatment</u> - Shave or cut hair short on and around the lesions - if suppurative lesions treat as impetigo before applying local treatment **WHITFIELD'S OINTMENT** BID 2 weeks Or **KETOCONAZOLE** cream BID 2 weeks **+** **GRISEOFULVIN** PO for 6 weeks < 12 years: 10-15 mg/kg/day OD or BID (maximum 500mg/day) > 12 years: 500mg OD or BID

Tinea corporis	**Ringworm of the body** Erythematous, scalym pruritic macule with a well demarcated, raised, vesicular border and central healing Localized tinea: **WHITFIELD'S OINTMENT** BID 4 weeks Or **KETOCONAZOLE** cream BID for 4 weeks Extensive lesions: **GRISEOFULVIN** PO for 2-4 weeks < 12 years: 10mg/kg/day OD or BID (maximum 500mg/day) > 12 years: 500mg OD or BID

CENTRAL NERVOUS SYSTEM

SEIZURES



IN CHILDREN OLDER THAN 1 MONTH

EPILEPSY

1. DEFINITION

A convulsion or seizure is a temporary disturbance in brain function in which groups of nerve cells in the brain signal abnormally and excessively.

During a seizure, the following can (but do not always) occur:

- changes in awareness or sensation such as loss of consciousness (unlike chills or trembling)
- involuntary movements, most often jerking motion of arms and/or legs but also subtle twitching of the face or hand
- other changes in behavior (lip smacking, staring away).

2. CAUSES

Epilepsy is a chronic neurological disorder characterized by recurrent, unprovoked seizures. Most (70% to 80%) of cases of epilepsy are idiopathic (cause is unknown, but presumed to be genetic).
Cerebral damage (congenital, previous infections or trauma) and cerebral tumors are additional causes.

3. DIAGNOSIS

The diagnosis of epilepsy is based on a detailed history of the child and family, the clinical examination, especially the neurological exam (look for conditions co-existing with epilepsy, such as cerebral palsy, etc.).
Further investigations such as detailed laboratory investigations, electroencephalogram and neuro-imaging can not be available.

Criteria for diagnosis of epilepsy

- Epilepsy is defined as having had two or more unprovoked seizures
- Exclude all causes of non-epileptic seizures (acute diseases, head trauma, hypoglycemia, etc.)
- Exclude other disorders such as syncope, breath-holding spells and psychogenic seizures.

4. TREATMENT OR MANAGEMENT

Treatment is indicated in the following situations:

- Any seizure lasting >5 minutes
- Any child who has more than one seizure within a 5-minute interval
- Any child with more than three febrile seizures in 24 hours

Before start consider:

- As epilepsy treatment is a long-term treatment
- It needs to be established that the family is willing to give the treatment and come for consultation on a regular basis.
- The most common seizures in childhood are of the generalized tonic-clonic type. The main four antiepileptic drugs (AEDs)—phenobarbital, phenytoin, carbamazepine and valproate—are almost equally effective for these seizures
- In cases of non-convulsive "absence seizures," use valproate as first-line treatment.

5. GUIDING PRINCIPLES TO START ANTIEPILEPTIC TREATMENT:

- Carefully establish diagnosis.
- Start treatment with one drug.
- Phenobarbitone is the most cost-effective drug and should be consider as first-line

Phenobarbitone is the most cost-effective drug and should be considered as first-line treatment.

Check for co-existing clinical conditions (heart, renal, hepatic failure, etc.) and contraindications for the drugs or interactions with other medications the patient might be taking.

A **starting dose of phenobarbital (3 mg/kg once a day)** is given for 3–4 weeks.
For the majority of patients, the starting dose is not enough to reach complete seizure control.
Gradually increase dosage with increments at regular intervals **(add 1 mg/kg every 3–4 weeks and give BID)** until complete seizure control (minimum maintenance dose), until side effects appear or until the maximum dosage has been reached.
Maximum dose of phenobarbital: 8 mg/kg/day BID (Max 600 mg/day)
Severe "intoxication" side effects appearing at the beginning of the treatment can indicate too rapid an increase in dosing.

If phenobarbital is not well tolerated (side effects) or if the maximum tolerated dose does not lead to seizure control, substitute it with another anticonvulsant (carbamazepine).

A **starting dose of carbamazepine (5mg/kg BID)** is given for 3–4 weeks. For the majority of patients, the starting dose is not enough to reach complete seizure control.
Gradually increase dosage with increments at regular intervals **(add 5 mg/kg every**

3–4 weeks) until complete seizure control (minimum maintenance dose), until side effects appear or until the maximum dosage has been reached. **Maximum dose of Carbamazepine 35 mg/kg/day (Max 1000 mg/day)**

Severe "intoxication" side effects appearing at the beginning of the treatment can indicate too rapid an increase in dosing.

When carbamezapine becomes effective, phenobarbital is gradually withdrawn.

If carbamazepine is not well tolerated (side effects) or if the maximum does not lead to seizure control, substitute it with another anticonvulsant (Valproate sodium).

A **starting dose of Valproate sodium (10mg/kg BID)** is given for 2 weeks. For the majority of patients, the starting dose is not enough to reach complete seizure control.
Gradually increase dosage with increments at regular intervals **(add 5 mg/kg every week)** until complete seizure control (minimum maintenance dose), until side effects appear or until the maximum dosage has been reached. **Maximum dose of Valproate sodium 40 mg/kg/day (Max 2500 mg/day)**

When Valproate sodium becomes effective, carbamazepine is gradually withdrawn.

Consider the use of 2 anticonvulsants, if the maximum dose of 2 or 3 antiepileptic drugs in monotherapy do not lead seizures control. The use of 2 drugs increase the possibility of side effects.

6. MONITORING AND FOLLOW-UP OF EPILEPSY PATIENT

During the first visit:

- Record the patient in the epilepsy register (if you do not have one, create one)

- History and clinical examination (including weight)
- Type and frequency of seizures

- Treatment plan and follow-up

- Provide counseling for patient and relatives (medical and social aspects)

- Fill and give a record card to the patient/relatives

- Name, address and contact (relative) of patient - Registration number
- Current medication
- Frequency of seizures since last visit
- Next appointment

- Provide a "safety stock" of medication in case the family cannot come back on the day of the follow-up appointment.

Follow-up visits should be scheduled as follows:

• second visit after 1 week (to check for side effects)
• third visit after 1 month (to check for side effects, compliance and response to treatment)
• next visits should be monthly until seizures are under control, then every 3 months.

7. FACTS TO BE DISCUSSED WITH THE PATIENT AND THE FAMILY:

- Epilepsy is a medical disorder that can be improved with medical treatment.
- In order for the drugs to be effective, they have to be taken for many years, possibly life long.
- It may take several days to a few weeks before the drugs show any effect.
- Do not modify or change the doses prescribed.
- Discontinuation of the drugs will result in recurrence of the seizures.
- Children with epilepsy are more likely to have seizures when they are sick.
- The disease is not contagious and anyone can touch the person while he or she is having a seizure (e.g., to remove him from the danger of fire or water).
- Children need to participate as fully as possible in the normal activities of their peers, at school, at play, in the home and preparing for employment.
- Overprotection is not helpful in a child's upbringing, but reasonable precautions should be taken if there are still occasional seizures (e.g., protection from fire, not climbing trees).
- In the event of seizure: place the child on his or her side, move the child away from potential hazards, do not try to stop the child's movements, do not put anything in the child's mouth and stay with the child until the seizures ends. Seek medical advice.
-

8. CRITERIA TO STOP ANTIEPILEPTIC DRUGS:

- Gradual withdrawal of antiepileptic drug therapy should be considered **in most children** after 2 years without seizures regardless of the etiology of the seizures.

- Children with co-existing conditions (cerebral palsy, etc.) with epilepsy are at risk of recurrent intractable seizures after discontinuing antiepileptic drugs.

- If no pediatrician is available in the field, contact the Pediatric Advisor prior to discontinuation of treatment.

Drug	Starting dose	Maximum dose	Contraindications	Side effects
Phenobarbitone	3 mg/kg OD Increase gradually: add 1 mg/kg at regular intervals(3–4 weeks), up to minimum maintenance dose	8 mg/kg/day or 250 mgr/day	Lopinavir/ritonavir (antiretroviral therapy) Artemether, lumefantrine, chloramphenicol, praziquantel, cotrimoxazole, quinine, clarithromycin	Systemic side effects Nausea, rash Neurotoxic side effects Alteration of sleep cycles, sedation, lethargy, behavioural changes, hyperactivity, ataxia, tolerance, dependence
Carbamazepine	5 mg/kg BID Increase gradually: add 5 mg/kg every week up to minimum maintenance dose	35 mg/kg/day or 1000 mg/day	Lopinavir/ritonavir (antiretroviral therapy) Phenytoin, artemether, doxycycline, isoniazid, praziquantel, clarithromycin, quinine	Systemic side effects Nausea, vomiting, diarrhoea, hyponatremia, rash, pruritus Neurotoxic side effects. Drowsiness, dizziness, blurred or double vision, lethargy, headache
Valproic Acid	10 mg/kg BID Increase gradually: add 5 mg/kg every week up to minimum maintenance dose	40 mg/kg/day or 2500 mgr/day	Carbapenem, mefloquine, macrolide	Systemic side effects Weight gain, nausea, vomiting, hair loss, easy bruising Neurotoxic side effects Tremor, dizziness Hepatitis and pancreatitis

OTHERS

DENTAL INFECTION	
Treatment	**AMOXICILLIN-CLAVULANIC** PO 50 mg/kg/day TID for 7 days + IBUPROFEN Refer to Dental Specialist if Possible

ABSCESS	
Collection of pus in the soft tissues. Most common due to *Staphylococcus aureus*	
Treatment suppurative stage	Surgical drainage At this stage the abscess is red, inflamed, painful, fluctuant. The abscess cavity is inaccessible to antibiotics
Indurated stage	**AMOXICILLIN** PO 80 mg/kg/day TID for 7 days + **METRONIDAZOL** PO 30 mg/kg/day TID for 7 days Or **AMOXICILLIN-CLAVULANIC** PO 80 mg/kg/day TID for 7 days - If no improvement in 48 hours: **Surgical Drainage**

ANNEX

HYPOGLYCEMIA

5 ml /kg of DNS10%

How to treat hypoglycemia in an unconscious patient?

Administer bolus of 5mL/kg of DNS10%

How to prepare Dextrose 10%?

Take 12,5 mL of D 40% + 37,5 mL of NS in a 50 mL syringe

ANNEX GLASGOW COMA SCALE

The Glasgow coma scale for adults and older children	
	Score
Eyes open: • Spontaneously • To speech • To pain • Never	 4 3 2 1
Best verbal response • Orientated • Confused, disoriented • Inappropriate words • Incomprehensible sounds • None	 5 4 3 2 1

Best motor response • Obeys commands • Localizes pain • Withdraws (flexion) • Abnormal Flexion posturing • Extension posturing • None	 6 5 4 3 2 1
TOTAL	3 -15

To calculate the Glasgow coma score, take the score for each section, then add the three figures to obtain a total score.

- Unarousable coma is defined as having a score < 10.
- Patients scoring 3 or 4 have an 85% of chance of dying or remaining vegetative.
- Patients scoring above 11 indicate only a 5 to 10 percent likelihood of death or vegetative state and 85 % of chance of moderate disability or good recovery.

ANNEX BLANTYRE COMA SCALE

Blantyre coma scale for young children who are preverbal	
	Score
Eye movements: • Directed (followed mother/caretakers face) • Not directed	 1 0
Verbal response • Appropriate for age (cry) • Moan or inappropriate for age (cry) • Gasp/none	 2 1 0
Best motor response: • Localizes painful stimulus (rub your knuckles firmly on the patients sternum) • Withdraws limb from pain (press firmly on patients thumbnail bed with the side of a horizontal pencil) • Nome specific or absent response	 2 1 0

Blantyre scale: Unarousable come is defined as having a score of < 3
The scores can be used repeatedly to assess improvement or deterioration.

ANAPHILAXIA

Give **epinephrine/adrenaline IM 0.01 mg/kg**. Use undiluted solution (1mg/ml) in a 1ml syringe and administer into the mid-anterolateral thigh. The IM dose of epinephrine/adrenaline does not need to be calculated exactly in anaphylaxis. Use the following chart

Age/weight	Dose of 1mg/ml epinephrine
<6 years or < 25kg	0,15 ml
6-12 years or 25-40 kg	0,3 ml
>12 years or >40kg	0,5 ml

If the patient does not improve, repeat every 5 minutes for a maximum of 3 doses

If a 1ml syringe not available, add 1ml of 1mg/ml epinephrine to 9 mL of 0,9% NaCl for 0,1 mg/ml solution, then administer as follows.

Age/weight	Dose of 0,1mg/mL epinephrine
< 6 years or < 25 kg	1,5 ml
6-12 years or 25-40 Kg	3ml
>12 years or >40Kg	5mL (IM??? Very painful)

PARACETAMOL syrup 120 mg/5 mL		
Kg	**mL**	**mg**
1 - < 2 Kg	1 mL	
2 – < 3 Kg	1,5 mL	
3 - < 4 Kg	2 mL	
4 - < 5 Kg	2,5 mL	
5 - < 6 Kg	3 mL	
6 - < 7 Kg	4 mL	100 mg
7 - < 8 Kg	4,5 mL	
8 - < 9 Kg	5 mL	
9 - < 10 Kg	6 mL	
10 - < 11Kg	6,5 mL	

11 - < 12 Kg	7 mL	
12 - < 13 Kg	8 mL	
13 - < 14 Kg	8,5 mL	
14 - < 15 Kg	9 mL	
15 - < 16 Kg	9,5 mL	
16 - < 17 Kg	10 mL	250 mg
17 – 30 Kg		250 mg
> 30 Kg		500 mg

COTRIMOXAZOL (Trimethoprim+Sulfamethoxazole)

4mg/kg Trimethoprim+ 20 mg/kg Sulfamethoxazol

	3 - <6 Kg	6 - <10 Kg	10 - 14 Kg	15 - 19 Kg	20 – 30 Kg
Cotrimoxazol syrup 40/200mg/5mL	2 mL	3,5 mL	6 mL	8,5 mL	-
Cotrimoxazol 80/400mg	¼ tab	½ tab	1 tab	1 tab	1 tab

NORMAL DAILY MAINTENANCE IV FLUIDS in children > 1 month and adults

This protocol should not be used for surgical burns patients, those with renal, cardiac disease or diabetic ketoacidosis.

Fluid to be administered

The fluid of choice is **Ringer Lactate with Dextrose 5% (RL-D5%).**

How to prepare RL-D5%

Add 25 mL of D 40% to 175 mL of RL = 200 mL of RL-D5%

Weight	Volume/24 hours	Rate (1mL= 20 drops)
3 to < 4 Kg	350 mL/24h	
4 to < 5 Kg	450 mL/24h	
5 to < 6 Kg	550 mL/24h	
6 to < 7 Kg	650 mL/24 h	
7 to < 8 Kg	750 mL/24h	
8 to < 9 Kg	850 mL/24h	
9 to < 11 Kg	950 mL/24h	

11 to < 14 Kg	1100 mL/24h	
14 to < 16 Kg	1200 mL/24h	
16 to < 18 Kg	1300 mL/24h	
18 to < 20 Kg	1400 mL/24h	
20 to < 22 Kg	1500 mL/24h	20 drops/min
22 to <26 Kg	1600 mL/24h	22 drops/min
26 to <30 Kg	1700 mL/24h	24 drops/min
30 to < 35 Kg	1800 mL/24h	26 drops/min
≥ 35 Kg	2000 mL/24h	28 drops/min

Daily needs are calculated according the following formula:

- Children 0-10 Kg: 100 mL/kg/day
- Children 11-20 Kg: 1000 mL + 50mL/kg every Kg over 10Kg
- Children >20 Kg: 1500 mL+ 20 mL/kg every Kg over 20 Kg.
- Adults: 2 liters per day

ANNEX CROUP CLASSIFICATION

Modified Westley Clinical Scoring System for Croup

	0	1	2	3	4	5
Inspiratory Stridor	Not present	When agitated/active	At rest			
Intercostal recession		Mild	Moderate	Severe		
air entry	Normal	Mild decreased	Severely decreased			
Cyanosis	None				With agitation activity	At rest
level of consciousness	Normal					Altered

Total possible Score = 0 – 17. <4= Mild Croup; 4 – 6= Moderate Croup; >6= Severe Croup

ANNEX BRONCHITIS SEVERITY. WOOD-DOWNES SCORE			
	0	**1**	**2**
Espiratory wheezing	No	Mild	Moderate
Use of supplementary muscle	No	Moderate	Maximum
Air entry	Normal	Mild decreased	Absend
Cyanosis	None	Yes at room air	Yes with oxigen
Saturation	>94%	90-94%	<90%
level of consciousness	Normal	Agitated or lethargic	Coma

If score ≤ 3: mild

IIf scoe 4-5: moderate

If score ≥6: severe

ANNEX FEEDING PROBLEMS

Feeding of normal baby:
The mother should be instructed to start feeding the baby within one to two hours after delivery. The first feed should be the breast milk and there is no need for any test feed with water or dextrose. The first few feeds should be supervised and records of feeds should be documented.

Feeding of a preterm, small for date (SGA) and infants of diabetic mothers (IDM): Infants less than 1500 grams should receive all the fluids and calories intravenously for the first 24 hours. SGA and IDM babies should be started feeding by one hour of age, First few feeds may be given by NG tube and they should be fed at least two hourly if sucking is poor. Once sucking is well established and blood sugar is normal these babies should be given to the mother for supervised breast feeding.

Feeding of term asphyxiated infants:
Mildly asphyxiated infants should feed like any healthy baby but must be closely supervised for the first 12 hours. Babies with severe asphyxia should be started with 2/3 maintenance IV fluids and strict intake records should be maintained routinely.

Evidence for adequate nutrition
Weight gain should be 20–30g/kg/day for premature infants and 10g/kg/day for full term infants

Adequate growth requires:
100-120kcal/kg/day in term infants 115-130kcal/kg/day for preterm infants 150kcal/kg/day for very low birth weight infants

ANNEX FLUID AND ELECTROLYTE

Normal maintenance requirements (volume of fluid/kg/day)

Day 1	60 mL/kg/day
Day 2	80 mL/kg/day

Day 3	100 mL/kg/day
Day 4	120 mL/kg/day
Day 5	60 mL/kg/day
Day 6	140 mL/kg/day
Day 6 and above	160 mL/kg/day

BREATH SOUNDS

Table 9.1.1. Adventitious breath sounds

Name	Continuous/ discontinuous	Frequency/ pitch	Inspiratory/ expiratory	Quality	Associated conditions
Wheeze (can be heard without a stethoscope when severe)	Continuous	High pitched, with higher-pitched wheezes indicative of more severe obstruction	Normally expiratory, can be inspiratory if very severe	Whistling/ sibilant, musical, hissing or shrill	Diffuse wheezing: asthma, bronchiolitis Unilateral wheezing: foreign body in the lower airway
Rhonchi	Continuous	Harsh, low pitched	Both	Snoring quality	Airway obstruction from secretions, oedema or inflammation
Stridor	Continuous	High	Inspiratory	Whistling or barking	Epiglottitis, croup, foreign body
Inspiratory gasp/whoop	Intermittent	High	Inspiratory	Whoop	Whooping cough
Crackles/ crepitations or rales	Discontinuous and brief	High and soft (fine) or low (coarse), non-musical	Inspiratory, especially when the child is crying and takes a deep breath in	Cracking, clicking, rattling	Coarse crackles: pneumonia Fine crackles: pulmonary oedema

HEART RATE AND RESPIRATORY RATE

Table 1.1.1 Normal heart and respiratory rates by age

Age	HR (Beats/min)		RR (Breaths/min)	
	Tachycardia	Bradycardia	Bradypnoea	Tachypnoea
<3 months	>160	<100	<30	>60
3 to 11 months	>160	<90	<30	>50
1 to 4 years	>140	<80	<25	>50
5 to 12 years	>100	<70	<20	>30
>12 years	>90	<60	<14	>20

NORMAL SYSTOLIC BLOOD PRESSURE

Table 1.1.6 Normal systolic blood pressure by age

Age	SBP (mm Hg)*
<3 months	≥50
2 to 11 months	≥60
1 to 5 years	≥70
5 to 12 years	≥80
>12 years	>90

*Only the normal minimum value for systolic blood pressure as defined by age is given because hypertension is not a common emergency problem among children

TRIAGE PRIORITY CATEGORIES

Table 2.1.1. Triage priority categories

Category	Procedure
Red: Signs of an immediately life-threatening emergency are present.	• The child is immediately admitted to the medical care zone to be stabilised and treated by the doctor.
Yellow: Signs of an urgent, though not immediately life-threatening, situation are present.	• Child should be given priority in the queue so that he or she can be admitted to the medical care zone after all red cases have been resolved. • The child can wait up to 1 hour to see the doctor. • The child must be reassessed every 20 minutes to ensure that they do not progress to the red category.
Green: Neither emergent nor urgent signs are present.	• The child is admitted to the medical care zone after all red or yellow cases have been resolved. • The child can wait up to 4 hours to see the doctor. • The child must be reassessed every 60 minutes to ensure that he or she does not progress to either the red or yellow categories.

EMERGENCY SIGNS (ABCDE)

Table 2.1.2. Emergency signs (ABCD)

Airway and breathing • Absence of breathing • Cyanosis • Severe respiratory distress Fast breathing + one of the following: – Nasal flaring – Abnormal positioning – Accessory muscle use – Abdominal breathing – Grunting	Manage airways and breathing 1. Support or open airways 2. Administer O_2 3. Support ventilation as needed
Circulation Signs of shock, including at least three of the following: • Fast pulse • Weak or absent pulse • Cold hands and feet • Capillary refill >2 seconds Hypovolaemic shock: Shock + signs of severe dehydration, or Shock + bleeding/haemorrhage Septic shock: Shock + sepsis Anaphylactic shock: Shock + allergen exposure Cardiogenic Shock: Shock + cardiac disease	Manage circulation 1. Stop any bleeding 2. Manage airways and support ventilation as needed 3. Administer O_2 4. Ensure vascular access (IV/IO) 5. Begin IV/IO fluid therapy (Lactated Ringers or NaCl 0.9%) for hypovolaemic shock 6. Follow specific protocols for sepsis and cardiogenic shock 7. Check glucose, malaria and Hb as needed
Disability (neurological status) • Coma – Altered level of consciousness – AVPU • Convulsion	Manage coma and convulsion 1. Manage airways and support ventilation as needed 2. Ensure vascular access (IV/IO) 3. Check glucose and treat hypoglycaemia if present 4. Administer diazepam if convulsion is present 5. Put patient in recovery position

PRIMARY ASSESSMENT

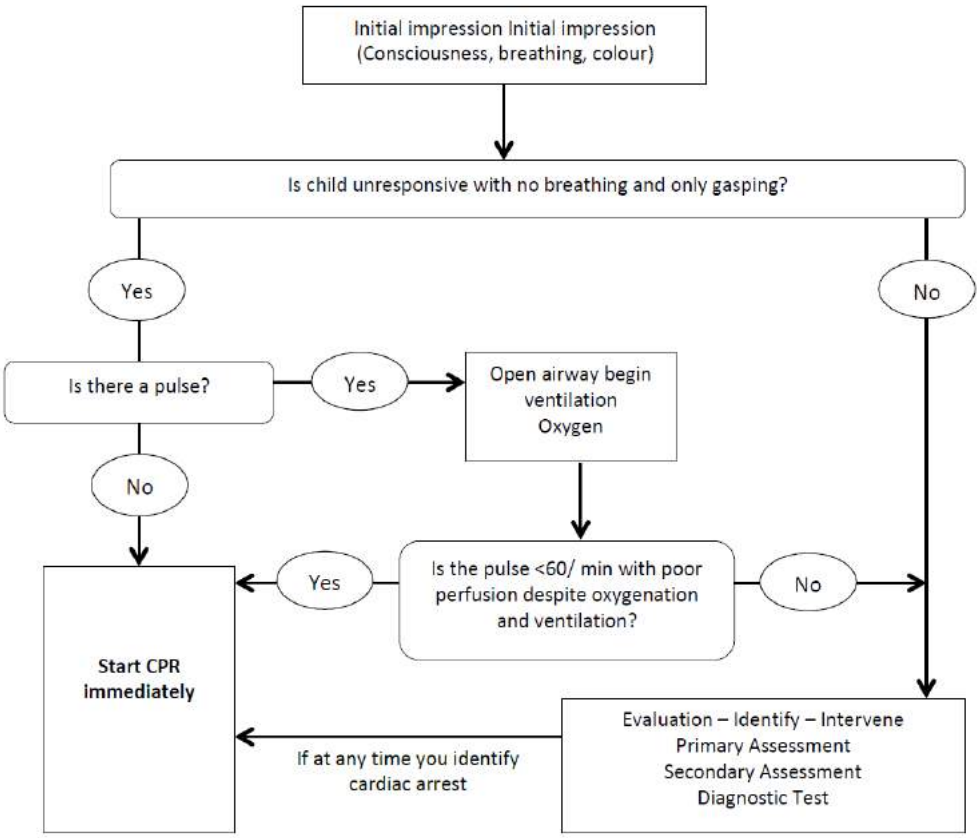
Table 2.2.1. Primary assessment

ABCDE	Emergency Signs and Symptoms	Management
Airway	**Complete or Partial Airway Obstruction** The following signs suggest that the upper airway is obstructed: • Increased inspiratory effort with retractions • Abnormal inspiratory sounds (snoring or stridor) • Episodes where no airway or breath sounds are present despite respiratory effort	**Call for help** 1. Support or open airways 2. Suction as needed 3. Remove visualised foreign body (See Chapter 2.3 for information regarding airway management)
Breathing	If the child is cyanotic (SpO_2 <95%), check for the following. **Respiratory Distress** Respiratory distress is indicated by rapid + increased work of breathing (any one of the following signs): • Nasal flaring • Abnormal positioning • Retractions or chest indrawing • Abdominal breathing • Grunting	**Call for help** 1. Support an open airway (allow the child to assume a position of comfort) 2. Clear the airway if indicated 3. Provide O_2
	Respiratory Failure and Apnoea	**Call for help** 1. Support or open the airway 2. Clear the airway if indicated 3. Consider an oropharyngeal airway 4. Provide O_2 5. Administer inhaled medication as needed 6. Assist ventilation with bag-mask device 7. Ensure vascular access (IV/IO) (See Chapter 2.3 for information regarding airway management)
	Tension Pneumothorax	Immediate needle aspiration of the chest (see Chapter 8.7)

Circulation	**Shock** Signs of shock: at least three of the following: • Fast pulse • Weak or absent pulse • Cold hands and feet • Capillary refill time >2 seconds **Specific Types of Shock** **Hypovolaemic shock**: Shock + Signs of severe dehydration Shock + Bleeding/haemorrhage **Septic shock:** Shock + Sepsis **Anaphylactic shock:** Shock + Allergen exposure **Cardiogenic Shock:** Shock + Cardiac disease **Cardiorespiratory Arrest** **Absence of a central pulse** **Severe Anaemia** Pallor of: • Mucous membranes/lips • Nail beds • Palms and soles Plus Signs of decompensation • Tachycardia (signs of shock) • Respiratory distress • Altered level of consciousness	**Call for help** 1. Manage airways 2. Provide O2 3. Ensure vascular access (IV/IO) 4. Treat shock according protocols of shock 5. Keep the patient warm **Call for help** **Immediately begin CPR** **Call for help** 1. Manage airways 2. Provide O_2 3. Ensure vascular access (IV/IO) 4. Transfuse blood ASAP according to protocol
Disability	**Coma, Convulsion and/or Confusion** Look for signs of: • Hypoglycaemia • Shock and/or sepsis • Meningitis/encephalitis • Cerebral malaria • Trauma • Diabetic ketoacidosis • Postictal status/Status epilepticus • Toxin ingestion	**Call for help** 1. Manage airways and assist breathing 2. Provide O2 3. Ensure vascular access (IV/IO) and administer bolus for hypovolaemic shock 4. Check glucose and test for malaria 5. Administer D10% for hypoglycaemia or if glucose cannot be checked 6. Administer diazepam if convulsions are present 7. Administer antibiotic for meningitis or sepsis 8. Administer antimalarial drugs for malaria
Exposure	**Hypothermia** **Hyperthermia/Hyperpyrexia** Look for: • Bleeding • Petechiae/purpura (signs of septic shock) • Trauma • Burns	Treat hypothermia (survival blanket) Treat fever according protocol Treat burns according protocol

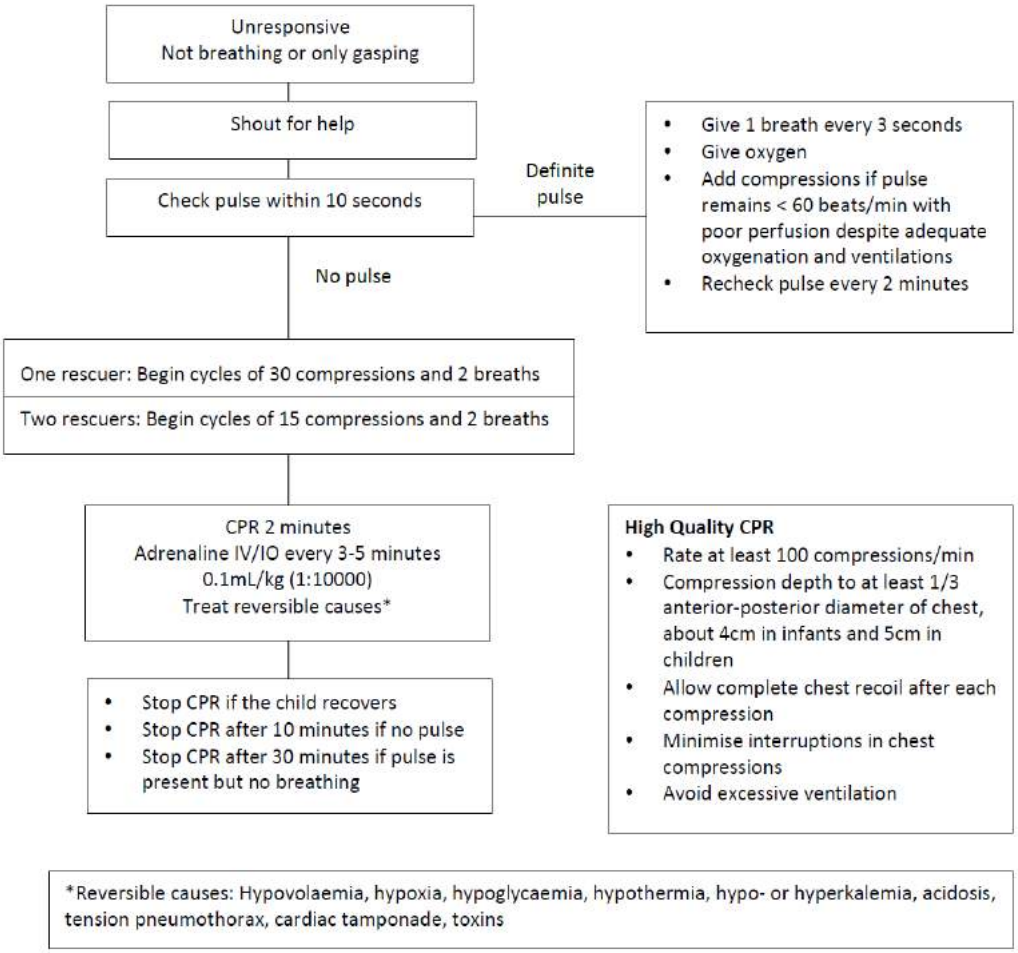
ALGORITHM SERIOUSLY ILL CHILD

Figure 2.3.1. Assessment algorithm for the seriously ill child



CPR ALGORITHM

Figure 2.3.2. CPR algorithm

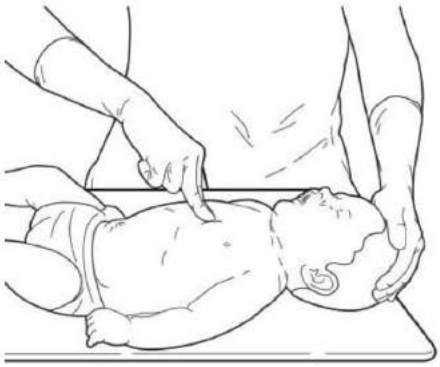


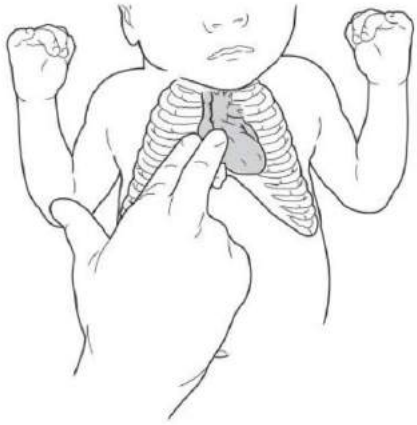
CPR IN INFANTS

CPR in Infants

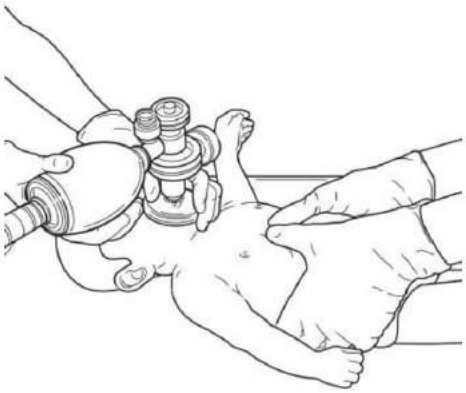
Infant CPR is slightly different from that for older children.

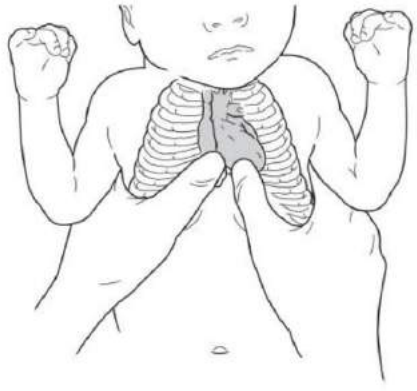
Two-finger chest compression technique in infant





Two-thumb encircling hands chest compression in infant (two-person technique)





NORMAL VALUES

NORMAL VALUES: BLOOD

Albumin (S)[1]

Newborn:	2.6–3.6 g/dL
1–3 years:	3.4–4.2 g/dL
4–6 years:	3.5–5.2 g/dL
7–9 years:	3.7–5.6 g/dL
10–19 years:	3.7–5.6 g/dL

Aldolase (S)[1]

10–24 months:	3.4–11.8 U/L
2–7 years:	1.2–8.8 U/L
Adults:	1.7–4.9 U/L

Aldosterone (S)[1]

6–9 years:	1–24 ng/dL
10–11 years:	2–15 ng/dL
12–14 years:	1–22 ng/dL
15–17 years:	1–32 ng/dL

Alkaline Phosphatase (S)[2]

Values in IU/L at 37°C (98.6°F) using *p*-nitrophenol phosphate buffered with AMP (kinetic).

Age	Males	Females
Newborns (1–3 days)	95–368	95–368
2–24 months	115–460	115–460
2–5 years	115–391	115–391
6–7 years	115–460	115–460
8–9 years	115–345	115–345
10–11 years	115–336	115–437
12–13 years	127–403	92–336
14–15 years	79–446	78–212
16–18 years	58–331	35–124
Adults	41–137	39–118

a_1Antitrysin (S)[1]

Newborn:	143–440 mg/dL
1–3 years:	147–244 mg/dL
4–9 years:	160–245 mg/dL
10–13 years:	166–267 mg/dL
14–19 years:	152–317 mg/dL

Aspartate Aminotransferase (AST) (GOT), Serum (S)[2]

Values in IU/L at 37°C (98.6°F) using *p*-nitrophenol phosphate buffered with AMP (kinetic).

	Males	Females
0-11 months:	not established	not established
1-13 years:	8-60 U/L	8-50 U/L
> or =14 years:	8-48 U/L	8-43 U/L

Alanine Aminotransferase (ALT) (GPT), Serum (S)[2]

Values in IU/L at 37°C (98.6°F) using *p*-nitrophenol phosphate buffered with AMP (kinetic).

	Males	Females
< 1 year:	not established	not established
>= 1 year	7 – 55 U/L	7 – 45 U/L

Ammonia (P)[1]

Newborns:	<50 mmol/L
Thereafter:	0–35 mmol/L

Base Excess (B)[1]

Newborn:	–10 to –2 mmol/L
Infant:	–7 to –1 mmol/L
Child:	–4 to +2 mmol/L
Thereafter:	–3 to +3 mmol/L

Bicarbonate, Actual (P)[2]

Calculated from pH and $Paco_2$

Newborns:	17.2–23.6 mmol/L
2 months–2 years:	19–24 mmol/L
Children:	18–25 mmol/L
Adult males:	20.1–28.9 mmol/L
Adult females:	18.4–28.8 mmol/L

Bilirubin, Conjugated (S)[1]

Neonates:	<10 f-mol/L
Neonate:	<2 f-mol/L
Preterm (1–6 days):	<10 f-mol/L

Bleeding Time (Simplate)[2]

2–9 min.

Blood Volume[2]

Premature infants: 98 mL/kg

At 1 year:	86 mL/kg (range, 69–112 mL/kg)
Older children:	70 mL/kg (range, 51–86 mL/kg)

Calcium (S)[2]

Premature infants (first week):	3.5–4.5 mEq/L (1.7–2.3 mmol/L)
Full-term infants (first week):	4.0–5.0 mEq/L (2.0–2.5 mmol/L)
Thereafter:	4.4–5.3 mEq/L (2.2–2.7 mmol/L)

Carbon Dioxide, Partial Pressure (Pco_2) (B)[1]

Newborn:	27–40 mmHg	(3.6–5.5 kPa)
Infant:	27–41 mmHg	(3.6–5.5 kPa)
Children:	32–48 mmHg	(4.3–6.4 kPa)

Carbon Dioxide, Total (P)[1]

Cord blood:	13–29 mmol/L
<1 year:	17–31 mmol/L
Adults:	24–30 mmol/L

Chloride (S, P)[1]

<1 year:	96–111 mmol/L
1–17 years:	102–112 mmol/L
Adults:	100–108 mmol/L

Cholesterol, High-Density Lipoprotein (S)[1]

1–9 years:	35–82 mg/dL	(0.91–2.12 mmol/L)
10–13 years:	36–84 mg/dL	(0.93–2.17 mmol/L)
14–19 years:	35–65 mg/dL	(0.91–1.68 mmol/L)

Cholesterol, Low-Density Lipoprotein (S)[1]

5–9 years:	63–140 mg/dL	(1.63–3.63 mmol/L)
10–14 years:	64–136 mg/dL	(1.66–3.52 mmol/L)
15–19 years:	59–137 mg/dL	(1.53–3.55 mmol/L)

Cholesterol, Total (S, P)[1]

1–3 years:	44–181 mg/dL	(1.15–4.70 mmol/L)
4–6 years:	108–187 mg/dL	(2.80–4.80 mmol/L)
7–9 years:	112–247 mg/dL	(2.90–6.40 mmol/L)
10–13 years:	125–244 mg/dL	(3.25–6.30 mmol/L)
14–19 years:	106–224 mg/dL	(2.75–5.80 mmol/L)

Complement (S)[2]

C3:	96–195 mg/dL
C4:	15–20 mg/dL

Creatine Kinase (S, P)[2]

Newborns (1–3 days):	40–474 IU/L at 37°C (98.6°F)
Adult males:	30–210 IU/L at 37°C (98°F)
Adult females:	20–128 IU/L at 37°C (98.6°F)

Creatine (S, P)[2]

Values in mg/dL (f-mol/L)

Age	Males	Females
1–3 days[a]	0.2–1.0 (17.7–88.4)	0.2–1.0 (17.7–88.4)
1 year	0.2–0.6 (17.7–53.0)	0.2–0.5 (17.7–44.2)
2–3 years	0.2–0.7 (17.7–61.9)	0.3–0.6 (26.5–53.0)
4–7 years	0.2–0.8 (17.7–70.7)	0.2–0.7 (17.7–61.9)
8–10 years	0.3–0.9 (26.5–79.6)	0.3–0.8 (26.5–70.7)
11–12 years	0.3–1.0 (26.5–88.4)	0.3–0.9 (26.5–79.6)
13–17 years	0.3–1.2 (26.5–106.1)	0.3–1.1 (26.5–97.2)
18–20 years	0.5–1.3 (44.2–115.0)	0.3–1.1 (26.5–97.2)

Creatinine Clearance[2]

Values show great variability and depend on specificity of analytical methods used.

Newborns (1 day):	5–50 mL/min/1.73 m^2 (mean, 18 mL/min/1.73 m^2)
Newborns (6 days):	15–90 mL/min/1.73 m^2 (mean, 36 mL/min/1.73 m^2)
Adult males:	85–125 mL/min/1.73 m^2
Adult females:	75–115 mL/min/1.73 m^2

C-Reactive Protien (S)[1]

Cord blood:	10–350 f-g/L
Adult:	68–8,200 f-g/L

Fasting Insulin Level[3]

1.8–24.6 mU/L

Fibrinogen (P)[2]

200–500 mg/dL (5.9–14.7 f-mol/L)

Galactose (S, P)[2]

1.1–2.1 mg/dL (0.06–0.12 mmol/L)

Galactose 1-Phosphate (RBC)

Normal: 1 mg/dL of packed erythrocyte lysate; slightly higher in cord blood
Infants with congenital galactosemia on a milk-free diet: <2 mg/dL
Infants with congenital galactosemia taking milk: 9–20 mg/dL

Galactose 1-Phosphate Uridyl Transferase (RBC)[2]

Normal:	308–475 mIU/g of hemoglobin
Heterozygous for Duarte variant:	225–308 mIU/g of hemoglobin
Homozygous for Duarte variant:	142–225 mIU/g of hemoglobin
Heterozygous for congenital galactosemia:	142–225 mIU/g of hemoglobin
Homozygous for congenital galactosemia:	<8 mIU/g of hemoglobin

Glucose (S, P)[2]

Premature infants:	20–80 mg/dL (1.11–4.44 mmol/L)
Full-term infants:	30–100 mg/dL (1.67–5.56 mmol/L)
Children and adults (fasting):	60–105 mg/dL (3.33–5.88 mmol/L)

Glucose 6-Phosphate Dehydrogenase (RBC)[2]

150–215 units/dL

Glucose Tolerance Test Results in Serum [a2]

	GLUCOSE		INSULIN	
TIME	mg/dL	mmol/L	f-U/mL	pmol/L
Fasting	59–96	3.11–5.33	5–40	36–287
30 min	91–185	5.05–10.27	36–110	258–789
60 min	66–164	3.66–9.10	22–124	158–890
90 min	68–148	3.77–8.22	17–105	122–753
2 hr	66–122	3.66–6.77	6–84	43–603
3 hr	47–99	2.61–5.49	2–46	14–330
4 hr	61–93	3.39–5.16	3–32	21–230
5 hr	63–86	3.50–4.77	5–37	36–265

[a]Normal levels based on results in 13 normal children given glucose, 1.75 g/kg orally in one dose, after 2 weeks on a high-carbohydrate diet.

Glycosylated Hemoglobin (Hemoglobin A_1) (B)[1]

Normal:	4–7% of total hemoglobin
Diabetic patients in good control of their condition:	8–10%
Diabetic patients in poor control:	8–18%
Pregnant Women:	5%–8%

Values tend to vary with testing technique.

[a]Note: These values reflect total Hemoglobin A_1 levels. When Hemoglobin A_{1c} is computed, values are usually 2–4% lower.

Growth Hormone (S)[2]

After infancy (fasting specimen): 0–5 ng/mL
In response to natural and artificial provocation (e.g., sleep, arginine, insulin, hypoglycemia): >8 ng/mL
During the newborn period (fasting specimen): GH levels are high (15–40 ng/mL) and responses to provocation variable

Hematocrit (B)[1]

Age	Males (%)	Females (%)
Newborns	43.4–56.1	37.4–55.9
6 months–2 years	30.9–37.0	31.2–37.2
2–6 years	31.7–37.7	32.0–37.1
6–12 years	32.7–39.3	33.0–39.6
12–18 years	34.8–43.9	34.0–40.7
>18 years	33.4–46.2	33.0–41.0

Hemoglobin (B)[1]

Age	Males (g/dL)	Females (g/dL)
Newborns	14.7–18.6	12.7–18.3
6 months–2 years	10.3–12.4	10.4–12.4
2–6 years	10.5–12.7	10.7–12.7
6–12 years	11.0–13.3	10.9–13.3
12–18 years	11.5–14.8	11.2–13.6
>18 years	10.9–15.7	10.7–13.5

Hemoglobin A_{1C}

See Glycosylated Hemoglobin.

Hemoglobin Electrophoresis (B)[2]

A_1 hemoglobin:	96%–98.5% of total hemoglobin
A_2 hemoglobin:	1.5%–4% of total hemoglobin

Hemoglobin, Fetal (B)[2]

At birth:	50%–85% of total hemoglobin
At 1 year:	<15% of total hemoglobin
Up to 2 years:	:::5% of total hemoglobin
Thereafter:	<2% of total hemoglobin

Immunoglobulins (S)[1]

Age	IgG (mg/dL)	IgA (mg/dL)	IgM (mg/dL)
1–30 days	221–1031	1–19	12–117
1–6 months	195–794	1–59	9–212
7–12 months	184–974	9–107	4–216
1–3 years	507–1407	18–171	63–298
4–6 years	571–1550	47–231	64–298
7–9 years	589–1717	41–252	49–270
10–12 years	705–1871	61–269	58–340
13–15 years	709–1907	42–304	57–361
16–18 years	632–2108	89–322	59–360

Immunoglobulin D (S)[1]

Newborn:	0 mg/dL
Thereafter:	0–8 mg/dL

Immunoglobulin E (S, P)[1]

0–12 months	<1 KIU/L
1–3 years	<90 KIU/L
4–10 years	<193 KIU/L
11–18 years	<398 KIU/L

Iron (S, P)[2]

Newborns:	20–157 f-g/dL (3.6–28.1 f-mol/L)
6 weeks–3 years:	20–115 f-g/dL (3.6–20.6 f-mol/L)
3–9 years:	20–141 f-g/dL (3.6–25.2 f-mol/L)
9–14 years:	21–151 f-g/dL (3.8–27 f-mol/L)
14–16 years:	20–181 f-g/dL (3.6–32.4 f-mol/L)
Adults:	44–196 f-g/dL (7.2–31.3 f-mol/L)

Iron-Binding Capacity (S, P)[2]

Newborns:	59–175 f-g/dL (10.6–31.3 f-mol/L)
Children and adults:	275–458 f-g/dL (45–72 f-mol/L)

Lactate Dehydrogenase (LDH) (S, P)[2]

Values using lactate substrate (kinetic).

1–3 days:	40–348 IU/L at 37°C (98.6°F)
1 month–5 years:	150–360 IU/L at 37°C (98.6°F)
5–8 years:	150–300 IU/L at 37°C (98.6°F)
8–12 years:	130–300 IU/L at 37°C (98.6°F)
12–14 years:	130–280 IU/L at 37°C (98.6°F)
14–16 years:	130–230 IU/L at 37°C (98.6°F)
Adult males:	70–178 IU/L at 37°C (98.6°F)
Adult females:	42–166 IU/L at 37°C (98.6°F)

Lead (B)[1]

0–15 years <10 f-g/dL (<0.48 f-mol/L)

Magnesium (P)[1]

Values in mg/dL (mmol/L)

Age	Males	Females
1–30 days	1.7–2.4 (0.70–0.99)	1.7–2.5 (0.70–1.03)
31–365 days	1.6–2.5 (0.66–1.03)	1.9–2.4 (0.78–0.99)
1–3 years	1.7–2.4 (0.70–0.99)	1.7–2.4 (0.70–0.99)
4–9 years	1.7–2.4 (0.70–0.99)	1.6–2.3 (0.66–0.95)
10–15 years	1.6–2.2 (0.66–0.91)	1.6–2.2 (0.66–0.91)
16–18 years	1.5–2.2 (0.62–0.91)	1.5–2.2 (0.62–0.91)

Osmolality (S)[1]

Birth–1 month:	275–305 mOsm/kg
Adults:	282–300 mOsm/kg

Oxygen, Partial Pressure (PO_2) (B)[1]

Birth:	8–24 mmHg	1.1–3.2 kPa
>1 hour:	55–80 mmHg	7.3–10.6 kPa
>1 day:	83–108 mmHg	11.0–14.4 kPa

Oxygen Saturation (B)[1]

Newborns:	85%–90%
Thereafter:	95%–99%

Partial Thromboplastin Time (P)[2]

Children:	42–54 sec

PH (B)[1]

0–6 months	7.18–7.50
6–12 months	7.27–7.49

Phenylalanine (S, P)[2]

0.7–3.5 mg/dL (0.04–0.21 mmol/L)

Phosphorus, Inorganic (S, P)[2]

Newborns:	5.0–7.8 mg/dL (1.61–2.52 mmol/L)
1 year:	3.8–6.2 mg/dL (1.23–2.0 mmol/L)
10 years:	3.6–5.6 mg/dL (1.16–1.81 mmol/L)
Adults:	3.1–5.1 mg/dL (1.0–1.65 mmol/L)

Platelet Count (RBC)[1]

Value X 10^3/f-L (f-L = mm^3)

Age	Males	Females
Newborns	164–351	234–346
1–2 months	275–567	295–615
2–6 months	275–566	288–598
6 months–2 years	219–452	229–465
2–6 years	204–405	204–402
6–12 years	194–364	183–369
12–18 years	165–332	185–335
>18 years	143–320	171–326

Potassium (S, P)[2]

Premature infants:	4.5–7.2 mmol/L
Full-term infants:	3.7–5.2 mmol/L
Children:	3.5–5.8 mmol/L
Adults:	3.5–5.5 mmol/L

Proteins in Serum[a2]

Age	Total Protein	a_1-Globulin	a_2-Globulin
At birth	4.6–7.0	0.1–0.3	0.2–0.3
3 months	4.5–6.5	0.1–0.3	0.3–0.7
1 year	5.4–7.5	0.1–0.3	0.5–1.1
>4 years	5.9–8.0	0.1–0.3	0.4–0.8

Age	(3-Globulin	X-Globulin
At birth	0.3–0.6	0.6–1.2
3 months	0.3–0.7	0.2–0.7
1 year	0.4–1.0	0.2–0.9
>4 years	0.5–1.0	0.4–1.3

[a]Values are for cellulose acetate electrophoresis and are in g/dL. SI conversion factor: g/dL X 10 = g/L.

Prothrombin Time (P)[2]

Children:	11–15 sec

Protoporphyrin, "Free" (FEP, ZPP) (B)[2]

Values for free erythrocyte protoporphyrin (FEP) and zinc protoporphyrin (ZPP) are 1.2–2.7 f-g/g of hemoglobin.

Red Blood Cell Count (B)[1]

Values X 10^6/f-L (f-L = mm^3)

Age	Males	Females
Newborns–6 months	4.2–5.5	3.4–5.4
6 months–2 years	4.1–5.0	4.1–4.9
2–12 years	4.0–4.9	4.0–4.9
12–18 years	4.2–5.3	4.0–4.9
>18 years	3.8–5.4	3.8–4.8

Sedimentation Rate (Micro) (B)[2]

<2 years:	1–5 mm/hr
>2 years:	1–8 mm/hr

Sodium (P)[1]

Newborns:	133–146 mmol/L
Children and adults:	135–148 mmol/L

Thrombin Time (P)[2]

Children:	12–16 sec

Thyroid-stimulating Hormone (TSH) (P, S)[1]

Values in mU/L.

Age	Males	Females
1–30 days	0.52–16.00	0.72–13.10
1 month–5 years	0.55–7.10	0.46–8.10
6–18 years	0.37–6.00	0.36–5.80

Thyroxine (T4) (S, P)[1]

Values in f-g/dL (nmol/L).

Age	Males	Females
1–30 days	5.9–21.5 (76–276)	6.3–21.5 (81–276)
1–12 months	6.4–13.9 (82–179)	4.9–13.7 (63–176)
1–3 years	7.0–13.1 (90–169)	7.1–14.1 (91–180)
4–6 years	6.1–12.6 (79–162)	7.2–14.0 (93–180)
7–12 years	6.7–13.4 (86–172)	6.1–12.1 (79–156)
13–15 years	4.8–11.5 (62–148)	5.8–11.2 (75–144)
16–18 years	5.9–11.5 (76–148)	5.2–13.2 (67–170)

Thyroxine, "Free" (Free T4) (S, P)[1]

Newborns:	0.80–2.78 ng/dL (10–36 pmol/L)
1–12 months:	0.76–2.00 ng/dL (10–26 pmol/L)
1–5 years:	0.90–1.72 ng/dL (12–22 pmol/L)
6–10 years:	0.81–1.68 ng/dL (10–22 pmol/L)
11–15 years:	0.79–1.57 ng/dL (10–20 pmol/L)
16–18 years:	0.83–1.53 ng/dL (11–20 pmol/L)

Thyroxine-binding Globulin (TBG) (P)1

1–12 months:	16.2–32.9 mg/L
1–3 years:	16.4–33.8 mg/L
4–6 years:	16.6–30.8 mg/L
7–12 years:	15.0–29.2 mg/L
13–18 years:	13.4–28.7 mg/L

Triglycerides (S)[1]

Values in mg/dL (mmol/L)

Age	Males	Females
1–3 years	27–125 (0.31–1.41)	27–125 (0.31–1.41)
4–6 years	32–116 (0.36–1.31)	32–116 (0.36–1.31)
7–9 years	28–129 (0.32–1.46)	28–129 (0.32–1.46)
10–11 years	24–137 (0.27–1.55)	39–140 (0.44–1.58)
12–13 years	24–145 (0.27–1.64)	37–130 (0.42–1.47)
14–15 years	34–165 (0.38–1.86)	38–135 (0.43–1.52)
16–19 years	34–140 (0.38–1.58)	37–140 (0.42–1.58)

Triiodothyronine (T3) (S, P)[1]

1–30 days	15–210 ng/dL
1–12 months	50–275 ng/dL
1–5 years	80–258 ng/dL
6–10 years	96–232 ng/dL
11–15 years	73–211 ng/dL
16–18 years	69–201 ng/dL

Urea Clearance[2]

Premature infants:	3.5–17.3 mL/min/1.73 m^2
Newborns:	8.7–33 mL/min/1.73 m^2
2–12 months:	40–95 mL/min/1.73 m^2
=2 years:	>52 mL/min/1.73 m^2

Urea Nitrogen (P)[1]

1–3 years	5–17 mg/dL (1.8–6.0 mmol/L)
4–13 years	7–17 mg/dL (2.5–6.0 mmol/L)
14–19 years	8–21 mg/dL (2.9–7.5 mmol/L)

Uric Acid (S, P)[2]

Males:	
0–14 years:	2–7 mg/dL (119–416 f-mol/L)
>14 years:	3–8 mg/dL (178–476 f-mol/L)
Females:	
All ages:	2–7 mg/dL (119–416 f-mol/L)

White Blood Cell Count (B)[1]

Values X 10^3/f-mL (f-L = mm^3)

Age	Males	Females
Newborns	6.8–13.3	8.0–14.3
6 months–2 years	6.2–14.5	6.4–15.0
2–6 years	5.3–11.5	5.3–11.5
6–12 years	4.5–10.5	4.7–10.3
12–18 years	4.5–10.0	4.8–10.1
>18 years	4.4–10.2	4.9–10.0

NORMAL VALUES: URINE

Addis Count[2]

Red cells (12-hr specimen):	<1 million
White cells (12-hr specimen):	<2 million
Casts (12-hr specimen):	<10,000
Protein (12-hr specimen):	<55 mg

Albumin[2]

First month:	1–100 mg/L
Second month:	0.2–34 mg/L
2–12 months:	0.5–19 mg/L

Ammonia[2]

2–12 months:	4–20 mEq/min/m^2
1–16 years:	6–16 mEq/min/m^2

Calcium[2]

4–12 years:	4–8 mEq/L (2–4 mmol/L)

Catecholamines (Norepinephrine, Epinephrine)[2]

Values in f-g/24 hr (nmol/24 hr)

AGE	TOTAL CATECHOLAMINES	NOREPINEPHRINE	EPINEPHRINE
<1 year	20	5.4–15.9 (32–94)	0.1–4.3 (0.5–23.5)
1–5 years	40	8.1–30.8 (48–182)	0.8–9.1 (4.4–49.7)
6–15 years	80	19.0–71.1 (112–421)	1.3–10.5 (7.1–57.3)
>15 years	100	34.4–87.0 (203–514)	3.5–13.2 (19.1–72.1)

Chloride[2]

Infants:	1.7–8.5 mmol/24 hr
Children:	17–34 mmol/24 hr
Adults:	140–240 mmol/24 hr

Corticosteroids (17-Hydroxycorticosteroids)[1]

0–2 years:	2–4 mg/24 hr (5.5–11 mmol)
2–6 years:	3–6 mg/24 hr (8.3–16.6 mmol)
6–10 years:	6–8 mg/24 hr (16.6–22.1 mmol)
10–14 years:	8–10 mg/24 hr (22.1–27.6 mmol)

Creatine[2]

18–58 mg/L (1.37–4.42 mmol/L)

Creatinine[2]

Newborns:	7–10 mg/kg/24 hr
Children:	20–30 mg/kg/24 hr
Adult males:	21–26 mg/kg/24 hr
Adult females:	16–22 mg/kg/24 hr

Growth Hormone[1]

2.2–13.3 years (Tanner 1):	0.4–6.3 ng/24 hr (0.9–12.3 ng/g creatinine)
10.3–14.6 years (Tanner 2):	0.8–12.0 ng/24 hr (1.0–14.1 ng/g creatinine)
11.5–15.3 years (Tanner 3):	1.7–20.4 ng/24 hr (1.9–17.0 ng/g creatinine)
12.7–17.1 years (Tanner 4):	1.5–18.2 ng/24 hr (1.3–14.4 ng/g creatinine)
13.5–19.9 years (Tanner 5):	1.2–14.5 ng/24 hr (0.8–11.0 ng/g creatinine)

Homovanillic Acid[2]

Children:	3–16 f-g/mg of creatinine
Adults:	2–4 f-g/mg of creatinine

Mucopolysaccharides[2]

Acid mucopolysaccharide screen should yield negative results. Positive results after dialysis of the urine should be followed up with a thin-layer chromatogram for evaluation of the acid mucopolysaccharide excretion pattern.

Osmolality[2]

Infants:	50–600 mosm/L
Older children:	50–1400 mosm/L

Phosphorus, Tubular Reabsorption

78%–97%.

Porphyrins[2]

δ-Aminolevulinic acid:	0–7 mg/24 hr (0–53.4 f-mol/24 hr)
Porphobilinogen:	0–2 mg/24 hr (0–8.8 f-mol/24 hr)
Coproporphyrin:	0–160 mg/24 hr (0–244 f-mol/24 hr)
Uroporphyrin:	0–26 mg/24 hr (0–31 f-mol/24 hr)

Potassium[2]

26–123 mmol/L

Sodium[2]

Infants: 0.3–3.5 mmol/24 hr (6–10 mmol/m^2)
Children and adults: 5.6–17 mmol/24 hr

Specific Gravity

1.010–1.030

Urobilinogen[2]

<3 mg/24 hr (<5.1 f-mol/24 hr)

Vanillylmandelic Acid (VMA)

Because of the difficulty in obtaining an accurately timed 24-hour collection, values based on microgram per milligram of creatinine are the most reliable indications of VMA excretion in young children.

1–12 months:	1–35 f-g/mg of creatinine (31–135 mg/kg/24 hr)
1–2 years:	1–30 f-g/mg of creatinine
2–5 years:	1–15 f-g/mg of creatinine
5–10 years:	1–14 f-g/mg of creatinine
10–15 years:	1–10 f-g/mg of creatinine (1–7 mg/24 hr; 5–35 mmol/24hr)
Adults:	1–7 f-g/mg of creatinine (1–7 mg/24 hr; 5–35 mmol/24 hr)

NORMAL VALUES: FECES

Fat, Total[2]

2–6 months:	0.3–1.3 g/d
6 months–1 year:	<4 g/d Children:
<3 g/d Adolescents:	<5 g/d
Adults:	<7 g/d

Electrolytes[2]

Normal:	<40 mmol/L for both sodium and chloride. Patients with
cystic fibrosis:	>60 mmol/L for both sodium and chloride.

NORMAL VALUES: CEREBROSPINAL FLUID

Protein[1]

Newborns:	40–120 mg/dL
<1 month:	20–80 mg/dL
>1 month:	15–45 mg/dL

Glucose[1]

All ages: 60%–80% of blood glucose

MEDICAL GLOSSARY

Terminology	Definition
Anemia	A reduction in the number of circulating red blood cells or in the quantity of hemoglobin.
Anopheles	A genus of mosquito; some species can transmit human malaria.
Anorexia	Lack of appetite and a lack of desire or interest in food.
Anthropophilic	Mosquitoes that prefer to take blood meals on humans.
Antibody	A specialized serum protein (immunoglobulin or gamma globulin) produced by B lymphocytes in the blood in response to an exposure to foreign proteins (*antigens*). The antibodies specifically bind to the antigens that induced the immune response. Antibodies help defend the body against infectious agents, including bacteria, viruses, or parasites.
Antigen	Any substance that stimulates the immune system to produce antibodies. Antigens are often foreign substances: invading bacteria, viruses, or parasites.
Autochthonous	Malaria transmitted by mosquitoes that can be indigenous (in a geographic area where malaria occurs regularly) or introduced (in a geographic area where malaria does not occur regularly).
Cerebral malaria	A complication of *Plasmodium falciparum* malaria with cerebral manifestations, usually including coma (Glasgow coma scale < 11, Blantyre coma scale < 3). Malaria with coma persisting for > 30 min after a seizure is considered to be cerebral malaria.
Chemoprophylaxis	Taking antimalarial drugs to prevent the disease.
Cinchonism	Side effects from quinine or quinidine, including tinnitus, headache, nausea, diarrhea, altered auditory acuity, and blurred vision. The term comes from cinchona bark, the natural source of quinine.
Clinical cure	Elimination of malaria symptoms, sometimes without eliminating all parasites. See *radical cure* and *suppressive cure/treatment*.
Coma	A decreased state of consciousness from which a person cannot be awakened.
Congenital malaria	Malaria in a newborn or infant, transmitted from the mother at birth.
Control	Reduction of disease incidence, prevalence, morbidity or mortality to a locally acceptable level as a result of deliberate efforts.
Cryptic	A case of malaria where epidemiologic investigations fail to identify how the patient acquired the disease; this term applies mainly to cases found in non-endemic countries.

Drug resistance	The result of microbes changing in ways that reduce or eliminate the effectiveness of drugs, chemicals, or other agents to cure or prevent infections.
Dyspnea	Shallow, labored breathing.
Efficacy	The power or capacity to produce a desired effect.
Elimination	The interruption of local mosquito-borne malaria transmission in a defined geographical area, creating a zero incidence of locally contracted cases. Imported cases will continue to occur and continued intervention measures are required.
Elimination of disease	Reduction to zero of the incidence of a specified disease in a defined geographical area as a result of deliberate efforts.
Elimination of infection	Reduction to zero of the incidence of infection caused by a specified agent in a defined geographical area as a result of deliberate efforts.
Endemic	Where disease occurs consistently.
Endophagic	A mosquito that feeds indoors.
Endophilic	A mosquito that tends to inhabit/rest indoors. Endophilism facilitates the blocking of malaria transmission through the application of residual insecticides to walls.
Epidemic	The occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time.
Epidemiology	The study of the distribution and determinants of health-related states or events in specified populations; the application of this study to control health problems.
Eradication	Permanentt reduction to zero of the worldwide incidence of infection caused by a specific agent as a result of deliberate efforts;
Erythrocytic stage	A stage in the life cycle of the malaria parasite found in the red blood cells. Erythrocytic stage parasites cause the symptoms of malaria.
Exoerythrocytic stage	A stage in the life cycle of the malaria parasite found in liver cells (hepatocytes). Exoerythrocytic stage parasites do not cause symptoms.
Exophagic	A mosquito that feeds outdoors.
Exophilic	An exophilic mosquito tends to inhabit/rest outdoors. Residual insecticides in buildings are less effective at controlling exophilic mosquitoes.
Extinction	The specific infectious agent no longer exists in nature or in the laboratory.
G6PD deficiency	An inherited abnormality that causes the loss of a red blood cell enzyme. People who are G6PD deficient should not take the antimalarial drug primaquine.

Gametocyte	The sexual stage of malaria parasites. Male gametocytes (microgametocytes) and female gametocytes (macrogametocytes) are inside red blood cells in the circulation. If a female Anopheles mosquito ingests them, they undergo sexual reproduction, which starts the extrinsic (sporogonic) cycle of the parasite in the mosquito. Gametocytes of Plasmodium falciparum are typically banana or crescent-shaped (from the Latin falcis = sickle).
Hypnozoite	Dormant form of malaria parasites found in liver cells. Hypnozoites occur only with Plasmodium vivax and P. ovale. After sporozoites (inoculated by the mosquito) invade liver cells, some sporozoites develop into dormant forms (the hypnozoites), which do not cause any symptoms. Hypnozoites can become activated months or years after the initial infection, producing a relapse.
Hypoglycemia	Low blood glucose; can occur with malaria. In addition, treatment with quinine and quinidine stimulate insulin secretion, reducing blood glucose.
Immune system	The cells, tissues, and organs that help the body resist infection and disease by producing antibodies and/or cells that inhibit the multiplication of the infectious agent.
Immunity	Protection generated by the body's immune system, in response to previous malaria attacks, resulting in the ability to control or lessen a malaria attack.
Immunization	The process or procedure by which a subject (person, animal, or plant) is rendered immune or resistant to a specific disease. This term is often used interchangeably with vaccination or inoculation, although inoculation does not always result in immunity.
Imported malaria	Malaria acquired outside a specific geographic area.
Incubation period	The interval of time between infection by a microorganism and the onset of the illness or the first symptoms of the illness. With malaria, the incubation is between the mosquito bite and the first symptoms. Incubation periods range from 7 to 40 days, depending on the species.
Indigenous malaria	Mosquito-borne transmission of malaria in a geographic area where malaria occurs regularly.
Induced malaria	Malaria acquired through artificial means (for example, blood transfusion, shared needles or syringes, or malariotherapy).
Infection	The invasion of an organism by a pathogen, such as bacteria, viruses, or parasites. Some, but not all, infections lead to disease.
Introduced malaria	Mosquito-borne transmission of malaria from an imported case in a geographic area where malaria does not regularly occur.

Merozoite	A daughter-cell formed by asexual development in the life cycle of malaria parasites. Liver-stage and blood-stage malaria parasites develop into schizonts, which contain many merozoites. When the schizonts are mature, they (and their host cells!) rupture, the merozoites are released and infect red blood cells.
Oocyst	A stage in the life cyle of malaria parasites, oocysts are rounded cysts located in the outer wall of the stomach of mosquitoes. Sporozoites develop inside the oocysts. When mature, the oocysts rupture and release the sporozoites, which then migrate into the mosquito's salivary glands, ready for injection into the human host.
Outbreak	AnIs an epidemic limited to a localized increase in disease incidence, e.g. in a village, town or closed institution.
Pandemic	AnIs an epidemic occurring over a very wide area, crossing international boundaries and usually affecting a large number of people.
Parasite	Any organism that lives in or on another organism without benefiting the host organism; commonly refers to pathogens, most commonly to protozoans and helminths.
Parasitemia	The presence of parasites in the blood. The term can also be used to express the quantity of parasites in the blood (for example, a parasitemia of 2 percent).
Paroxysm	A sudden attack or increase in intensity of a symptom, usually occurring at intervals.
Pathogen	Bacteria, viruses, parasites, or fungi that can cause disease.
Plasmodium	The genus of the parasite that causes malaria. The genus includes four species that infect humans: Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, and Plasmodium malariae.
Presumptive treatment	Treatment of clinically suspected cases without, or prior to, results from confirmatory laboratory tests.
Prophylaxis	See chemoprophylaxis.
Radical cure (also radical treatment)	Complete elimination of malaria parasites from the body; the term applies specifically to elimination of dormant liver stage parasites (hypnozoites) found in Plasmodium vivax and P. ovale.
Recrudescence	A repeated attack of malaria (short-term relapse or delayed), due to the survival of malaria parasites in red blood cells. Radical treatment: see radical cure.
Relapse	Recurrence of disease after it has been apparently cured. In malaria, true relapses are caused by reactivation of dormant liver stage parasites

Residual insecticide spraying	SS praying insecticides that have residual efficacy (that continue to affect mosquitoes for several months) against houses where people spend nighttime hours. Residual insecticide spraying is done to kill mosquitoes when they come to rest on the walls, usually after a blood meal.
Resistance	The ability of an organism to develop strains that are impervious to specific threats to their existence. The malaria parasite has developed strains that are resistant to drugs, such as chloroquine. The Anopheles mosquito has developed strains that are resistant to DDT and other insecticides.
Rigor	Severe shaking chill.
Schizogony	Asexual reproductive stage of malaria parasites. In red blood cells, schizogony entails development of a single trophozoite into numerous merozoites; a similar process happens in infected liver cells.
Schizont	A developmental form of the malaria parasite that contains many merozoites. Schizonts are seen in the liver-stage and blood-stage parasites.
Sector	A 1 km square grid in a kebele map (in the context of this guideline).
Serology	The branch of science dealing with the measurement and characterization of antibodies and other immunological substances in body fluids, particularly serum.
Sporozoite rate	The proportion of female anopheline mosquitoes of a particular species that have sporozoites in their salivary glands (as seen by dissection) or that are positive in immunologic tests to detect sporozoite antigens.
Sporozoite	A stage in the life cycle of the malaria parasite. Sporozoites, produced in the mosquito, migrate to the mosquito's salivary glands. They can be inoculated into a human host when the mosquito takes a blood meal on the human. In the human, the sporozoites enter liver cells where they develop into the next stage of the malaria parasite life cycle (the liver stage or exo-erythrocytic stage).
Suppressive treatment	Treatment intended to prevent clinical symptoms and parasitemia by destroying the parasites in red blood cells. It does not prevent infection because the parasite stages inoculated by the mosquito (sporozoites) will survive and invade the liver and develop liver-stage parasites. The parasites are destroyed when they leave the liver cells to invade the blood. Because the blood-stage parasites cause the disease, eliminating these stages will prevent symptoms.
Tachycardia	Increased heart rate.
Tachypnea	Increased rate of breathing.
Tinnitus	Ringing sound in the ears, a common side effect of quinine treatment.

Trophozoite	A developmental form during the blood stage of malaria parasites. After merozoites have invaded the red blood cell, they develop into trophozoites (sometimes, early trophozoites are called rings or ring stage parasites); trophozoites develop into schizonts.
Upsurge	Sometimes used as euphemism for an outbreak or epidemic.
Vaccine	A preparation that stimulates an immune response that can prevent an infection or create resistance to an infection.
Vector competence	The ability of a vector (for example, Anopheles mosquitoes) to transmit a disease (for example, malaria).
Vector	An organism (for example, Anopheles mosquitoes) that transmits an infectious agent (for example, malaria parasites) from one host to the other (for example, humans).
Virus	A microorganism made up of a piece of genetic material — RNA or DNA — surrounded by a protein coat. To replicate, a virus must infect a cell and direct its cellular machinery to produce new viruses.
Zoophilic	Mosquitoes that prefer to take blood meals on animals.

COMMENTS ON AMOXI-CLAV PRESCRIPCION

Amoxi / Clav 312,5 (250/62,5)mg/ 5ml. Amox/clav 4:1	100ml
Amoxi / Clav 375 (250/125)mg. Amox/clav 2:1	1 tablet
Amoxi / Clav 625 (500/125)mg. Amox/clav 4:1	1 tablet

Dosage of amoxicillin 40-100 mg/kg/dia

Dosage of clavulanate: maximum 12.5 mg/kg/dia or 375 mg/day

Exemple 10 kg patient

If dosage amoxi 40mg/kg/dia → Amoxi/clav susp 4 ml (200mg amox+ 50 mg clavu) BID (dosage of clavulanate 10mg/kg/day)

If dosage of amoxi 80 mg/kg/day→ 800 mg/day aprox 250mg amox TID

If suspension it will be 62,5 x 3 mg clavu= 187 mg/day (18.7 mg/kg/d)

If tabs 250/125→ 125 x 3 = 375 mg/day (37.5mg/kg/day)

If tabs 500/125→ 1 tab BID = 1000mg of amoxi (100 mg/kg/dia+ 250 mg clavula

(25mg/kg/dia)