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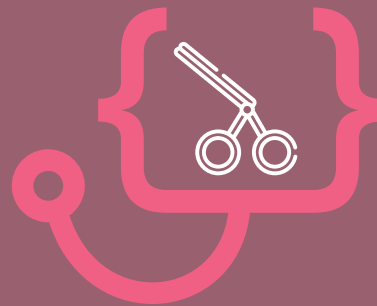
Department of Health Research

Ministry of Health and Family Welfare, Government of India



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2019 Edition, Vol. I

# STANDARD TREATMENT WORKFLOWS *of India*

**PARTNERS**

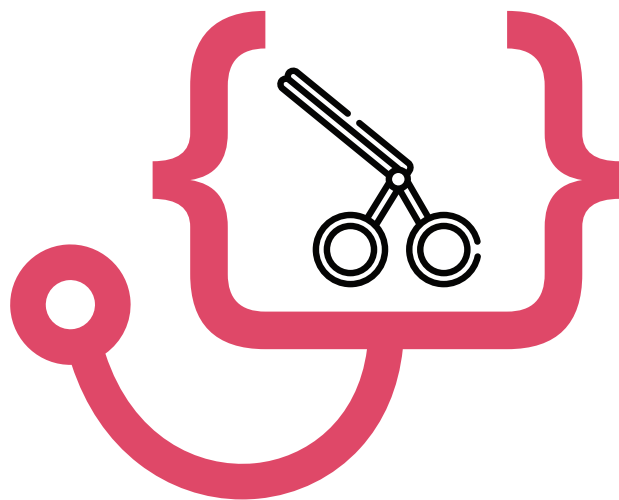


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STANDARD  
**TREATMENT**  
WORKFLOWS  
*of India*



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Department of Health Research  
Ministry of Health and Family Welfare, Government of India



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These STWs have been prepared by national experts of India with feasibility considerations for various levels of healthcare system in the country. These broad guidelines are advisory, and are based on expert opinions and available scientific evidence. There may be variations in the management of an individual patient based on his/her specific condition, as decided by the treating physician. There will be no indemnity for direct or indirect consequences. Kindly visit our web portal ([stw.icmr.org.in](http://stw.icmr.org.in)) for more information. © Indian Council of Medical Research and Department of Health Research, Ministry of Health & Family Welfare, Government of India.

# CONTENTS

- **INTRODUCTION**
- **SPECIALITIES COVERED IN THIS EDITION**

- **PAEDIATRICS**

- ACUTE ENCEPHALITIS SYNDROME
- ACUTE DIARRHEA
- DENGUE FEVER
- FEVER IN CHILDREN
- SEPSIS AND SEPTIC SHOCK IN CHILDREN
- SEVERE ACUTE MALNUTRITION
- SEVERE PNEUMONIA IN CHILDREN



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# INTRODUCTION

## GOAL

To empower the primary, secondary and tertiary care physicians/surgeons towards achieving the overall goal of Universal Health Coverage with disease management protocols and pre-defined referral mechanisms by decoding complex guidelines

## OBJECTIVES

### Primary Objective:

To formulate clinical decision making protocols for common and serious medical/surgical conditions for both OPD and IPD management at primary, secondary and tertiary levels of healthcare system for equitable access and delivery of health services which are locally contextual

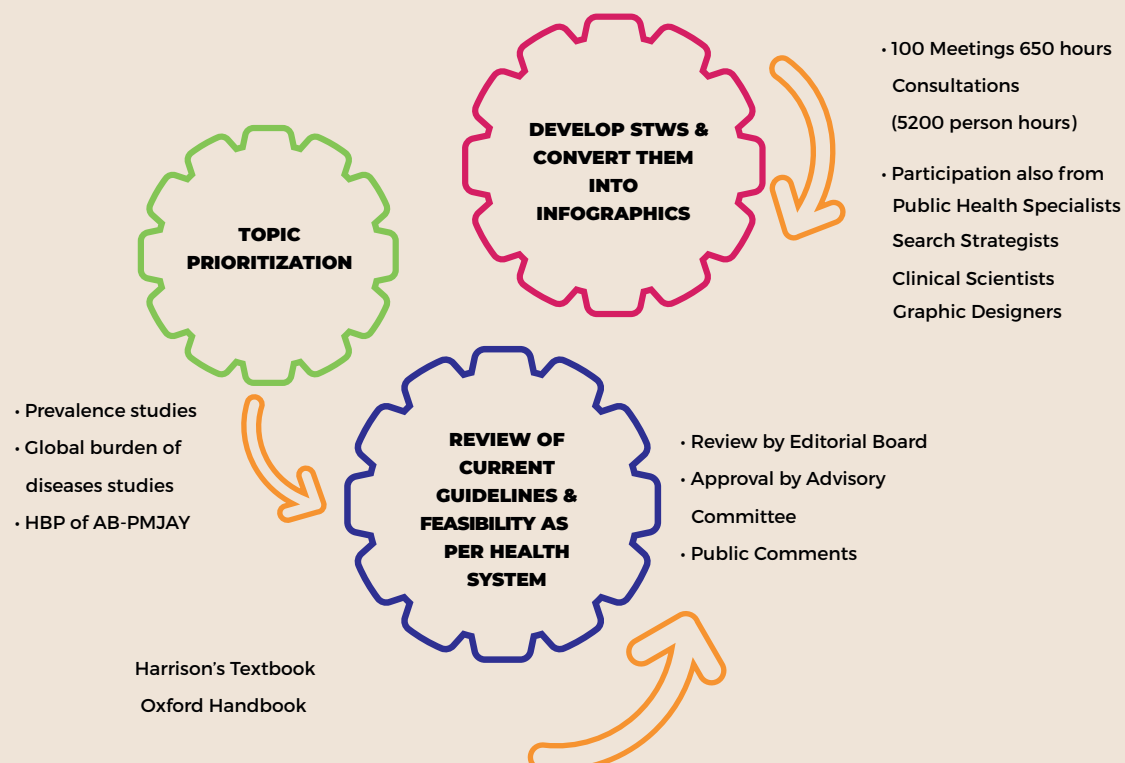
### Secondary Objective:

To facilitate PMJAY arm of Ayushman Bharat with secondary and tertiary level management of all surgical and medical conditions covered under the scheme.

## METHODOLOGY



## PROCESS OVERVIEW

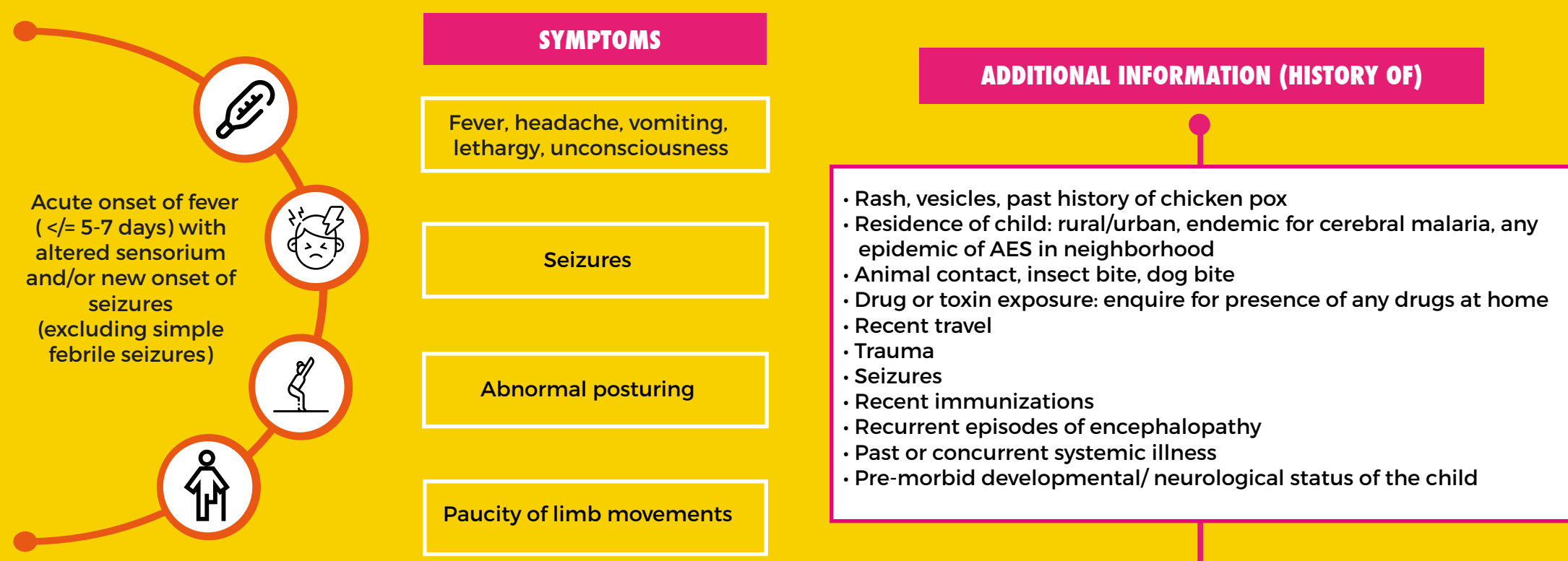




**PAEDIATRICS**



# Standard Treatment Workflow (STW) for the Management of ACUTE ENCEPHALITIS SYNDROME (AES) IN CHILDREN ICD-10-G04



## EXAMINATION

### VITAL SIGNS

- Temperature
- Pulse rate
- Respiratory rate
- Blood pressure

### GENERAL EXAMINATION

- Pallor
- Petechiae
- Rash
- Icterus

### NEUROLOGICAL EXAMINATION

- Level of consciousness by Glasgow Coma Scale (GCS)
- Abnormal posturing: decerebrate, decorticate
- Active seizures
- Cranial nerves: pupil size and reaction, doll's eye movements, squint, facial deviation
- Focal neurological deficits
- Meningeal signs

## INVESTIGATIONS

### ESSENTIAL

CBC, LFT, KFT, blood sugar, CECT Brain, CSF examination\* (cytology, biochemistry, culture, AFB staining, Gene Xpert), peripheral smear for malarial parasite, Rapid Malarial Antigen Test

### DESIRABLE

MRI Brain, CSF PCR for Herpes simplex encephalitis, JE serology, EEG, Dengue serology and NS1 testing, HIV testing

### OPTIONAL

CSF Neurovirology panel, anti-NMDA receptor antibody testing, PCR viral testing of other samples (throat swab, nasopharyngeal aspirates, stool etc), Blood Tandem Mass Spectrometry and urine gas chromatography, antinuclear antibodies

\*Lumbar puncture is contra-indicated or neuroimaging must be obtained before lumbar puncture

1. Fundus: papilledema 2. Platelet count <math>< 50,000</math> 3. Focal neurological deficits 4. Asymmetric/unreactive pupils 5. Decerebrate/decorticate posturing

## MANAGEMENT

All patients need to be admitted.

If any of the following signs are present, the child should be referred to tertiary care facility with PICU and facilities for mechanical ventilation:

- Glasgow Coma Scale <math>< 8</math>
- Abnormal breathing pattern
- Shock not responding to fluid bolus
- Decerebrate or decorticate posturing
- Seizures persisting despite benzodiazepine and phenytoin

### Step I: Rapid assessment and stabilization

- Establish and maintain airway: Intubate if GCS<math>< 8</math>, impaired airway reflexes, abnormal respiratory pattern, signs of raised intracranial pressure, SpO<sub>2</sub> <math>< 92\%</math> despite high flow oxygen and fluid refractory shock
- Ventilation, oxygenation
- Circulation: Establish IV access, take samples for relevant investigations, fluid bolus if in circulatory failure (20 mL/kg NS), inotropes if required
- Identify signs of cerebral herniation or raised ICP
- Temperature: treat fever and hypothermia
- Treat ongoing seizures- Benzodiazepine, followed by phenytoin loading

### Step II: History, Examination and Investigations as given above

### Step III: Empirical Treatment (must be started if CSF cannot be done/ report will take time and patient sick)

- Ceftriaxone:** 100 mg/kg/day in 2 divided doses X 10-14 days
- Acyclovir** (use in all suspected sporadic viral encephalitis):  
3 mo to 12 y: 500mg/m<sup>2</sup> 8 hourly (min 21 days)  
>12 y: 10mg/Kg 8 hourly (14-21 days in confirmed cases)\*\*
- Artesunate combination therapy** (stop if peripheral smear and RDT are negative): 3mg/kg in child <math>< 20</math> kg, and 2.4mg/kg in child > 20kg IV/IM at 0,12 and 24 hours, followed by once daily parental/oral X 3-7 days

\*\*If therapy was started empirically stop acyclovir, in case an alternative diagnosis is confirmed, or HSV PCR of CSF is negative on two occasions (24-48 h apart) and MRI imaging not suggestive of Herpes Simplex Encephalitis

### Step IV: Supportive care and treatment

- Maintain euglycemia, hydration and control fever
- Treat raised intracranial pressure#, mild head-end elevation-15-30°
- Treat seizures##; Give anticonvulsant if: history of seizures / GCS <math>< 8</math> / child has features of raised ICP
- Steroids: Pulse steroids (methylprednisolone) to be given in children with suspected acute disseminated encephalomyelitis or autoimmune encephalitis

### Step V: Prevention/treatment of complications and rehabilitation

- Physiotherapy, posture change, prevent bed sores and exposure keratitis
- Complications: aspiration pneumonia, nosocomial infections, coagulation disturbances
- Nutrition: early feeding
- Psychological support to patient and family

### #Management of raised intracranial pressure

- Intubate if: GCS <math>< 8</math> / evidence of herniation / irregular respirations and inability to maintain airway
- Signs of impending herniation: patient to be hyperventilated to a target PaCO<sub>2</sub> of 30-35 mmHg
- Initial bolus of Mannitol(0.25 g/kg), then 0.25 g/kg q 6 h as per requirement, up to 48 hours.
- In the presence of hypotension, hypovolemia, and renal failure: hypertonic (3%) saline (preferable to mannitol) 0.1-1 mL/kg/hr by infusion; serum sodium to be targeted to 145-155 meq/L
- Adequate sedation and analgesia
- Avoid noxious stimuli
- Administer nebulized lignocaine prior to endotracheal tube suctioning

### ##Treatment of seizures

- 1st Line:** IV Lorazepam 0.1mg/kg or Midazolam 0.2 mg/kg or Diazepam 0.3 mg/kg).  
If no IV access: IM Midazolam 0.2 mg/kg
- 2nd Line:** Inj. Phenytoin 20 mg/kg (in Normal saline 1mg/kg/min)  
If seizures still persist:  
**Refractory status:** Transfer to PICU -> midazolam infusion (1-18 microgram/kg/min)  
If ICU facilities not available: sodium valproate (20 mg/kg) or levetiracetam (20-40 mg/kg) or phenobarbitone (20mg/kg)

## DISCHARGE CRITERIA

Hemodynamically stable

Improvement in consciousness

Afebrile

Has started eating and drinking orally

Seizures have subsided

Parents have been explained the supportive care and physiotherapy to be continued at home

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

## REFERENCES

- World Health Organisation. Acute Encephalitis Syndrome. Japanese encephalitis surveillance standards. January 2006. From WHO-recommended standards for surveillance of selected vaccine-preventable diseases. WHO/V&B/03.01. Available from: [http://www.who.int/vaccines-documents/ DocsPDF06/843.pdf](http://www.who.int/vaccines-documents/DocsPDF06/843.pdf)
- National Program for Prevention and Control of Japanese Encephalitis/Acute Encephalitis Syndrome 2014. Government of India Ministry of Health & Family Welfare Directorate General of Health Services National Vector Borne Disease Control Programme.
- Sharma S, Mishra D, Aneja S, Kumar R, Jain A, Vashishtha VM. Consensus guidelines on evaluation and management of suspected acute viral encephalitis in children in India. Indian Pediatr. Nov 2012;49(11):897-910.
- Sankhyan N, Vyunkta Raju KN, Sharma S, Gulati S. Management of raised intracranial pressure. Indian J Pediatr. 2010 Dec;77(12):1409-16.

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# Standard Treatment Workflow (STW) for the Management of ACUTE DIARRHEA ICD-10-R19.7

## DIARRHEA IS

- >3 loose or watery stools/ day
- Acute Diarrhea <14 days
- Persistent diarrhea >14 days
- Dysentery - blood in stools



### ASK FOR

- Duration
- Blood in stool
- Vomiting, fever, cough, recent measles, HIV status (if known)
- Immunization status and pre illness feeding practices
- Fluids/ food/ drugs and other remedies taken during illness

### EXAMINATION

- General condition of child
- Nutritional status (weight/ weight for height / MUAC)
- Classify malnutrition if any
- Signs of dehydration & classify dehydration

### SKIN PINCH TEST

- Locate the area on the child's abdomen halfway between the umbilicus and the side of the abdomen.
- Use thumb and first finger to pinch and not finger tips.
- The fold of the skin should be in a line up and down the child's body.
- Firmly pick up all layers of the skin and tissue under them.
- Pinch the skin for one second and then release it. Look to see if the skin pinch goes back:
  - Very slowly (longer than 2 seconds)
  - Slowly (skin stays up even for a brief instant)
  - Immediately (normal)

### REFER TO HOSPITAL

- Severe malnutrition/ HIV
- Severe dehydration
- Hypernatremic (Na >145mmol/L) / hyponatremic dehydration (Na <135 mmol/L)
- Dysentery with age <1 yr/ measles in past 6 weeks/ dehydration/ sick
- Dysentery with no improvement on antibiotics
- Persistent diarrhea with dehydration
- Persistent diarrhea with serious systemic infection such as pneumonia, sepsis, infants <4 months of age, or when there is no improvement with treatment over 5 days

## MANAGEMENT

### CLASSIFY DEHYDRATION

Not enough signs to classify some or severe dehydration

#### 2 of following:

- Restless, irritable
- Sunken eyes
- Drinks eagerly, thirsty
- Skin pinch - goes back very slowly

#### 2 of following:

- Lethargy / unconscious
- Sunken eyes
- Not able to drink/ drinking poorly
- Skin pinch - goes back slowly

### NO DEHYDRATION: PLAN A

- Fluids
  - Give extra fluids (as much as child will take) until diarrhea stops.
  - Use WHO ORS after each loose stool (in addition to usual fluid intake)
    - Upto 2 yrs → 50 -100 ml
    - 2 yrs or more → 100 -200ml
  - On ORS packet check whether 200ml or 1 litre of clean water is needed
  - Frequent small sips with spoon or cup.
  - If child vomits, wait 10 minutes then continue slowly.
  - Homemade fluids- salted rice water, salted yogurt drink, vegetable or chicken soup with salt and clean water, unsweetened fresh fruit juice and coconut water
  - Unsuitable fluids - carbonated beverages, commercial fruit juice, sweetened tea & coffee, other medicinal teas / infusions.
  - Zinc supplement (Zinc sulphate/ carbonate / acetate)
    - 2-6 months → 10mg/day x 2 weeks
    - >6 months → 20mg/day x 2 weeks
  - Counsel Mother/ Attender
    - Feeding advise
      - Infants on breast feed, to continue more frequent breast feeding than usual.
      - Those not on breast feed to continue their usual milk feed/ formula at least once in 3 hours.
      - Give age appropriate foods to >6 months old based on their pre illness feeding pattern
- Danger signs (return immediately)
  - Passing many watery stools
  - Repeated vomitings / very thirsty
  - Eating / drinking poorly
  - Develops fever / blood in stools
- Follow up in 5 days if no improvement

### SOME DEHYDRATION: PLAN B

- Manage in clinic /daycare facility with recommended amount of ORS (75ml /kg) over 4 hour period
- If weight is not known

AGE	< 4 months	4 -11 months	12 -23 months	2 - 4 years	5-14 years	15 years or older
WEIGHT	<5kg	5 - 7.9 kg	8 - 10.9 kg	11 - 15.9 kg	16 - 29.9 kg	30 kg or more
IN ml	200 - 400	400 - 600	600 - 800	800 - 1200	1200 - 2200	2200 - 4000

- After 4 hours reassess the child, classify dehydration and select appropriate plan (A/B/C)
- Give extra fluids, zinc supplement, feeding advise and counselling regarding danger signs\* as in plan A
- Follow up in 5 days if no improvement

#### PATIENT EDUCATION

- Danger signs\*
- Hygiene practices
- Hand washing, proper disposal of excreta
- Safe drinking water
- Appropriate feeding practices
- Vaccination as per IAP guidelines

#### INVESTIGATIONS

- Some dehydration:
  - Preferable Tests- electrolytes
- Severe dehydration:
  - Essential tests- CBC, electrolytes
  - Preferable Tests- Renal Function Tests, VBG
- In suspected cholera cases:
  - Preferable tests- stool for hanging drop and stool culture
- Dysentery: (no response to antibiotic in 2 days)
  - Preferable test- stool culture & stool routine for trophozoites of Ameoba
- Persistent diarrhea:
  - Preferable test- stool routine microscopy, urine routine microscopy, urine culture, sepsis screen

#### WHEN CONSIDERING ALTERNATIVE DIAGNOSIS OF PERSISTENT DIARRHEA AND DYSENTERY

#### PERSISTENT DIARRHEA

- Appropriate fluids to prevent or treat dehydration
- Nutrition:
  - If breastfeeding, give more frequent, longer breastfeeds, day and night.
  - Other milk: replace with increased breastfeeding, or with fermented milk products, such as yogurt, or half the milk with nutrient-rich semi-solid food.
  - For other foods, follow feeding recommendations for the child's age: give small, frequent meals (at least 6 times a day), and avoid very sweet foods or drinks.
- Zinc for 14 days
- Supplement vitamins / minerals
- Antimicrobial to treat diagnosed infection
  - Intestinal infection:
    - If blood in stool: Treat like dysentery
    - If stool routine suggestive of Amoebiasis: Treat for it
    - If stool suggestive of cyst/ Trophozoite of Giardia: Give Metronidazole 5mg/kg/dose x 8hrly x 5 -7 days
  - Treat Non intestinal such as UTI / Otitis Media
- Follow up in 5 days
- Refer to hospital (See box)

### SEVERE DEHYDRATION: PLAN C

- Urgent referral to hospital
- Mother to continue rehydration by giving frequent sips of ORS during transport or use NG tube when possible in patients with poor drinking

NO

#### CAN YOU GIVE INTRAVENOUS (IV) FLUIDS IMMEDIATELY?

NO

- Start IV fluid immediately
- Ideal fluid is Ringer lactate solution / Normal saline (DNS in malnourished)

AGE	FIRST GIVE 30 ML/KG IN	THEN GIVE 70 ML/KG IN
Infant (< 12 months)	1 hour	5 hours
Older	30 minutes	2.5 hours

- If child can drink, give ORS by mouth while the drip is set up
- Assess heart rate/ respiratory rate/ BP/ CFT/ consciousness and recognize early shock
- Refer for hospitalization
- If prevalence of cholera - Doxycycline single dose 300mg or Tetracycline 12.5mg/kg 4 times a day x 3 days. For young children Erythromycin 12.5mg/kg 4 times a day x 3 days
- Associated vomitings - Ondanstetron 0.15 mg/kg/dose IV/oral in addition to rehydration therapy
- Reassess every 15-30 minutes till a strong radial pulse is present and then every hour. If hydration status is not improving, give IV drip more rapidly
- After 6 hours (infants) and 3 hours (older patients) - evaluate for dehydration and choose the appropriate plan (A, B, or C) to continue treatment
- Give ORS (about 5 ml/kg/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1-2 hours (children)
- Observe for 6 hours after the child has been fully rehydrated.
- In hypernatremic and hyponatremic dehydration child appears relatively less ill / more ill respectively and needs to be referred for hospitalization

#### DISCHARGE CRITERIA

- Sufficient rehydration (indicated by wt gain &/or clinical status)
- IV fluids no longer needed
- Oral intake = / > losses
- Medical f/u available

#### DYSENTERY

- Treat dehydration according to assessment.
- Ciprofloxacin 15mg/kg twice a day and reassess after 2 days. Improvement: 3 days of treatment
- No improvement → Cefixime 10 mg//kg/d, 2 div doses. Reassess after 2 days. If better complete 3-5 days of treatment.
  - If stool routine positive for Ameobiasis : Metronidazole 10mg/kg/dose 8 hourly x 7 days (10 days in severe cases)
- Refer to hospital (See box)

## REFERENCES

1. IMCI (WHO) module on Diarrhea 2014.
2. WHO Treatment for Diarrhea - A manual for physicians and other senior health workers 2005.
3. WHO GLOBAL TASK FORCE ON CHOLERA CONTROL 2010.

## KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

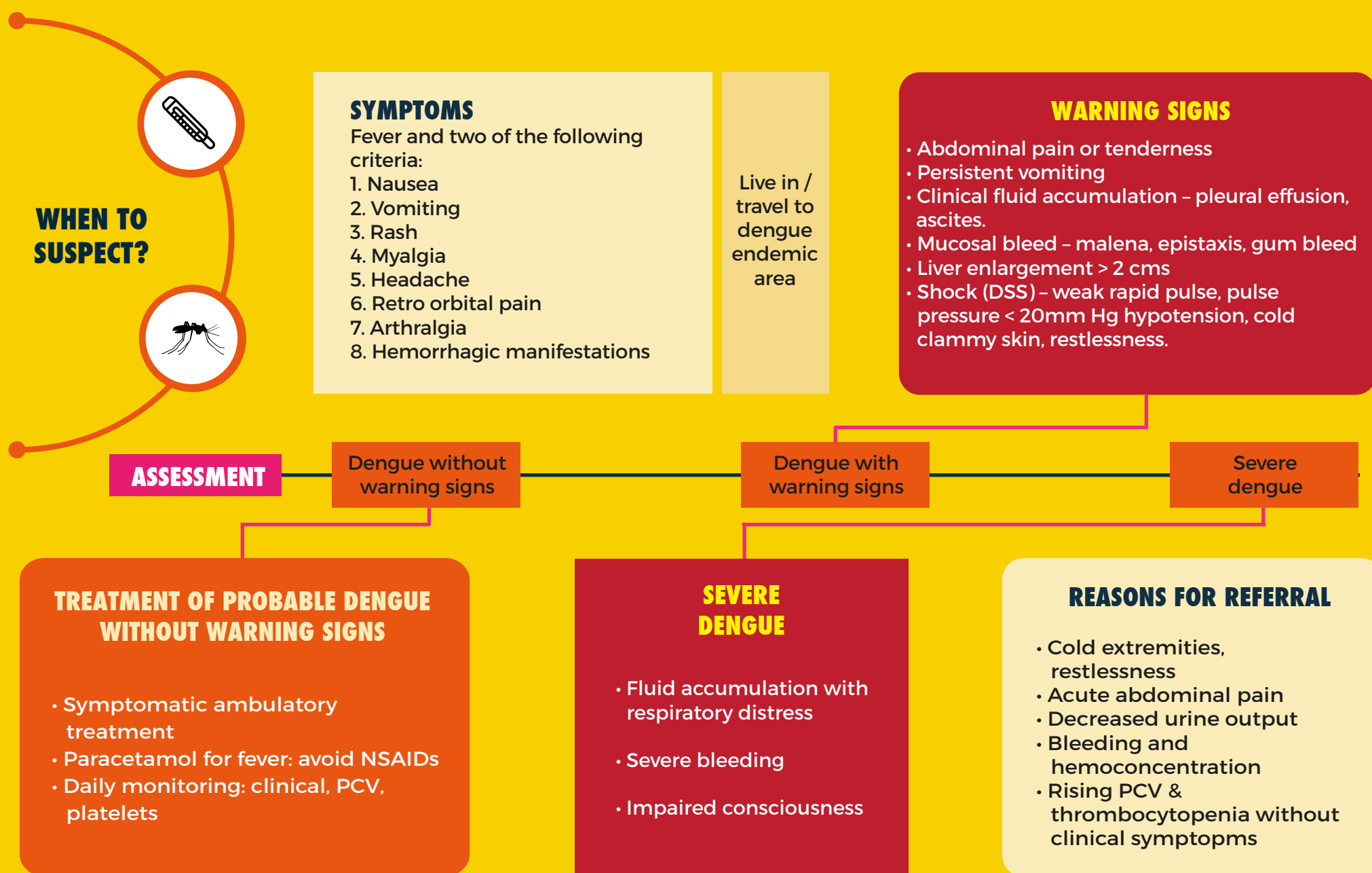


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# Standard Treatment Workflow (STW) for the Management of DENGUE FEVER ICD-10-A90



## INVESTIGATIONS

### ESSENTIAL

- Hb, TLC, DLC, Platelets, PCV
- Positive tourniquet test
- NS1 antigen (ELISA method)

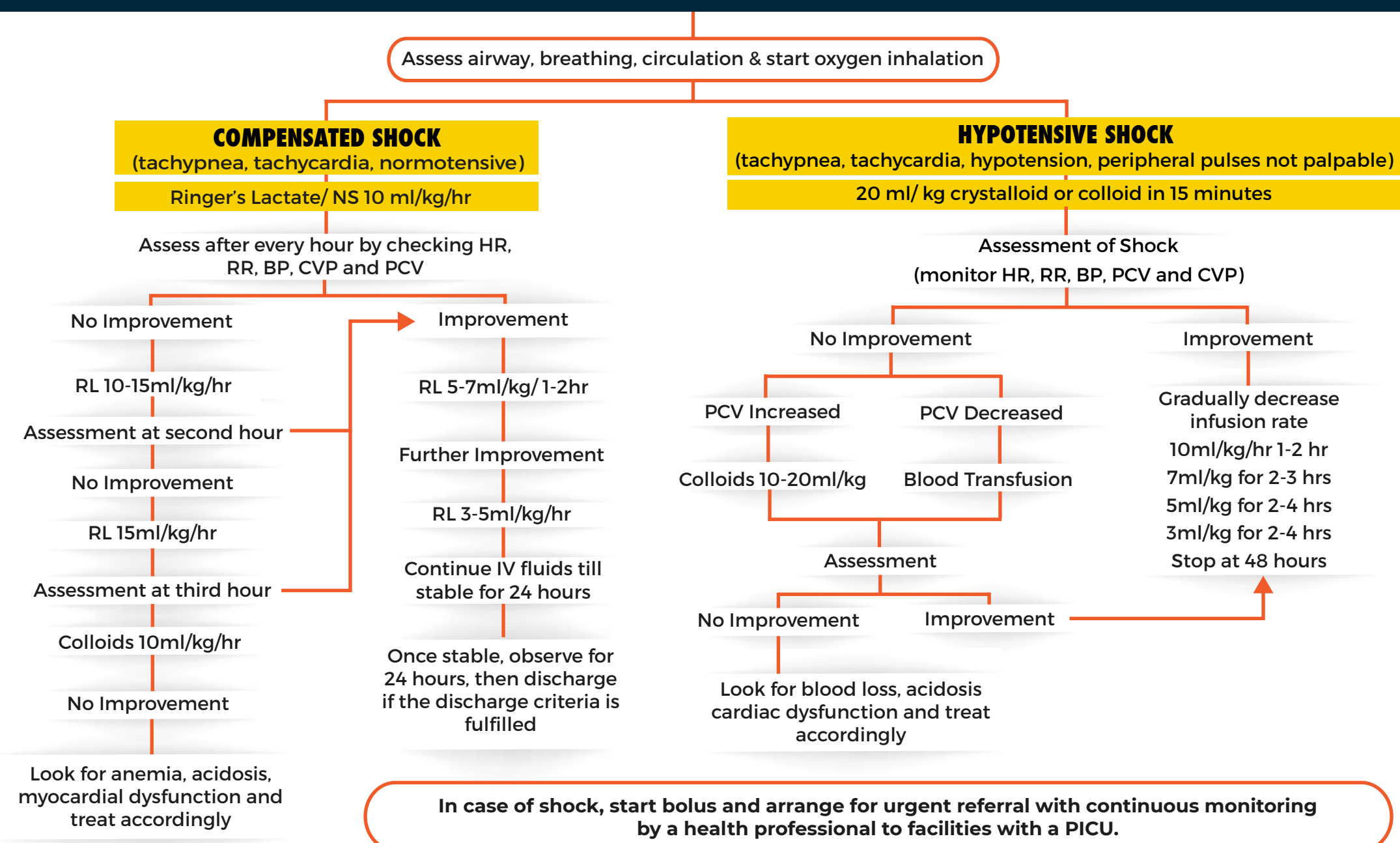
### DESIRABLE

- Chest X-ray
- LFT, RFT,
- CPK, albumin
- USG abdomen
- Dengue IgM

### OPTIONAL

- Echocardiography
- PCR - dengue
- CVP monitoring
- USG guided measurement of collapsibility of IVC for monitoring hypovolemia

## SHOCK



## INDICATION FOR PLATELET TRANSFUSION & PACKED RED CELLS

### PACKED RED CELLS

- Loss of blood (overt blood) 10% or more of total blood volume.
- Refractory shock
- Fluid overload

### PLATELETS

- Prolonged shock
- Prophylactic platelet transfusion (PLT <10,000/cumm)
- Systemic massive bleeding

### FRESH FROZEN PLASMA/CRYOPRECIPITATE

Coagulopathy with bleeding

## DISCHARGE CRITERIA (ALL OF THE FOLLOWING CONDITIONS MUST BE PRESENT)

### CLINICAL

- No fever for 48 hours
- Improvement in clinical status (check for general well-being, appetite, haemodynamic status, urine output, respiratory distress)

### LABORATORY

- Increasing trend of platelet count
- Stable haematocrit without intravenous fluids

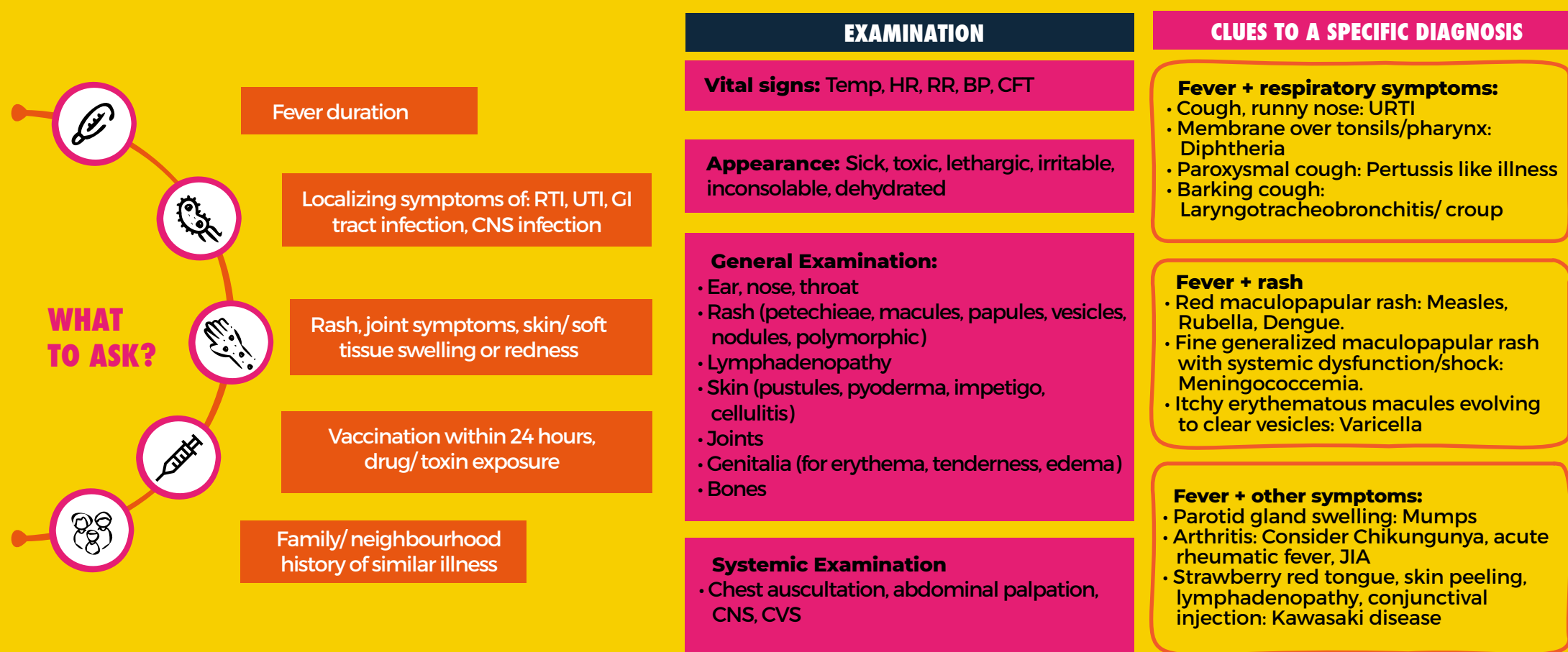
**KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**





# Standard Treatment Workflow (STW) for the Management of FEVER IN CHILDREN ICD-10-R50

**FEVER IS** Core (rectal) temperature  $\geq 38.0^{\circ}\text{C}$  ( $100.4^{\circ}\text{F}$ ) or axillary temperature  $> 37.5^{\circ}\text{C}$  ( $100.4^{\circ}\text{F}$ ).

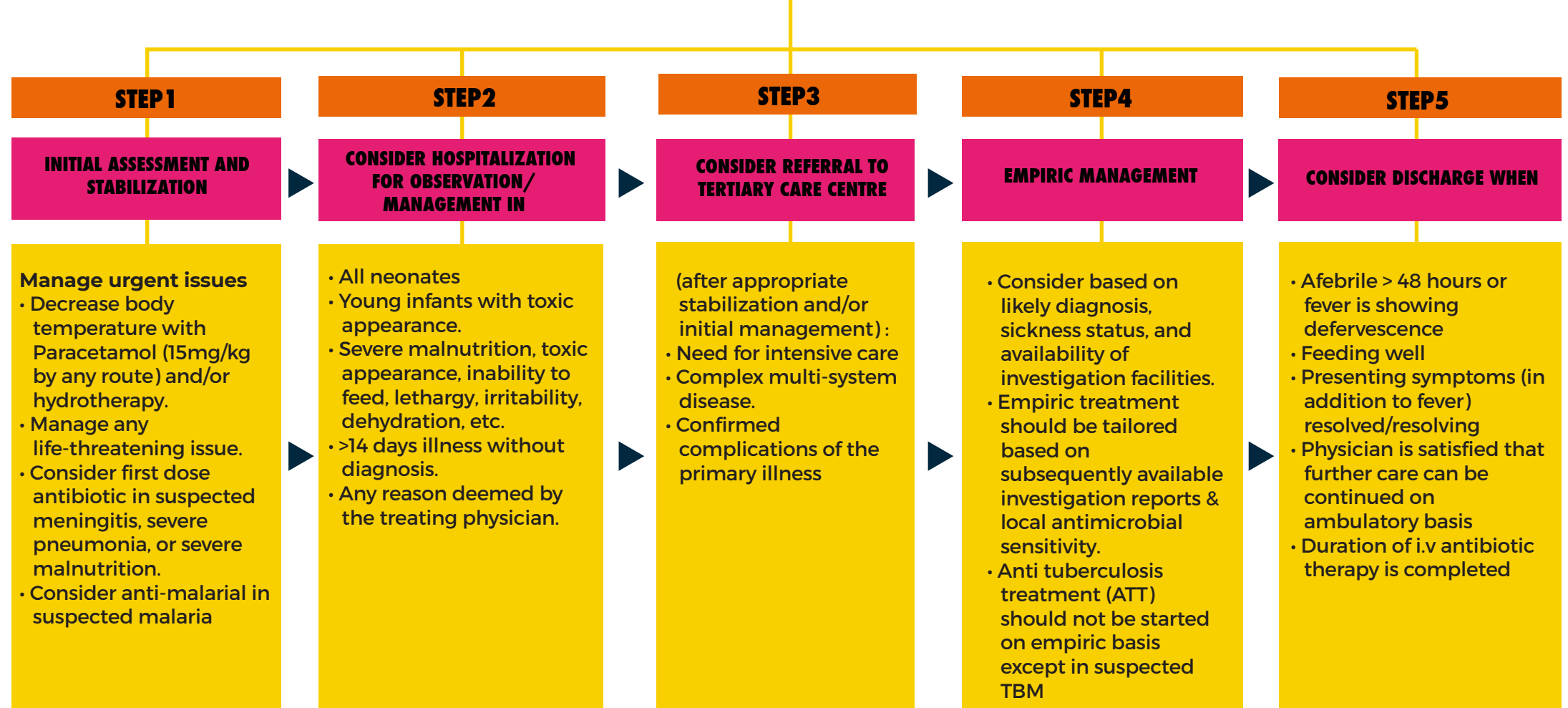


## INVESTIGATION OF THE FEBRILE CHILD

(Consider if one or more of the following are warranted. Perform investigations only where result impacts management)

<7 DAYS FEVER ALONE	<7 DAYS AND LOCALIZING SYMPTOMS PRESENT	<7 DAYS AND NON SPECIFIC SYMPTOMS	>7 DAYS AND FEVER ALONE OR WITHOUT LOCALIZING SYMPTOMS	>7 DAYS AND LOCALIZING SYMPTOMS PRESENT
<p><b>ESSENTIAL:</b> If fever &lt;72 hours and child not looking sick: No investigations If fever &gt;72 hours, consider: TLC, DLC, P.S for leukocyte morphology, malarial parasite &amp; platelet count</p> <p><b>DESIRABLE:</b> Rapid antigen test for malaria, NSI antigen and dengue IgM antibody, blood culture</p> <p><b>OPTIONAL:</b> C reactive protein, procalcitonin</p>	<p><b>ESSENTIAL:</b> As given in the first box</p> <p><b>DESIRABLE:</b> As given in the first box + consider: (Clean-catch) urine microscopy &amp; culture, chest Xray, CSF analysis</p> <p><b>OPTIONAL:</b> As given in the first box + consider: ultrasonography, throat/pharyngeal swab, pus aspiration.</p>	<p><b>ESSENTIAL:</b> As given before</p> <p><b>DESIRABLE:</b> As given before. Additionally consider: serology for specific viral infection, rapid antigen test for malaria, NSI antigen and dengue IgM antibody, blood culture, serology for scrub typhus</p> <p><b>OPTIONAL:</b> As given before</p>	<p><b>ESSENTIAL:</b> All mentioned in Essential &amp; Desirable list in the prior boxes. Additionally consider Widal test.</p> <p><b>DESIRABLE:</b> Consider Mantoux test, ultrasonography</p> <p><b>OPTIONAL:</b> As given before. Additionally consider: Ultrasonography of abdomen, chest, pericardium, joint(s), abscess, lymph node clusters, parotid gland etc, for microscopy, Xpert MTB RIF assay, Mycobacterial culture. Consider: bone marrow, ANA-profile, HIV serology, echocardiography, CT PET scan.</p>	<p><b>ESSENTIAL:</b> All investigations mentioned in the prior boxes</p> <p><b>DESIRABLE:</b> All investigations mentioned in the prior boxes. Additionally consider: serology for Brucella, CMV, Herpes, Japanese encephalitis. CT scan in deep seated abscess or lung abscess, Bone marrow examination, ANA profile, HIV serology, PET scan.</p> <p><b>OPTIONAL:</b> All investigations mentioned in the prior boxes</p>

## MANAGEMENT



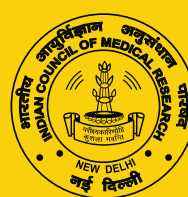
## ABBREVIATIONS

<b>ANA:</b> Anti-nuclear antibody	<b>CSF:</b> Cerebro-spinal fluid	<b>HR:</b> Heart rate	<b>RTI:</b> Respiratory tract infection
<b>BP:</b> Blood pressure	<b>CT:</b> Computed tomography	<b>JIA:</b> Juvenile idiopathic arthritis	<b>TLC:</b> Total leukocyte count
<b>CFT:</b> Capillary filling time	<b>DLC:</b> Differential leukocyte count	<b>PET:</b> Positron emission tomography	<b>URTI:</b> Upper respiratory tract infection
<b>CMV:</b> Cytomegalovirus	<b>CVS:</b> Cardiovascular system	<b>PS:</b> Peripheral smear	<b>UTI:</b> Urinary tract infection
<b>CNS:</b> Central nervous system	<b>GI:</b> Gastro-intestinal	<b>RR:</b> Respiratory rate	

**KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**

## REFERENCES

1. World Health Organization. Integrated Management of Childhood Illness: distance learning course. [http://apps.who.int/iris/bitstream/handle/10665/104772/9789241506823\\_Module-5\\_eng.pdf;jsessionid=942F89F89671BA396EC7F46C9B5C1158?sequence=7](http://apps.who.int/iris/bitstream/handle/10665/104772/9789241506823_Module-5_eng.pdf;jsessionid=942F89F89671BA396EC7F46C9B5C1158?sequence=7)
2. Mahajan P, et al. Consensus Guidelines on Evaluation and Management of the Febrile Child Presenting to the Emergency Department in India. Indian Pediatr 2017; 54: 652-60.
3. World Health Organization 2015. Government of India National Guidelines for Clinical Management of Dengue Fever.
4. Kliegman RM (ed). Nelson Textbook of Pediatrics 20th edition, 2016.



# Standard Treatment Workflow (STW) for the Management of SEPSIS AND SEPTIC SHOCK IN CHILDREN

## ICD-A41.9, R65.21

**Sepsis to be suspected:** in children with any infections (fever with or without rashes/ pneumonia/ diarrhoea) and they are at risk of life threatening organ dysfunction



### WHEN TO SUSPECT (2-59 MONTHS)?

Poor Feeding	Lethargy	Decreased responsiveness	Unconsciousness
Cold/ bluish peripheries	Rapid or shallow breathing	Chest in drawing	Stridor
Excessive vomiting	Decreased urine output	Convulsions	Stiff neck

### CHECK FOR HISTORY OF

Prior treatment
Previous recurrent infections
Prior hospitalisation
Chronic systemic illness (congenital or acquired)
Immunization (age appropriate)

### EXAMINATION

#### GENERAL PHYSICAL EXAMINATION

#### VITAL SIGNS

#### SYSTEMIC EXAMINATION

Lethargy	Petechial rash
Decreased alertness	Mucosal bleeding
Activity	Rapid breathing
Pallor	Chest in drawing
Cyanosis	Cold peripheries
Skin mottling	Assess nutritional status

Pulse volume (High volume as well as low volume/feeble pulse)	Heart rate and respiratory rate (outside the age range)
Capillary refilling time > 3 seconds	Pulse oximetry (saturation <95%)
Blood pressure* (Systolic blood Pressure < 70 in <1 year)	>1 year child if systolic BP < 70+ Age (yrs) x2) or ( lower than age range)

**Respiratory:** Signs of respiratory distress - retraction, nasal flaring, grunting, crepitation on auscultation  
**CVS:** Murmur, gallop rhythm  
**Per abdomen:** Abdominal distension  
**CNS:** \*AVPU scale, signs of meningitis, seizures  
**Skin:** Rashes  
**Bone & joints:** Swelling, redness, tenderness

#### SIGNS OF SEVERE DEHYDRATION

**Diarrhoea plus any two of these:** Lethargy or unconscious, not able to drink or drinks poorly, Sunken eyes, skin pinch goes back very slowly

### INVESTIGATIONS- (Based on symptoms and available facility)

**Essential -** Complete blood counts, peripheral blood film, urine routine, blood sugar, CRP, serum electrolytes, renal function test, liver function test

**Desirable -** Blood culture, blood gas, relevant cultures (based on symptoms), chest X-ray, specific illness- Malaria - rapid malarial antigen test, Dengue- dengue NS1, IgM, CSF study

**Optional- PCT, USG** to guide the fluids

### MANAGEMENT

#### DIAGNOSTIC ALGORITHM

CHILD (2-59 MONTHS OF AGE WITH FEBRILE ILLNESS (WITH WARNING SIGNS))

#### GOOD PERIPHERAL PERFUSION

Admit or initiate treatment as per IMNCI guidelines<sup>2</sup>

#### POOR PERIPHERAL PERFUSION\*\*

With fast pulse, cold peripheries, poor pulse volume, CRT >3 seconds (Fast pulse: HR > 180 in <12 month old child, HR >120 in >12 month old child)

Admit, initiate treatment, refer to centre with facility of ICU, ventilation, 24 hour monitoring (if required)

Start O<sub>2</sub> with face mask @ 4-6 lit/min, or hood @8-10 lit if not available nasal prongs 1-2 lit/min to maintain SpO<sub>2</sub> >95%, Insert two IV cannulas, give first dose of antibiotics within first one hour

Give 20 ml/kg of normal saline fluid bolus over 20- 30 minutes.

Reassess for decreases in heart rate, improvement in pulse volume and warm peripheries

If no improvement

Repeat bolus of 20 ml/kg over 30 minutes, with careful monitoring for hepatomegaly, oxygen saturation, crepitation's in chest (if any of above appears then stop fluids)

If shock persists

Start Inj Adrenaline infusion @0.1 microgram/kg/min and refer to higher centre

#For severe acute malnutrition - consider SAM STW  
 #For suspected Dengue follow Dengue Fever STW

\*\*If there is improvement after 1st bolus and history of diarrhea present then:

Give 70 ml/kg over 5 hours in infants and over 2 ½ hours in a child with hypovolemic shock. Give additional fluids if losses continue.

Start maintenance fluid in case of other illness

#### Antibiotics

- >3 months Inj Ceftriaxone 100mg/kg/day ( 2 divided doses)
- <3 month Inj Cefotaxime 200mg/kg (divided 6-8hrly),  
Inj Gentamicin 5-7.5 mg/kg single dose /day
- If soft tissue infection: consider Inj Cloxacillin 200mg/kg divided 6 hourly or Inj Amoxicillin- Clavulanic acid 30 mg/kg/dose 8hrly)

Inj Adrenaline- 0.3x body weight in mg in 50 ml NS or 5% dextrose at 1 ml/hr will give 0.1 microgram/kg/min

#### When to refer

- Shock does not improve after 2nd fluid bolus
- Signs of fluid overload
- No facility for continuous monitoring.
- Before referral counsel the parents and inform referring facility

#### When to Suspect Cardiac Failure

- History of underlying heart disease
- History of forehead sweating/ suck rest suck cycle
- Murmur
- Hepatomegaly or basilar crept

If it is suspected be careful in giving fluid bolus

#### Complications

- Respiratory failure** ( excessive increase in the respiratory rates and inability to maintain saturation > 94% with oxygen) -non-invasive (CPAP/BIPAP) or invasive ventilation
- Congestive heart failure-** Dobutamine / Milrinone infusion and Furosemide
- Infections on other sites-** explore and treat accordingly

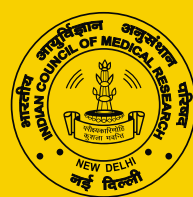
### DISCHARGE CRITERIA

Completion of antibiotics as per culture sensitivity	Afebrile for 48 hours	Vitals within normal limit for age	Good oral intake	Adequate urine output >1ml/kg/hr
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👉 KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

\***DISABILITY (AVPU SCALE)** **A** Is the child Alert? If not; **V** Is the child responding to Voice? If not; **P** Is the child responding to Pain?; **U** The child who is Unresponsive to voice (or being shaken) AND to pain is Unconscious \*Anything below A should be classify as danger sign





## Standard Treatment Workflow (STW) for the Management of SEVERE ACUTE MALNUTRITION WITH COMPLICATIONS ICD-10-E43

### WHEN TO SUSPECT?

#### COMMON PRESENTATION

- Faulty feeding
  - Not exclusively breastfed for 6 months
  - Bottle feeding
  - Delayed/Inadequate complementary feeding
- Poor appetite
- Not gaining weight
- Lethargic
- Disinterested in surroundings
- Delayed development

#### Additional symptoms of complications

- Loose motions
- Jaundice
- Seizures
- Inter-current infections:**
  - Pneumonia
  - Diarrhea
  - Sepsis
  - Skin infections
  - Severe dehydration
  - Untreated tuberculosis
  - HIV
  - Social challenges

#### DIAGNOSTIC CRITERIA FOR SAM & MAM

##### 0-6 months

- Consider SAM if MUAC <11.0 cm

##### 6-59 months

- Consider SAM if MUAC <11.5 cm or WHZ <-3 SD or bilateral pitting oedema
- Consider MAM if MUAC is between 11.5- 12.4 cm or WHZ is between -2 to -3 SD

##### >5 years

- Consider SAM if BMI ≤ 3SD (severe thinness)
- Consider MAM if BMI ≤ 2 SD (thinness)

#### EXAMINE FOR

- Vital signs: PR, RR, CRT
- Lethargy/ irritability
- Loss of subcutaneous fat
- Muscle wasting
- Pallor
- Signs of Vitamin B, K and A deficiencies
- Respiratory distress
- Dehydration

#### TRIAGE

##### SAM + GOOD APPETITE + NO MEDICAL COMPLICATION

Home based treatment + oral amoxicillin 50 mg/kg/dose twice a day for 7-10 days

##### SAM + COMPLICATIONS/ POOR APPETITE/ FAILED HOME TREATMENT

Hospitalize

#### INVESTIGATIONS

##### ESSENTIAL

Hemogram, RBS, LFT, KFT, Chest X-Ray, RDT-HIV, Gastric aspirate for CBNAAT/AFB

##### DESIRABLE

EKG, Stool pH, Stool microscopic, Urine culture, Serum electrolytes (Na, K, Ca), Serum B12, Serum Folate levels

##### OPTIONAL

Blood Culture, Blood gases, Ultrasound (inferior vena cava to ascending aorta ratio)

### TREATMENT

**A. STABILISATION PHASE:** Monitor vitals, urine frequency, stool/vomitus volumes

**INTAKE:** IVF (DNS) 4 ml/kg/hr for 2-3 days with early/concomitant initiation of oral feeds (130 ml/kg/day)

CONDITION	PLACE OF TREATMENT	TREATMENT
<b>INFECTIONS</b> (empirically)	Facilities for supportive monitoring, investigations and IVF	<ul style="list-style-type: none"> <li>• Inj.. Ampicillin - 50 mg/kg/iv or im X 6hrly Plus inj. Gentamicin- 7.5 mg/kg iv or im, OD for 7-10 days</li> <li>• If no response within 48 hrs or critically ill give inj. Ceftriaxone 50 mg/kg, OD for 7-10 days</li> <li>• When accepting orally, switch to oral amoxicillin 40-45 mg/kg/dose twice a day for 7 days</li> <li>• If prolonged diarrhea (&gt;7 days): Metronidazole 10-12 mg/kg, 8 hrly for 7-10 days (inj.ectable or oral)</li> </ul>
<b>HYPOGLYCEMIA</b> (RBS <54mg/dL)	Facilities for supportive monitoring, investigations and IVF	Conscious: 50 ml of 10% Dextrose or 1 tsf sugar in 3 tsf water orally
	Transfer to intensive care facility to manage shock	Unconscious: 5 ml/kg of 10% Dextrose IV NO IMPROVEMENT treat as shock
<b>HYPOTHERMIA</b> (<35.5 °C or 96 °F)	Facilities for supportive monitoring, investigations and IVF. Plus warmer	Skin to skin care with mother (infants) Warming under warmer, incandescent lamp or warmer
	Intensive care facility to manage shock	NO IMPROVEMENT treat as shock
<b>SEVERE DEHYDRATION</b>	Facilities for supportive monitoring, investigations and IVF	Conscious: 50 ml of 10% Dextrose or 1 tsf sugar in 3 tsf water orally
	Transfer to intensive care facility to manage shock	Unconscious: 5 ml/kg of 10% Dextrose IV NO IMPROVEMENT treat as shock
<b>ELECTROLYTE IMBALANCE</b> (empirically)	Facilities for supportive monitoring, investigations and IVF	Potassium: 3-4 mmol/kg/D, orally for 2 wks Magnesium: 0.4-0.6 mmol/kg/D1 IM followed by oral for 2 wks
<b>ANEMIA</b>	Facilities for supportive monitoring, investigations and IVF	Whole blood /PRBC transfusion (10 ml/kg over 3 hrs): if Hb <4 gm/dL or Hb 4-6.5 gm/dL with respiratory distress with close monitoring and hy. Furosemide (1 mg/kg) at start of transfusion

**B. REHABILITATION PHASE** (Transfer to NRC when child meets criteria for discharge\* & accepts home available foods)

#### FEEDING

**Place of treatment:** Facilities for supportive monitoring

#### Treatment:

- a. 6 months and above: F75 at least 5 times/day gradually increasing to give 150-200 kcal/kg/day (usually 2-3 days) then switch to F100 for next 5-7days with introduction of home available food
- b. Below 6 months: same as above with return to exclusive breastfeeding where ever possible

#### ELECTROLYTES

**Place of treatment:** Facilities for supportive monitoring

#### Treatment:

- a. Zinc: 2 mg/kg/day X 2wks orally
- b. Copper: 0.3 mg/kg/day X 2 wks orally
- c. Iron: 3 mg/kg/day once weight gain has started orally for 6 weeks

#### VITAMINS

**Place of treatment:** Nutritional rehabilitation center (NRC)

#### Treatment:

- a. Vitamin A: >12 months- 2 lac iu, 6-12 months: 1 lac iu, <6 months: 0.5 lac iu if food not fortified
- b. Vitamin D, A, B Complex: RDA

\***CRITERIA FOR DISCHARGE FROM HOSPITAL TO OUTPATIENT CARE:** Clinically well and alert; no or resolving medical complications; no or resolving oedema (if present); satisfactory oral intake has a good appetite (taking at least 75% of target calorie intake of 150- 200 kcal/kg/day & 0-6 months old have weight gain of 3-5 gm/kg/day for three days).

**PRIMARY FAILURE OF TREATMENT:** (a.) Failure to regain appetite by day 4 (b.) Failure to lose oedema by day 4 (c.) Oedema still present Day 10 (d.) Failure to gain at least 5g/Kg/day for 3 consecutive days on catchup diet. Look for unrecognized congenital abnormality, inborn errors of metabolism, immune deficiency, other major organ dysfunction, and malignancy.

**APPETITE TEST:** Passed if, a child not fed for last 2 hours, when fed by mother in a quiet place consumes in 1 hour:

• 7-12 months: of ≥ 25 ml/kg of F100

• > 12 months: of locally prepared ready to eat food \*\*

**AMOUNT TO BE GIVEN:** 15 gms or more if < 4 kg; 25 gms or more if 4 - 7 kg; 35 gms or more if 7-10 kg

\*\*[ Mixture of Roasted groundnut 1000 gm , Milk powder 1200 gms, Sugar 1120 gms, Coconut oil 600 gms. To be kept refrigerated for not more than 1 week.]

#### HOW TO PREPARE F75 AND F100

	F75	F100
<b>FRESH WHOLE CREAM MILK</b>	300 ml	900 ml
<b>SUGAR</b>	100 gm	75 gm
<b>VEGETABLE OIL</b>	20 ml	20 ml
<b>ADD WATER TO GET TOTAL VOLUME OF</b>	1 Litre	1 Litre

### ABBREVIATIONS

**WHZ:** Weight for Height Z-score  
**SAM:** Severe Acute Malnutrition

**MUAC:** Mid-upper Arm Circumference  
**SD:** Standard Deviation (from median)

**MAM:** Moderate Acute Malnutrition  
**BMI:** Body Mass Index

👉 **KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**

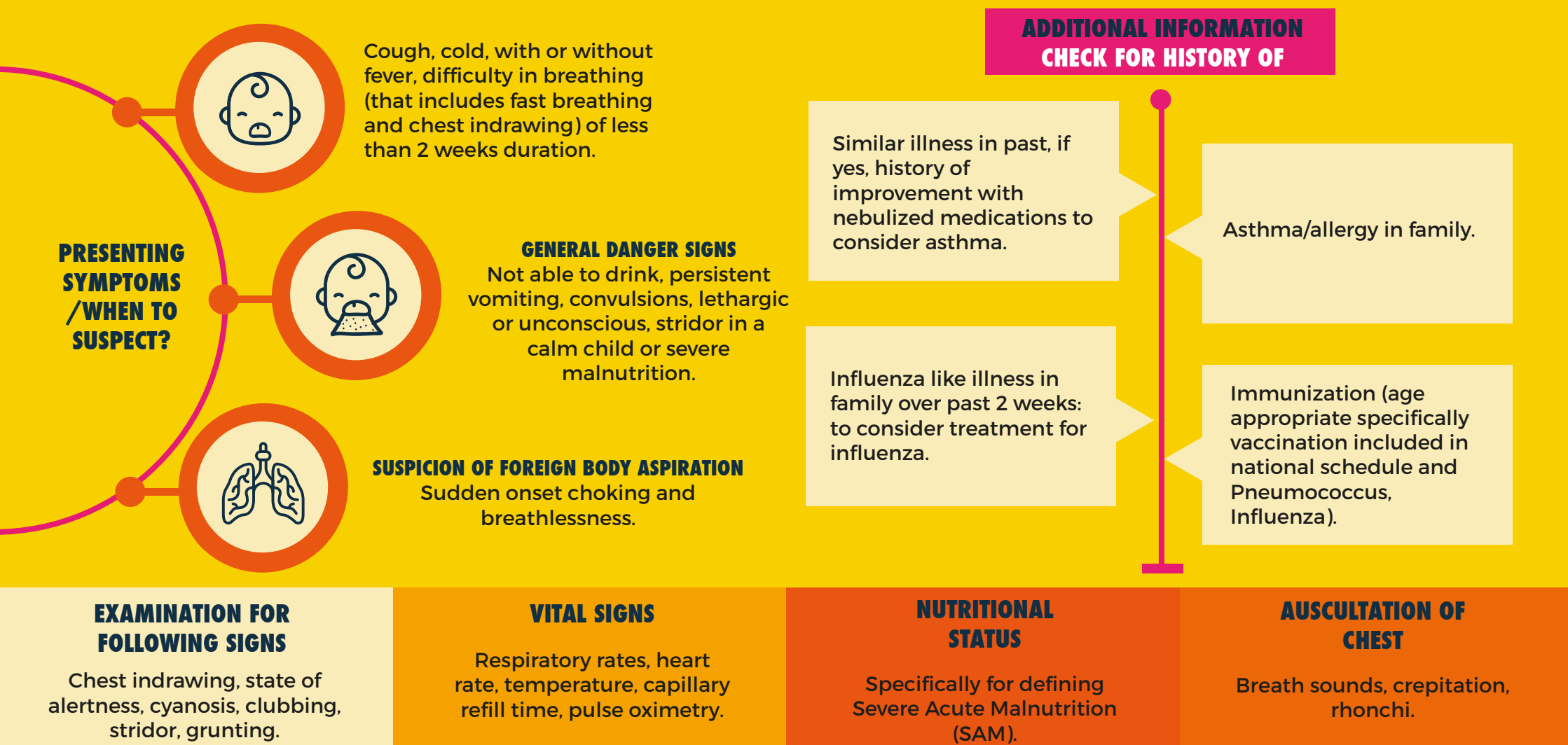
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# Standard Treatment Workflow (STW) for the Management of SEVERE PNEUMONIA IN CHILDREN

## ICD10-J18.9



### DIAGNOSTIC ALGORITHM

Child age 2-59 months with cough and/or difficult breathing.

### RED FLAG SIGNS

Irregular or gasping respiration, cold extremities, altered sensorium, cyanosis.

Cough and cold, no breathing difficulty.

Fast breathing (2-12 months >50; 1-5 years >40; >5 years >20 ) and/or chest indrawing oxygen saturation >92%.

Fast breathing (2-12 months >50; 1-5 years >40 ; >5 years >20 ) and/or chest indrawing with any of the general danger signs (not able to drink, persistent vomiting, convulsions, lethargic or unconscious, stridor in a calm child or severe malnutrition).

### NO PNEUMONIA

Home care advice.

### PNEUMONIA

Ambulatory treatment with oral Amoxicillin and follow up.

### SEVERE PNEUMONIA

#### No red flag signs

Admit or refer to a facility with following: oxygen by mask or hood, pulse oxymeter, IV fluids, oxygen, clinical supervision, X ray film (desirable).

#### Red flag signs positive

Admit or refer to facility with following: Appropriate: ventilation facility, ICU, round the clock monitoring

**If plan to refer:** Give first dose of antibiotics, arrange transport and inform to the referral centre.

### INVESTIGATIONS

**ESSENTIAL:** Hemogram, random blood sugar, CRP, chest X-ray.  
**DESIRABLE:** Blood culture, pleural tap, serum electrolytes, renal and liver function tests.  
**OPTIONAL:** ABG, lung ultrasound, PCT, tracheal aspirate (gram stain with culture), bronchoscopy/BAL, microbiology culture, investigations for atypical organisms, PCR for viral etiology.

### TREATMENT

**OXYGEN INHALATION:** by mask (1-2 L/min) or hood (4-6 L/Minute) to maintain oxygen saturation > 95%.

#### IV ANTIBIOTICS:

- **For children 2-59 months:** Ampicillin 100-200mg/kg in four divided doses + Gentamicin +5-7.5 mg/kg as single dose daily.
- **For children >5 years:** Ampicillin/Amoxicillin, add macrolide (Azythromycin/Erythromycin) if atypical pneumonia is suspected.
- If suspected Staphylococcal pneumonia in any age (Pneumatocele on CXR, post measles, infected scabies or pyoderma) add Cloxacillin/Amoxiclavulanic acid.
- **SUPPORTIVE CARE:** Paracetamol for fever, IV fluid, bronchodilators (inhaled) as needed.
- **WHEN AND WHAT TO SWITCH TO ORAL AND DURATION:**
  - **Child is afebrile, RR has returned to below age specific cutoffs, no chest indrawing and accepting orally:** switch to oral Amoxicillin to complete a total of 5-7 days duration (include duration of IV also in it).
  - **If getting Doxycillin/Amoxyclav:** continue oral Cloxacillin or Amoxclav for 2 weeks.
  - Start feeding as soon as possible when child shows improvement.
  - **IF ASSOCIATED SAM:** follow treatment guidelines for SAM.

### COMPLICATIONS AND THEIR TREATMENT

**NON RESPONDERS:** persistence of symptoms and/or signs 48-72 hours after initiation of appropriate treatment-change antimicrobials.  
**PLEURAL EFFUSION:** diagnostic aspiration.  
**EMPYEMA:** drainage with ICD.  
**LUNG ABSCESS:** change antibiotics for longer duration (4-6 weeks).  
**PNEUMOTHORAX:** Intercostal drainage.  
**RESPIRATORY FAILURE:** consider ventilation.  
**INFECTION IN OTHER SITES:** identify and treat appropriately.

### ADDITIONAL INFORMATION

First and second line antibiotics for severe pneumonia:

### FIRST LINE

Ampicillin

### ALTERNATE FIRST LINE

First gen Cephalosporins

### SECOND LINE

AmoxiClav Cefuroxime Cefotaxime/ Ceftriaxone

### WHEN TO REFER TO HIGHER CENTERS?

Facilities (as described above) for treatment or complications (if develops) are not available, suspecting chronic respiratory problems.

### WHEN TO SUSPECT INFECTION WITH H1N1 VIRUS?

Child with cold, cough, fever with similar illness in any family members, consider H1N1 infection. Start Oseltamivir (as per national guideline).

### WHEN TO SUSPECT ACUTE BRONCHIOLITIS?

A child below 2 years of age fulfilling case definition of first episode of severe pneumonia with predominant finding of wheezing on auscultation.

### WHEN TO SUSPECT ASTHMA?

A child of age >3 years with history of recurrent cough, cold, wheezing with or without fever with good response to bronchodilator and personal or family history of asthma.

### WHEN TO SUSPECT CHRONIC RESPIRATORY PROBLEM?

Child has any of the following: severe malnutrition, clubbing, feeding difficulty, family history of sibling death due to pneumonia, multi site infections (diarrhea, ear discharge oral thrush).

Discharge when child is switched to oral medications, accepting oral for 24 to 48 hours

**KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**

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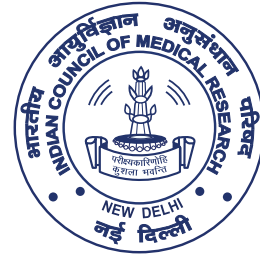
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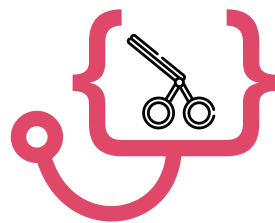




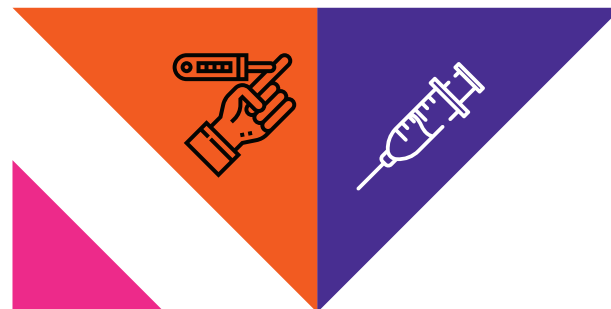
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# STANDARD TREATMENT WORKFLOWS *of India*



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