Approach to an Infant and A Child with Fever

What is a fever?

- A fever is a rise in internal temperature above the normal (37.5o)

- Fever helps the body to fight infections by stimulating the body's natural defences.
- By increasing the body's temperature, a fever makes it harder for the bacteria and viruses that cause infections to survive.

Fever

- Clinically significant fever in children > 3 months .
- Measured Rectally a Temperature ≥ 38C is significant
- An ill appearing Child with fever warrants a detailed Hx &PE including vaccination, travel and animal contact
- Fever for > 7 days without a Focus is considered Fever of Unknown Origin (FUO)

Fever Continue…..

- Although an extensive diagnostic evaluation is still recommended for neonates, lumbar puncture and chest radiography are no longer recommended for older children with fever but no other indications.
- With an increase in the incidence of urinary tract infections in children, urine testing is important in those with unexplained fever.

Fever: a common problem in children

Fever in children:

- 65% of children <2 years will visit a physician for an acute febrile illness
- 60-80% of encounters in clinical practice
- Most commonly caused by self-limited viral illness and localized bacterial infection, but may be presenting feature of something more serious infection e.g. meningitis

- Quick emergency questions

  Recent vaccine: DPT : fever after 24hr.

  MMR: after 5-7 days.

Important questions for the history in OPD setting

Does your child has convulsion or unconsciousness? Meningitis/encephalitis/ febrile seizure

Is the child able to swallow? Tonsillitis/herpangina/

Does he vomits every thing? Raised intracranial pressure/hepatitis/gastritis

How long your child has fever? Prolonged fever: kalazar/ tuberculosis/malignancy/ malaria

History: Associated symptoms

Associated symptoms with fever that helps to localize the infection

Convulsion- meningitis, acute encephalitic syndrome, sepsis

Headache-sinusitis, otitis media, meningitis, acute encephalitis syndrome

Vomiting, pain in abdomen-Hepatitis, appendicitis, enteric fever, amoebiasis.

Red eye-

Bulbar conjunctivitis-Kawasaki's disease, leptospirosis

Palpebral conjunctivitis-measles, infectious mononucleosis..

Cough, cold, breathlessness -URTI, bronchitis, pneumonia, empyema, sinusitis, lung abscess, otitis media, pharyngitis.

Difficult to swallow/ excessive salivation- Herpangina, gingivostomatitis, tonsillitis, pharyngiits, epiglottitis.
Noisy breathing- Croup syndromes
Projectile vomiting -Meningitis.
Jaundice-hepatitis.
Increasded frequency of urination or cry – Urinary tract infection
Skin rash-measles, chickenpox, rubella, meningococcemia, fifth disease, ricketssia.
Joint swelling-septic arthritis.
Swelling in the neck-Tuberculosis, Toxoplasmosis, Infectious mononucleosis, Brucellosis,
Palpable mass in abdomen-spleenomegaly-malaria, kala-azar, infectious mononucleosis, lymphoma, enteric fever, bacterial endocarditis.

For The Ill Febrile child

General Exam is essential : check for:

- Level of consciousness and activity level
- Presence of distress (Respiratory, agitation)
- Abnormal Color (Central cyanosis, pallor, Jaundice)
- Poor perfusion (mottling, Delayed CRT, weak pulses)
- Hydration status (Skin turgor, sunken eyes, depressed fontanell, absent tears and no sweat, urine output)

For The Ill Febrile child Vital signs

1-Temp.: infants and children may present with fever or hypothermia

2-HR: Usually tachycardic for age but may be bradycardic

- < 12 months 160 beats/min
- 1-2 years 150 beats/ min
- 3-5 years 140 beats/ min

3-RR: Tachypnea, hypopnea or apnea

- 4-BP : Initially normal but later hypotension, Pt can be shocked with normal BP

4-In an Ill appearing febrile child in addition to the usual vital signs and general exam always do

- Pulse oximetry (SaO_2)
- Capillary re fill time (CRT) (< 2 Sec)
- Blood glucose (> 40mg/dl in newborn, > 60 mg/dl in children)

special consideration for Infant <2 months

- Serious bacterial infections can present with normal or subnormal temperatures. absence of fever does not rule out a serious illness.
- For hot weather and over raping :undress the patient and recheck the temperature 15 to 30minutes later, prior to giving any type of antipyretic,

Serious infections <2m includes.

The prevalence of serious bacterial infections in infants less than or equal to 2 months of age who come in with fevers of 39C degrees or greater is high.

Serious bacterial infections are:

severe pneumonia, meningitis, sepsis, bone & joint infections, urinary UTI , and enterocolitis.

Bacterial pathogen in this age: group B beta srep.

Age :Two months to five year

The common causes of fever in this age group are:

Respiratory:	nasopharyngitis /pneumonia/ tonsillitis/ otitis media/ tubercular
Viral:	measles/ chicken pox/ mumps/ herpangina/ hepatitis/
GI infection:	dysentery/ acute watery diarrhoea/ typhoid
CNS infection:	meningitis/ encephalitis/ brain abscess
Skin infections:	abscess/ cellulites
Urinary infections:	pyelonephritis/ cystitis
Protozoal infections:	malaria/ kalazar/ amoebiasis
Collagen disease:	rheumatoid/ rheumatic

Age 2 m- 5y continue…

- if they look sick admit.
- Complete sepsis work-up & IV. antibiotics.
- Blood and urine culture.
- Stool culture is there is blood or mucus in the stool.

- If the patient has respiratory signs and symptoms , consider the diagnosis of pneumonia,
- Tachypnea defined according to the WHO criteria: In children <2 months: >60 breaths/minute ,in children 2-12 months: >50 breaths/minute and inchildren >12 months: >40 breaths/minute.

- The best guide to distinguishing bacterial from viral pneumonia is clinical judgment.
- Give antibniotics if bacteria infection suspected.

- Bacterial pneumonia should be considered in children up to 3 years of age with a temperature >38.5°C along with chest retractions and RR >50 per minute.
- Chest Xray and Blood culture should be done if WBC > 15,000 , high rate of bacteremia.

Fever of unknown etiology (FUO)

- Documented fever of more than one week duration.
- Fever documented in the hospital.
- No apparent diagnosis after after an investigation for one week in the hospital.

- FUO causes : Most of FUO result

- 1-from common diseases that may be atypical in ther presentations.

2- most causes tends to be infectious and collagen vascular diseases: Like Juvenile Rheumatoid arthritis and Systemic Lupus Erythromatosis (SLE).

Clinical assessment of fever

- Check for any immediately life-threatening features.
- Use traffic light system to check for symptoms and signs that predict the risk of serious illness.
- Look for a source of fever and check symptoms and signs associated with specific diseases.
- Measure and record temperature, heart rate, respiratory rate, capillary refill time and assess for dehydration.

The Traffic Light System

- The Traffic Light System is a tool used in health care to quickly assess the risk of serious illness in children. It categorizes children into three risk levels: guiding Dr for appropriate course of action.
- Green (low risk),
- Amber (intermediate risk).
- Red (high risk),

The Traffic Light System

- Tool for identifying the likelihood of serious illness
- Children with only symptoms and signs in the 'green' column are at low risk
- Children with one or more symptom or sign in the 'amber' column are at intermediate risk
- Children with one or more symptom or sign in the 'red' column are at high risk

Traffic light system for identifying risk of serious illness*

	Green – low risk	Amber – intermediate risk	Red – high risk
Colour (of skin, lips or tongue)	• Normal colour	• Pallor reported by parent/carer	• Pale/mottled/ashen/ blue
Activity	• Responds normally to social cues • Content/smiles • Stays awake or awakens quickly • Strong normal cry/not crying	• Not responding normally to social cues • No smile • Wakes only with prolonged stimulation • Decreased activity	• No response to social cues • Appears ill to a healthcare professional • Does not wake or if roused does not stay awake • Weak, high-pitched or continuous cry
Respiratory		• Nasal flaring • Tachypnoea: – RR >50 breaths/ minute, age 6–12 months – RR >40 breaths/ minute, age >12 months • Oxygen saturation ≤95% in air • Crackles in the chest	• Grunting • Tachypnoea: RR >60 breaths/minute • Moderate or severe chest indrawing
Circulation and hydration	• Normal skin and eyes • Moist mucous membranes	• Tachycardia: – >160 beats/minute, age <12 months – >150 beats/minute, age 12–24 months – >140 beats/minute, age 2–5 years • CRT ≥3 seconds • Dry mucous membranes • Poor feeding in infants • Reduced urine output	• Reduced skin turgor
Other	• None of the amber or red symptoms or signs	• Age 3–6 months, temperature ≥39°C • Fever for ≥5 days • Rigors • Swelling of a limb or joint • Non-weight bearing limb/not using an extremity	• Age <3 months, temperature ≥38°C • Non-blanching rash • Bulging fontanelle • Neck stiffness • Status epilepticus • Focal neurological signs • Focal seizures

CRT, capillary refill time; RR, respiratory rate

** This traffic light table should be used in conjunction with the recommendations in the guideline on investigations and initial management in children with fever. See http://guidance.nice.org.uk/CG160 (update of NICE clinical guideline 47).*

Septic work up

- **White blood cell and absolute neutrophil counts**

ANC may be a better predictor of occult bacteremia in incompletely immunized children

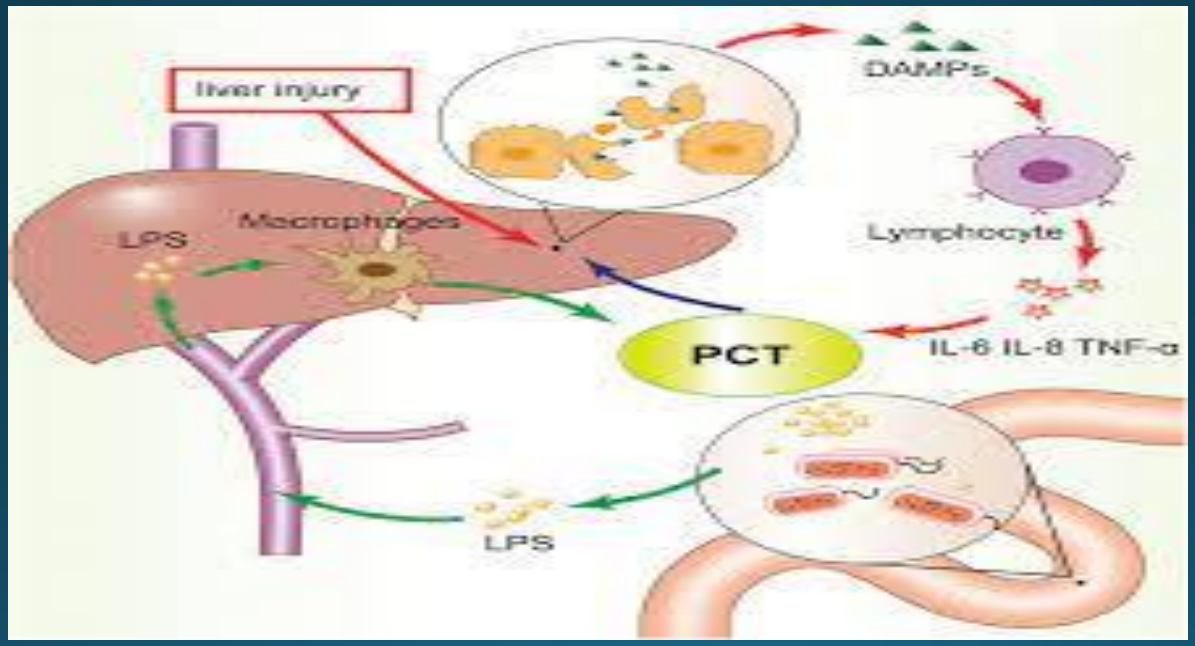
- **Procalcitonin and other biomarkers**

PCT levels rise in response to bacterial infections more rapidly than other markers, such as C-reactive protein and ANC

PCT is more specific than WBC count

- **Cultures:** Blood, Urine, CSF, Sputum, any other body fluids
- **Molecular assays** : Molecular methods to identify bacterial infection include polymerase chain reaction (PCR) and detection of bacterial 16S ribosomal RNA genes or host RNA signatures.

Procalcitonin: procalcitonin (PCT) has developed into a promising new biomarker for the early detection of systemic bacterial infections, not elevated in viral infections.



Symptoms and signs of specific diseases

Meningococcal disease	Non-blanching rash, particularly with one or more of the following: •an ill-looking child •lesions >2 mm in diameter (purpura) •a CRT of ≥3 seconds •neck stiffness
Meningitis	Neck stiffness Bulging fontanelle Decreased level of consciousness Convulsive status epilepticus
Herpes simplex encephalitis	Focal neurological signs Focal seizures Decreased level of consciousness
Pneumonia	Tachypnoea Chest indrawing Crackles Cyanosis Nasal flaring Oxygen saturation ≤95%

Symptoms and signs of specific diseases (2)

Urinary tract infection (in children aged older than 3 months)	Vomiting Poor feeding Lethargy Irritability Abdominal pain or tenderness Urinary frequency or dysuria Offensive urine or haematuria
Septic arthritis/ osteomyelitis	Swelling of a limb or joint Not using an extremity Non-weight bearing
Kawasaki disease	Fever >5 days and at least four of the following: •bilateral conjunctival injection •change in upper respiratory tract mucous membranes •change in the peripheral extremities •polymorphous rash •cervical lymphadenopathy

Look for RASH •

a) Erythmatous rash (rash that blanch on pressure) Causes:

1) Meseals: often accompanied by upper respiratory tract symptoms and conjunctivitis
2) 2) other viral infection like : rubella , scarlet fever

Roseola infantum

- Probably viral.
- Infants and young children.
- High fever lasting 1-5 days.
- Insufficient findings to explain the fever.
- Abrupt drop of temperature and appearance of generalized rash which disappears quickly, DIAGNOSTIC FOR ROSEOLA .

Erythema infectiosum (Fifth Disease)

- It's the fifth illness described with similar rash
- 1-Rubella 2- Measels 3-Scarlet fever 4-Filatov-Dukes disease (its now considered a mild atypical form of scarlet fever).
- Viral Eteology postulated. But no viruses isolated.
- Affect school age children.
- Low grade fever followed by a rash. Slapped cheek appeara
- Rash fades with central clearing giving reticulated appearance.

Scarlet fever

The first signs of scarlet fever can be flu-like symptoms, including a high temperature, a sore throat and swollen neck glands (a large lump on the side of your neck).

A rash appears 12 to 48 hours later. It looks like small, raised bumps and starts on the chest and tummy, then spreads. The rash makes skin feel rough, like sandpaper.

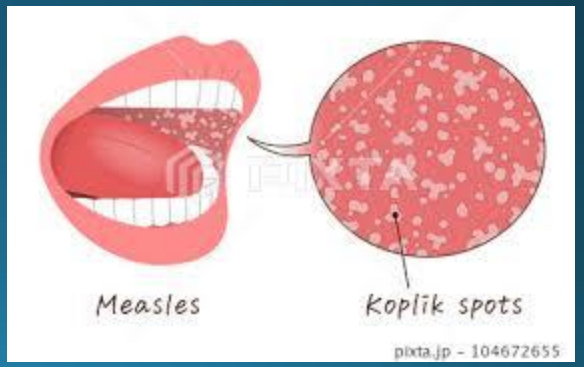
caused by Group A streptococcus .[affects children between five and 15 years of age

- Vesicular rash: may be caused by
- chickenpox or shingles

Measels

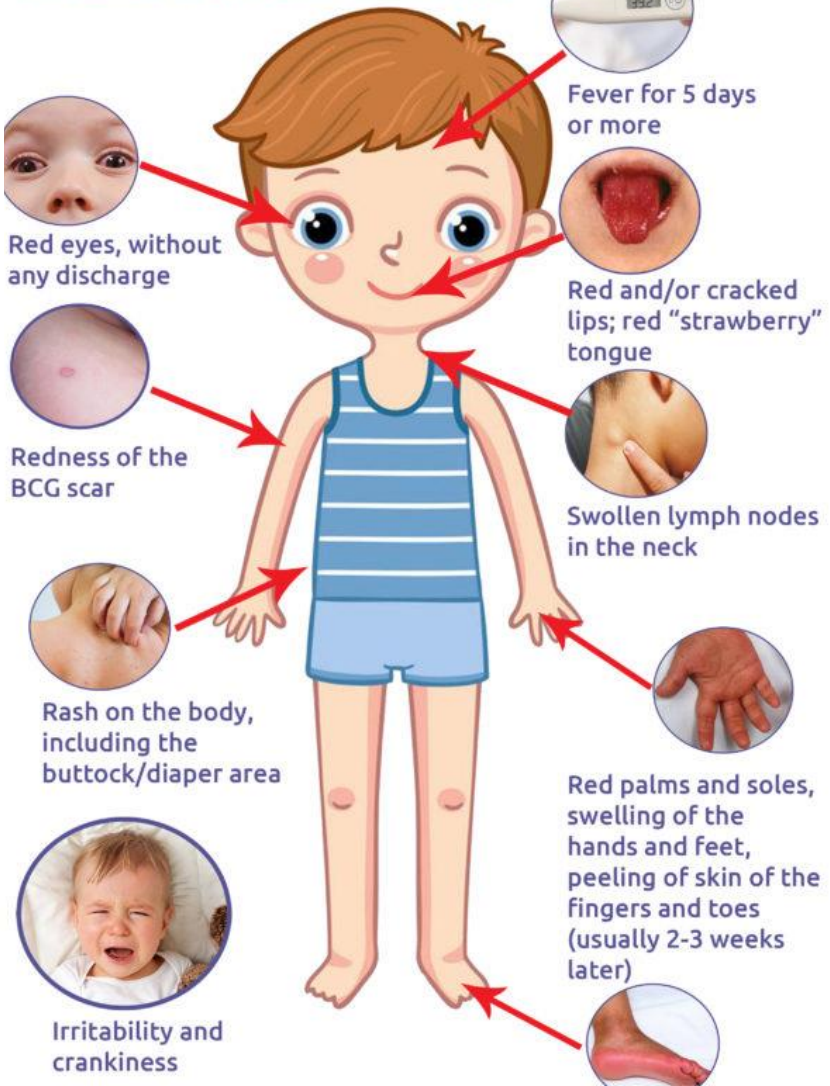
Measles

- Viral. Incupation period 10-12 days.
- In unvaccinated child.
- Generalized rash.
- High fever, looks sick, mucos membranes, conjunctivitis,
- Koplik spots in buccal and pharyngeal mucosa is diagnostic.
- Secondery bacterial pneumonia is a serious complication.



SYMPTOMS OF KAWASAKI DISEASE

If your child has a fever and shows 4 of these symptoms, they could have Kawasaki disease. Consult your doctor immediately.



Diagnostic criteria for Kawasaki disease

The diagnosis of KD requires the presence of fever lasting at least 5 days* without any other explanation combined with at least 4 of the 5 following criteria. A significant proportion of children with KD have a concurrent infection; therefore, ascribing the fever to such an infection or to KD requires clinical judgment.
Bilateral bulbar conjunctival injection
Oral mucous membrane changes, including injected or fissured lips, injected pharynx, or strawberry tongue
Peripheral extremity changes, including erythema of palms or soles, edema of hands or feet (acute phase), and periungual desquamation (convalescent phase)
Polymorphous rash
Cervical lymphadenopathy (at least 1 lymph node >1.5 cm in diameter)

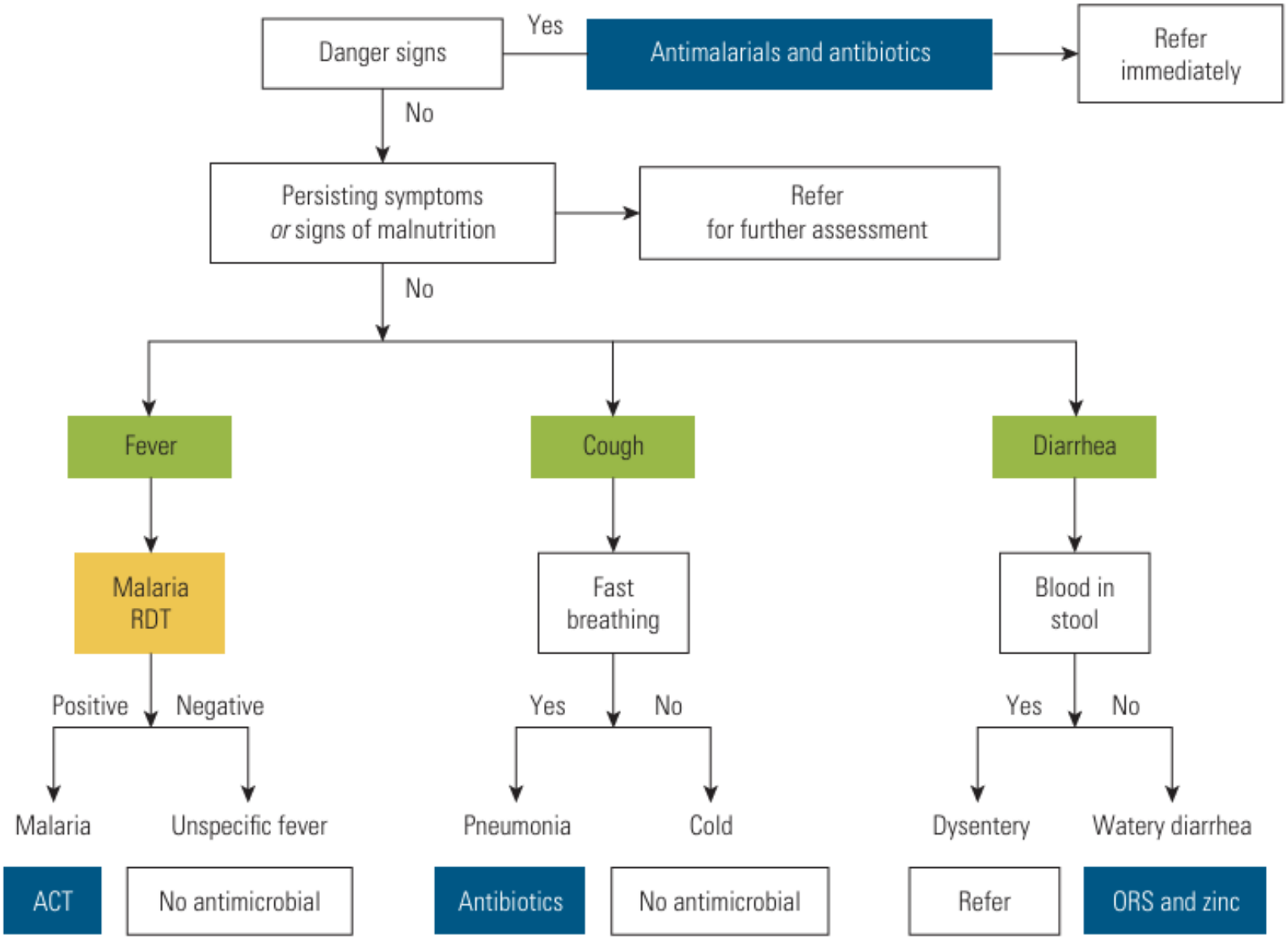
KD: Kawasaki disease.

* If ≥4 of the above criteria are present, a diagnosis of KD can be made on day 4 of illness.

Take Home Massage:

- Fever is the most common reason to bring the child to heath care facilities.
- Cause of fever ranges from very simple cause to very serious illness.
- Can have no apparent source.
- Use traffic light system to classify patients.

Figure 8.2 Sample Integrated Community Case Management Algorithm



Source: WHO 2009.

Note: ACT = artemisinin-based combination therapy; ORS = oral rehydration solution; RDT = rapid diagnostic test.

THANK YOU