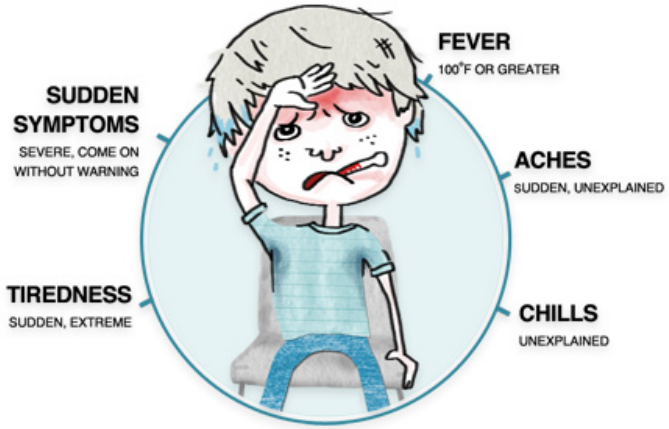
Basic pathological symptoms in childhood.



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Symptoms vs. signs

- In medicine a **symptom** is generally subjective while a **sign** is objective
- A symptom is subjective evidence of disease or physical disturbance observed by the patient
- A sign is objective evidence of disease or dysfunction.
- A symptom cannot be measured directly, whereas a sign is objectively observable by others.

Symptoms in children

1. Fever
2. Respiratory – cough, dyspnea
3. Gastrointestinal – abdominal pain, vomiting, diarrhoea
4. Neurological – seizure, headache
5. Skin - cyanosis, jaundice

Fever

Fever is generally agreed to be present if the elevated temperature is caused by a raised set point and:

a. Temperature in the rectum is at or over 37.5–38.3 °C
b. Temperature in the mouth is at or over 37.7 °C
c. Temperature under the arm or in the ear is at or over 37.2 °C

Normal body temperature varies through the day — it's lower in the morning and higher in the late afternoon and evening.

Body temperature can vary by a degree or more — from about 36.1 C to 37.2 C — and still be considered normal.

Risk factors for worrisome fevers include age under 2 years (infants and toddlers) or recurrent fevers lasting more than one week.

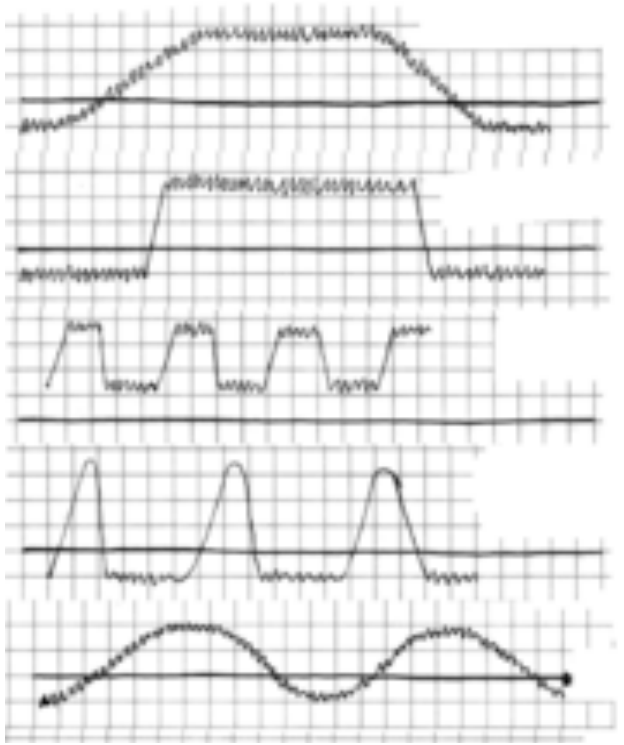
Causes of the fever

Fever or elevated body temperature might be caused by:

- A virus / bacterial infection
- Heat exhaustion or extreme sunburn
- Connective tissue disease
- A malignant tumor
- Some immunizations (DTaP or pneumococcal vaccine)
- Fever of unknown origin – fever lasts for more than three weeks without known cause

Types of fever

1. **Persistent fever** - temperature remains above normal throughout the day and does not fluctuate more than 1 °C in 24 hours, e.g. lobar pneumonia, meningitis, urinary tract infection
2. **Remittent fever** - temperature remains above normal throughout the day and fluctuates more than 1 °C in 24 hours, e.g. infective endocarditis, sepsis
3. **Intermittent fever-** the temperature elevation is present only for a certain period, later cycling back to normal, e.g. malaria, pyaemia, or septicemia
4. **Undulant fever** - fever that fluctuates widely at regular intervals e.g. brucellosis



Cough

- Cough is a sudden and often repetitively occurring reflex which helps to clear the large breathing passages from secretions, irritants, foreign particles and microbes.

The cough reflex consists of three phases:

1. an inhalation
2. a forced exhalation against a closed glottis
3. a violent release of air from the lungs following opening of the glottis, usually accompanied by a distinctive sound

Types of cough

- Acute cough – lasts less than 2 weeks, (Acc . British Thoracic Society - 3 weeks)
- Acute prolonged (subacute) – lasts less than 4 weeks, (BTS - 8 weeks)
- Persistent more than 4 weeks, (BTS - 8 weeks)

- Productive (wet) cough with a sputum
- Non – productive (dry) cough
  - Barking cough (e.g. laryngitis), paroxysmal cough

Cough- causes

- Respiratory tract infection (cold, acute bronchitis, pneumonia, pertussis, tuberculosis)-> acute cough
- Postinfectious cough - often persist for weeks after an illness -> dry, non-productive cough
- Asthma -> chronic cough in children with allergy, often nocturnal cough, after effort
- Gastroesophageal reflux disease- associated with heartburn, sour taste in the mouth, or a feeling of acid reflux in the chest
- A foreign body -> acute beggining
- A psychogenic cough caused by emotional or psychological problem, occurs in day time

Dyspnea

- Laboured breathing
- Increased respiratory rate – tachypnoe

Increased work of breathing is judged by:

- nasal flaring
- expiratory grunting – to increase positive end-expiratory pressure
- use of accessory muscles, especially sternomastoids
- retraction of the chest wall, from use of suprasternal, intercostal and subcostal muscles
- difficulty speaking (or feeding)

Tachypnoe

Age	Normal	Tachypnoe
Neonate	30-50	>60
Infants	20-30	>50
Young chidren	20-30	>40
Older children	15-20	>30

Dyspnea - causes

- asthma
- pneumonia
- cardiac ischemia
- interstitial lung disease
- congestive heart failure
- psychogenic causes

Abdominal pain

- Acute Abdominal Pain: less than 4-6 week
  - Single episode, self limited and treatable
  - Episodic localized pain, sharp, stabbing
- Chronic Abdominal Pain: at least 3 months duration
  - Long lasting, intermittent or constant
  - functional or organic (disease)

Abdominal pain is a symptom not only of gastrointestinal diseases !!!

Abdominal pain

Common causes of abdominal pain

- Gastroenteritis
- Constipation
- Systemic viral illness
- Infections outside of the gastrointestinal tract (e.g. streptococcal pharyngitis, lower lobe pneumonia, UTI)
- Mesenteric lymphadenitis
- Infantile colic

Acute abdomen

It is a sudden, severe abdominal pain of unclear etiology that is less **than 24 hours** in duration.

It is in many cases a medical emergency, requiring urgent and specific diagnosis and even surgical treatment:

- Appendicitis
- Intussusception
- Ileus
- Peritonitis
- Acute pancreatitis
- Renal colic
- Billary colic

Chronic abdominal pain

In 70% cases the cause of chronic abdominal pain is functional- only during day time, without evidence of disease/pathologic process.

The pain-predominant functional gastrointestinal disorders (PP-FGIDs) include:

- functional dyspepsia
- irritable bowel syndrome (IBS)
- abdominal migraine
- childhood functional abdominal pain
- childhood functional abdominal pain syndrome

Vomiting

Nausea: The unpleasant sensation of the imminent need to vomit, usually referred to the throat or epigastrium; a sensation that may or may not ultimately lead to the act of vomiting

Vomiting: Vomiting is the means by which the upper gastrointestinal tract rids itself of its contents when almost any part of the upper tract becomes excessively irritated, over distended, or even over excitable

Regurgitation: The act by which food is brought back into the mouth without the abdominal and diaphragmatic muscular activity that characterizes vomiting.

Causes of vomiting -neonatal period:

Bilious vomiting:

1. Atresias
2. Midgut volvulus
3. Annular pancreas
4. Hirschprungs disease
5. Preduodenal portal vein
6. Peritoneal bands
7. Persistent omphalomesenteric duct
8. Duodenal duplication
9. Meconium plug

Non-bilious vomiting:

1. Feeding excessive volume
2. Milk human or formula intolerance
3. Prematurity, NEC
4. Sepsis (meningitis) with ileus,
5. CNS lesion
6. Lesion above ampulla of Vater
   pyloric stenosis
   upper duodenal stenosis
   Annular pancreas
7. GER, inborn errors of metabolism

Causes of vomiting in infancy:

Medical causes:

1. GER
2. gastroeneritis
3. CNS infections
4. UTI
5. Inborn errors of metabolism
6. Uremia
7. Cow milk protein allergy
8. Over feeding
9. Faulty feeding technique

Surgical causes:

1. Intra cranial space occuping lesions (ICSOL), e.g. brain tumors, haematoma, abscesses
2. Hydrocephalus
3. Subdural hematoma
4. Volvulus
5. Peritonitis
6. Intussusception

Causes of vomiting in childhood:

Medical causes:

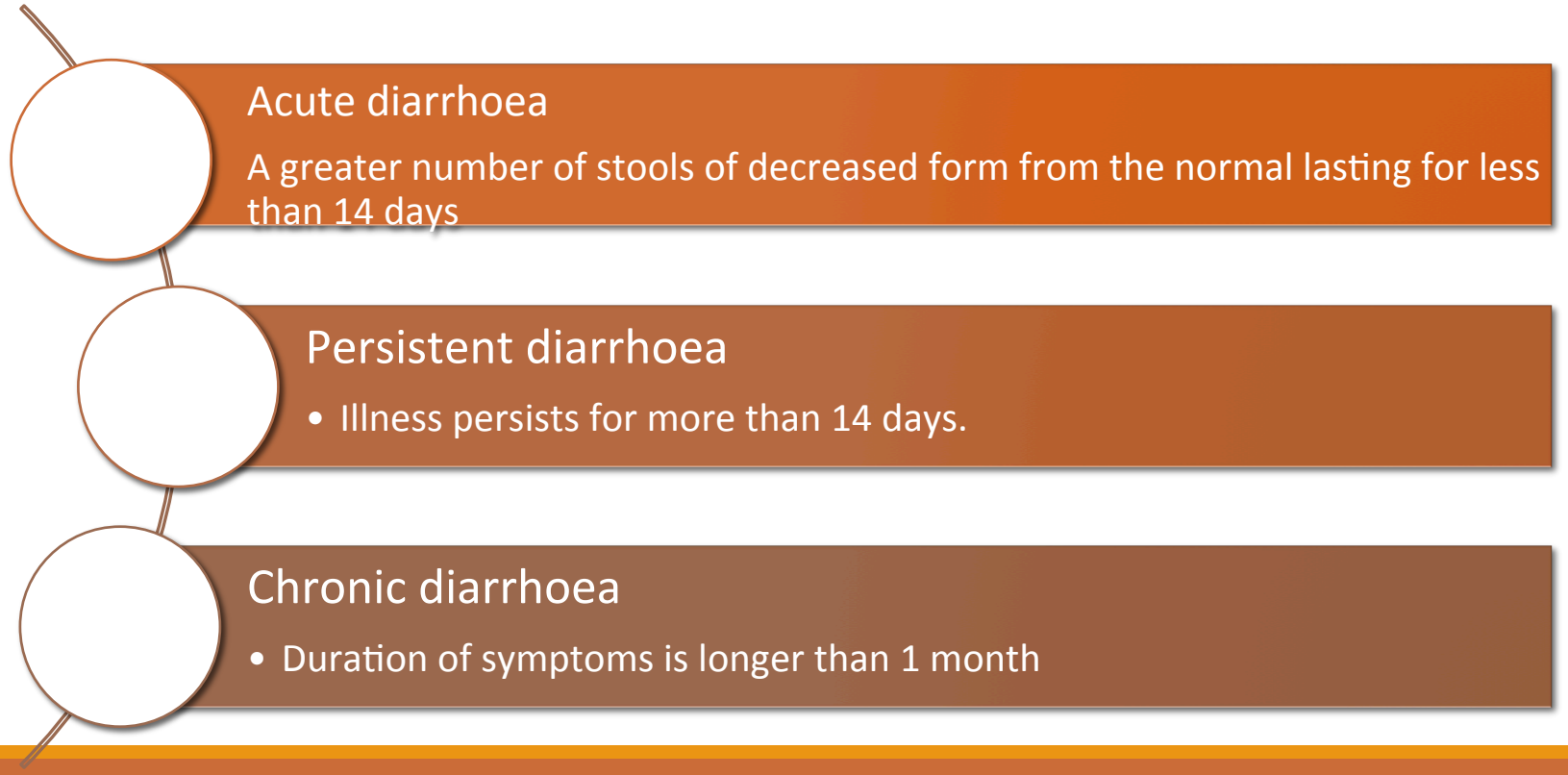
1. GER
2. gastroeneritis
3. CNS infections
4. UTI
5. Inborn errors of metabolism
6. Cow milk protein allergy
7. Over feeding
8. Faulty feeding technique
9. Post nasal dripping
10. Diabetic ketoacidosis
11. Psychogenic
12. Pneumonia

Surgical causes:

1. Intestinal obstruction
2. Appendicitis
3. Intra cranial space occuping lesions (ICSOL), e.g. brain tumors, haematoma, abscesses
4. Peritonitis
5. Hydrocephalus
6. Subdural hematoma

Diarrhoea

Passage of **3 or more loose or liquid stools per day** (according to WHO)



Caused of diarrhea in infant

Acute diarrhea

1. Gastroenteritis
2. Systemic infection
3. Antibiotic associated

Chronic diarrhea

1. Post-infectious secondary lactase deficiency
2. Cow's milk/ soy protein intolerance
3. Toddler's diarrhea
4. Coeliac disease
5. Cystic fibrosis
6. AIDS enteropathy

Causes of diarrhea in children

Acute diarrhea

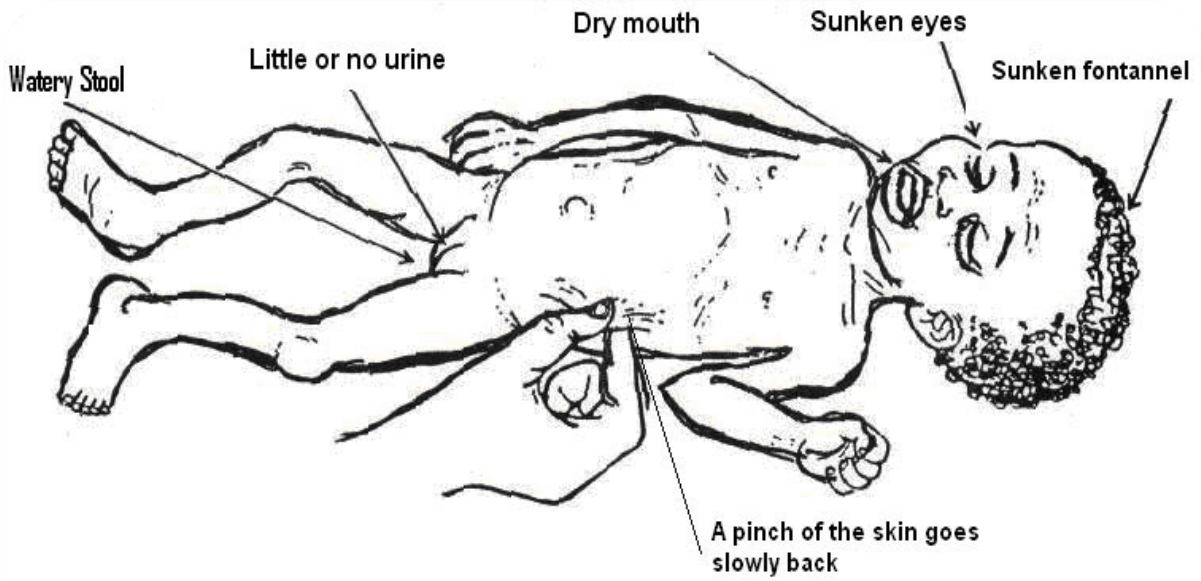
1. Gastroenteritis
2. Food poisoning
3. Systemic infection
4. Antibiotics associated

Chronic diarrhea

1. Post-infectious secondary lactase deficiency
2. Irritable bowel syndrome
3. Coeliac disease
4. Lactose intolerance
5. Giardiasis
6. Inflammatory bowel disease

Symptoms of dehydratation

- Sunken fontanel
- Eyes sunken and tearless
- Dry mucous membrane
- Prolonged capillary refill time
- Reduced skin turgor
- Tachycardia, tachypnea



Classification:

1. Mild dehydration (<5%)
2. Moderate dehydration (5-10%)
3. Severe dehydration (>10%)

Headache

- Acute
- Acute recurrent
- Chronic progressive
- Chronic nonprogressive
- Cluster headache
- Epileptic headache
- Psychogenic
- Mixed

Acute headache - causes

- Migraine
- Cerebrovascular bleed
- Trauma
- Meningitis
- Encephalitis
- Drugs

Migraine

1. Incidence 1.2% - 3.2% at age of 7 years, 4% - 19% by age of 15 years
2. More prevalent in females
3. In most cases child migraine is without an aura
4. Cause- vasodilatation, vasoconstriction and inflammation of cerebral vessels

Migraine - symptoms

- Pulsating head pain
- Pain that worsens with exertion
- Nausea, vomiting
- Abdominal pain
- Extreme sensitivity to light and sound

Abdominal migraine

1. The child may have recurrent bouts of generalized stomach pain with nausea and vomiting
2. No headache is present. After several hours, the child can sleep and later feel better.
3. Abdominal migraine may alternate with typical migraine and usually leads to typical migraine as the child matures

Tension-type headache

Symptoms:

- A pressing tightness in the muscles of the head or neck
- Mild to moderate, nonpulsating pain on both sides of the head
- Pain that's not worsened by physical activity
- Lasts from 30 minutes to several days

Headache red flags

1. Wakes child from sleep
2. Worsen or become more frequent
3. Change child's personality
4. Follow a head injury
5. Headache associated with persistent vomiting or visual changes
6. Headache accompanied by fever, neck pain or stiffness

Brain tumor

Uncommon in school-age children

Incidence is 0.003%

Additional neurological symptoms and signs on examination

Seizures

1. Paroxysmal involuntary disturbance of brain accompanied by altered consciousness; motor, sensory, and/or autonomic dysfunction
2. Seizures affect 4 to 7 % of children
3. Epileptic seizures affect 1-2% of the population & 4% of children
4. **Seizures are not always epilepsy!!!**

**Epilepsia* 1989;30:389–99

Febrile seizures

1. Incidence 4-5% in children
2. Seizure during fever in absence of neuroinfection in a neurologically normal child.
3. The most common type of seizure in children is the febrile seizure, which occurs when an infection associated with a high fever develops.
4. Occur between 3months to 5 years of age, with peak incidence at 18 months
5. Onset after 6 years is unusual
6. In most cases febrile seizures have good prognosis without any residual effect and remits with age

Complex febrile seizures

1. Focal
2. Lasting more than 15 minutes
3. Relapses within 24 hours

Indications for intermittent prophylaxis :

- Frequent seizures in short period.
- Seizure lasting for more than 15 min
- Abnormal Brain MRI

Seizures

Other reasons for seizures are these:

- Infections
- Metabolic disorders
- Drugs
- Medications
- Poisons
- Disordered blood vessels
- Bleeding inside the brain

Cyanosis

Cyanosis is the abnormal blue discoloration of the skin and mucous membranes, caused by an increase in the deoxygenated haemoglobin level to above 5 g/dL.

Cyanosis - types

Central

- Skin & mucous membranes
- Caused by decreased arterial oxygen sat. or abnormal hemoglobin
- Exposed areas warm
- Clubbing may be present

Peripheral

- Peripheral exposed skin only
- Caused by vasoconstriction or decreased blood flow
- Exposed areas cold, massage/ warming helps
- No clubbing

Central cyanosis

Associated features of central cyanosis depend on the underlying cause and include:

- Dyspnoea
- Tachypnoea
- Secondary polycythaemia
- Bluish or purple discolouration of the oral mucous membranes, fingers and toes.

The hands and feet are usually normal temperature or warm but not cold unless there is an associated poor peripheral circulation.

Cenatral cyanosis- causes

- High altitude- decreased atmospheric pressure
- Respiratory system:
  - Pneumonia, Bronchiolitis
  - Bronchospasm (e.g. asthma)
  - Pulmonary hypertension
  - Intrapulmonary fistula/shunts
- Congenital heart disease
  - TOF
  - Transposition of the great arteries
  - Stenosis or atresia of the pulmonary valve or tricuspid valve
  - Total anomalous pulmonary venous return
  - Hypoplastic left heart.
- Met/Sulf-hemoglobinemia

Peripheral cyanosis - causes

- All common causes of central cyanosis
- Reduced cardiac output (e.g. heart failure, hypovolaemia)
- Cold exposure
- Arterial obstruction (e.g. peripheral vascular disease, Raynaud phenomenon)
- Venous obstruction (e.g. deep vein thrombosis)

Jaundice

Jaundice is a yellowish pigmentation of the skin, the conjunctival membranes over the sclerae (whites of the eyes), and other mucous membranes caused by **high blood bilirubin levels**.

Category	Patology
Pre-hepatic/ hemolytic	Intrinsic defects in red blood cells Extrinsic causes external to red blood cells
Hepatic/ hepatocellular	Liver
Post-Hepatic/ cholestatic	Obstruction of biliary passage

Pre-hepatic jaundice

Pre-hepaticular – hemolytic jaundice is caused by anything which causes an increased rate of hemolysis (breakdown of red blood cells).

- Sicle cell anemia,
- spherocytosis,
- thalassemia,
- glucose 6-phosphate dehydrogenase
- Gilbert's syndrome

Laboratory tests

- urine: no bilirubin present, serum: increased unconjugated bilirubin

Hepatocellular jaundice

The cause is:

- Liver failure (e.g. acute or chronic hepatitis, hepatotoxicity, cirrhosis, drug-induced hepatitis and alcoholic liver disease).

Laboratory tests: urine - conjugated bilirubin present, serum – high level of conjungated bilirubin, low level of albumin

Post- hepatic jaundice

Post-hepatic jaundice, also called obstructive jaundice, is caused by an interruption to the drainage of bile containing conjugated bilirubin in the biliary system.

The causes:

- gallstones in the common bile duct
- biliary atresia

- The pale stools and dark urine suggests an obstructive or post-hepatic cause of jaundice.

Neonatal jaundice

- Neonatal jaundice is usually harmless
- This condition occures around **the second day after birth**, lasting **until day 8** in normal births, or to around day 14 in premature births.
- Serum bilirubin normally drops to a low level without any intervention
- In cases where bilirubin rises higher -> kernicterus, a bilirubin induced brain dysfunction can occur

Causes of Hyperbilirubinemia in Newborns

- Increased Bilirubin Production
  - Hemolytic disease
    - Immune mediated (Rh alloimmunization, ABO incompatibility)
    - Heritable (spherocytosis, G6PD deficiency, pyruvate kinas deficiency)
  - Polycythemia
  - Extravasation of blood (cephalohematoma, intraventricular hemorrhage)
  - Sepsis with disseminated intravascular coagulation (DIC)
- Decreased Bilirubin Clearance
  - Prematurity
  - Increased enterohepatic circulation
    - Breast milk jaundice
    - Pyloric stenosis
    - Small or large bowel obstruction
  - Inborn errors of metabolism (Gilbert syndrome, Crigler-Najjar syndrome)
  - Metabolic discorder (hypothyroidism, hypopituitarism)

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