

# Monitoring of physiological functions

The basic physiological functions that need to be monitored in the patient include **body temperature, pulse, blood pressure, and respiration.**

## Body temperature

Body temperature expresses the balance between the heat produced inside the body and its expenditure and losses.

**Factors affecting body temperature** include:

- age,
- day time,
- physical activity,
- hormones,
- environment.

**Body temperature assessment** (measured in the axilla):

- below 34°C - death,
- 34-35.9°C - hypothermia,
- 36-36.9°C - normothermia,
- 37-38°C - subfebrile,
- 38.1-40°C - febrile / febris (fever),
- 40.1-42°C - hyperpyrexia,
- above 42°C - death.

## Types of fever

1. **Febris intermittens** (alternating fever) - periods of fever alternate with periods of normal body temperature (eg in some cancers, septic conditions);
2. **Febris remittens** (fluctuating fever) - fluctuates by more than 1.5–2 ° C during the day, while all values are above normal (eg during the purulent process);
3. **Febris recurrens** - recurrence of febrile conditions with 1-2 days of normal temperature (typically in malaria, typhoid fever);
4. **Febris continua** (persistent fever) - daily fluctuations of max. 1 ° C (eg in pneumonia, viral diseases, streptococcal infections).

## Symptoms of fever

**The onset** of fever is manifested by cold, tachycardia, pale and cold skin, cessation of sweating, "goosebumps". When the temperature rises suddenly, there is a disparity between increased heat production and output - shaking occurs.

**During** the fever, the skin is warm to the touch, the acral parts are cold. There is a feeling of thirst, dry mouth, drowsiness, loss of appetite, weakness, muscle pain, lack of cold.

When the **fever subsides**, sweating and dehydration appear, and the skin is warm and pink.

**In hypothermia**, the patient feels cold, frozen, the skin is pale, waxy, cold, initially severe chills. The patient has decreased urinary excretion, is disoriented, drowsy, and may become unconscious.

## Body temperature measurement

Body temperature is usually measured twice a day, or more often. The data is written into the documentation. We measure either with glass mercury (note thermometers with mercury filling can no longer be distributed <sup>[1]</sup>) with a thermometer (axillae, rectum, vagina, groin, mouth) or with an electronic thermometer (axillary, esophageal, skin,...).

**Care of a patient with febrile illness** - it is necessary to monitor the overall condition, ensure sufficient fluids, pharmacological and non-pharmacological temperature reduction.

## Pulse

A pulse is a pressure wave caused by the expulsion of blood from the left ventricle into the aorta.

**Factors affecting pulse:**

- age, gender,
- physical exertion,
- respiratory failure,
- medicines,
- bleeding, circulatory overload,
- disease,
- stress,
- and more.

## Heart rate measurement

When measuring the pulse, we monitor:

1. **speed, frequency,**
2. **regularity, rhythmicity** - regular × irregular,
3. **heart rate quality** - hard, soft, well palpable × filamentous, intangible.

We measure:

- by listening - apically - we measure heartbeats, using a stethoscope,
- by palpating - on the radial artery, carotid artery, a. dorsalis pedis, temporal artery, brachial artery, femoral artery,
- electronically - indirectly (from ECG, from pulse curve when measuring blood pressure or saturation), directly (from pressure curve from arterial cannula).

## Normal heart rate

- Newborn: 130-160/min,
- infant up to 1 year: 100-140/min,
- child 10 years: about 90/min,
- adult: 70-80/min.

## Blood pressure

Blood pressure (BP) is the pressure that blood acts on the arteries wall. We distinguish:

- arterial pressure,
  - systolic,
  - diastolic,
- venous pressure.

Unless otherwise stated, blood pressure means arterial pressure.

### BP is affected by:

- age,
- physical activity,
- stress
- drugs, obesity,
- bleeding, dehydration, circulatory overload.

## Blood pressure measurement

The average arterial blood pressure of an adult is **120/80** mmHg. At pressures **below 100/60** mmHg we speak of **hypotension**, at pressures **above 140/90** mmHg we speak of **hypertension**.

When measuring, it is important to have the correct cuff size, to apply it correctly, the arms should be at the level of the heart and must not be strangled by clothing. We release the cuff at a reasonable speed.

### Measuring points:

1. **upper limb** - on the arm or forearm,
2. **lower limb** - only if the measurement cannot be performed on the arm; we measure on the thigh, or on the calf.

Blood pressure can be measured **directly** (arterial cannula, central venous pressure - CVT or CVP) or **indirectly** (mercury tonometer, electronic tonometer,...).

## Respiration

Breathing is a basic necessity of life, it ensures the intake of oxygen and the release of carbon dioxide. We divide breathing into internal and external. It is the only physiological function that can be influenced.

Respiration is **affected by**:

- age,

- movement,
- stress, lifestyle,
- environment, altitude,
- disease.

## Breath measurement

When measuring breath, we monitor **speed, quality, and regularity.**

We measure for 1 minute, the patient should not know about it. We measure by looking, listening, or placing our hand on the chest or abdomen.

## Normal respiratory rate

- Newborn: 50-60/min,
- infant: 35-40/min,
- child 10 years: 20/min,
- adult: 16-20/min.

According to the respiratory rate, we distinguish: **eupnoea** (normal frequency), **tachypnea** (increased frequency), **bradypnea** (decreased frequency), **apnea** (breathlessness).

## Regularity of breath

- **regular breathing,**
- **irregular breathing** - alternating deep breaths with shallow or paused,
- **Cheyne-Stokes breathing** - rapid, gradually deepening breathing, becoming more audible, ending with an apnea pause,
- **Biot's breathing** - irregular, of various depths, interspersed with apnea pauses (damage to the respiratory centers),
- **Kussmaul's breathing** - deep accelerated breathing due to metabolic acidosis (e.g. in diabetes mellitus),
- **Gasping** - so-called catching breaths, in the early phase of sudden circulatory arrest.

## Links

### References

1. Příloha XVII nařízení (ES) č. 1907/2006 – Omezení výroby, uvádění na trh a používání některých nebezpečných látek, směsí a předmětů (viz 18a. Rtuť)

Portal:Nursing

Portal:Internal medicine