Vital signs and deterioration

Ranges by age, oximetry limits, orthostatics, early warning signs and escalation

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1 AT A GLANCE

Vital signs are quick to take and easy to get wrong. Most clients who crash in hospital warn us first, often hours before: the skill is noticing the quiet signs, and acting on them.

Heart rate by age (resting examples)

Age	Heart rate
Newborn	100 to 160 bpm
Infant	About 80 to 140 bpm
Toddler	80 to 130 bpm
School age	70 to 100 bpm
From adolescence	60 to 100 bpm

References differ: Resting examples; rates run lower asleep. In infants and children up to five, the apical pulse is best practice.

Breathing

- Newborns and infants: 30 to 60 breaths a minute; irregular breathing is common.
- ★ Adults commonly breathe 12 to 20 times a minute, though references differ (MedlinePlus gives 12 to 18). Don't call 10 a minute normal without context.
- Distress: nasal flaring, neck and chest muscles working, noisy breathing, leaning forward on the arms.
- Count the breathing rate for a real minute: a rising rate is an important clue.

Measuring it right

Sign	Normal, and getting it right
Temperature	Oral about 35.8 to 37.3 C (96.4 to 99.1 F). **Document the route**: ear and rectal run higher than oral; armpit and forehead lower. After eating, a hot or cold drink, or smoking, follow the device and protocol (MedlinePlus advises waiting 20 to 30 minutes)
Ear and infants	Skip the ear with a suspected ear infection. **Under 3, pull the outer ear down**; older children and adults, up and back. In infants, rectal is the most accurate, but not always recommended: newborn protocols often use the armpit
★ **Pulse**	**Count a full 60 seconds**, especially if irregular: rate, rhythm, force and equality. The apical pulse (fifth space, left midclavicular line, a full minute) is the most accurate, and is used before heart medicines
★ **Pulse oximetry**	Adult target 94 to 100%. COPD with carbon dioxide retention risk: oxygen often targets 88 to 92%, pending a blood gas. **It's an estimate**: severe anemia can look normal; poor circulation, nail polish, movement and bright light can mislead; readings may be less accurate on darker skin
Blood pressure	Cuff width about 40% of the arm's circumference; bladder covers 80 to 100%. Rest at least 5 minutes. Avoid an arm with a dialysis fistula, clot, lymphedema, wound or IV. Palpate while inflating first, or a silent gap can make it falsely low; then deflate slowly

Pulse deficit: A weak beat may not reach the wrist, as in atrial fibrillation. Count apical and radial for a full minute, subtract, and report the difference.

Blood pressure

Range	Reading
Normal	Under 120/80 mmHg
Elevated	Systolic 120 to 129 mmHg
Stage 1	130 to 139, or 80 to 89 mmHg
Stage 2	140 or more, or 90 or more mmHg
★ **Severe**	Systolic over 180, or diastolic over 120 mmHg
Hypotension	Under 90/60 mmHg

Report: Readings out of range for age, or with symptoms, at once. Under 3: not routine at checkups; measure if at risk or ill.

Orthostatic vital signs

- ★ Orthostatic hypotension: a drop of **at least 20 mmHg systolic, or at least 10 mmHg diastolic**, within 3 minutes of standing.
- Take the baseline lying down, then stand the client, if able, and repeat pressure and pulse at 1 and 3 minutes.
- Use the same arm and equipment, and stay close: dizziness can cause a fall, and some clients drop only after 3 minutes.
- Dizzy, with a drop that meets the definition: help the client sit or lie down, and report it.

Early, quiet signs of deterioration

	Early signs	What it means
★ **Low oxygen**	**Anxiety, restlessness, new confusion**; then the breathing and heart rate climb	The saturation falls; blue skin is a late sign. Never sedate a restless client before you've checked oxygen and breathing
★ **Rising carbon dioxide**	**Sleepier, with slower, shallower breaths**, while the saturation can look normal	A blood gas shows PaCO2 over 45 mmHg and acidic blood. A normal saturation isn't proof, especially with lung disease, opioids or sedation
Sepsis	Fever or chills, a fast heart rate or weak pulse, shortness of breath, confusion, clammy skin, extreme pain, low blood pressure	A medical emergency (life-threatening organ dysfunction): alert the provider at once, follow your sepsis protocol, and reassess often. Minutes matter

Educational use only. Not a substitute for clinical judgment, your facility's policy or the provider's orders. Where practice varies, follow facility policy and state law. No patient information.

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1 AT A GLANCE, CONTINUED

Same client, four checks

Time	Pulse	Breaths	BP	Mental status
0800	84	16	128/76	Alert
1000	96	20	122/74	Alert
1200	108	24	110/70	Restless
1400	118	28	98/64	Confused

Read the trend: The pulse and breathing climbed first, and the pressure fell later; the time to act was before noon. Compare every set with the baseline and the last set.

Rapid response: example triggers (AHRQ PSNet; facilities set their own)

Sign	Call when
Heart rate	Over 140 or under 40 bpm
Breathing	Over 28 or under 8 breaths a minute
Systolic BP	Over 180 or under 90 mmHg
Saturation	Under 90% despite oxygen
★ **Before any cutoff**	**An acute change in mental status, low urine output, or a nurse who is worried**

Call early: Any staff member can call; some hospitals let clients and families call too. Teams work best called early, not as a last resort.

2 PRIORITY AND SAFETY CALLS

★ Restless or newly confused? Think oxygen: **assess the airway and breathing, give oxygen as ordered, and escalate**, before any sedative.

★ Sleepy, with slow, shallow breathing and a normal saturation: **the saturation may hide rising carbon dioxide**, so escalate.

If you're worried, that alone is reason enough to call rapid response.

Quiet signs count too: falling urine output, new or extreme pain, cool and clammy skin. In older adults, new confusion may be the first sign of infection.

Escalate with SBAR: situation, background, assessment, recommendation. Have results and medicines ready if you can, but **don't delay an urgent call** to find them.

Cold hands in shock can give a misleading low reading: assess the client, and try the earlobe or forehead.

Delegate the measuring, not the meaning: the nurse analyzes and reports the numbers.

Never press both carotid pulses at once: it can cut blood flow to the brain.

3 EXAM ANCHORS

1. Vital signs stems: orthostatic numbers, an irregular pulse, an oximeter you shouldn't trust, a toddler's ear, and the arm to avoid.
2. Traps: a 30-second count of an irregular pulse, trusting the oximeter over the client, coffee before an oral reading, a fistula arm.
3. Deterioration stems: new restlessness or confusion, a creeping breathing rate, a sleepy client with a normal saturation, a worrying trend.
4. Traps: one reassuring number, sedating before assessing, waiting for the next scheduled check, calling it anxiety.
5. Trends beat single numbers; compare with baseline.
6. Severe anemia with an SpO2 of 97%: the reading may look normal even though too little oxygen is being carried, so assess the client.

4 SELF-QUIZ

1. Count an irregular pulse for a full _____ seconds.
2. Orthostatic hypotension: a systolic drop of at least _____ mmHg within 3 minutes of standing.
3. For a child under 3, pull the outer ear _____ for a tympanic reading.
4. The cuff's width is about _____ % of the arm's circumference.
5. On a blood gas, rising carbon dioxide shows as a PaCO2 over _____ mmHg.
6. Blue skin is a _____ sign of low oxygen.
7. SBAR: situation, background, assessment, _____.

ANSWER KEY 1. 60 · 2. 20 · 3. down · 4. 40 · 5. 45 · 6. late · 7. recommendation

5 SOURCES

1. Open RN, Nursing Skills 2e, 1.3 Vital Signs. wtcs.pressbooks.pub/nursingskills/chapter/1-3-vital-signs
2. Open RN, Nursing Skills 2e, 3.3 Blood Pressure Assessment. wtcs.pressbooks.pub/nursingskills/chapter/3-3-blood-pre…
3. FDA, Pulse Oximeters. fda.gov/medical-devices/products-and-medica…
4. AHRQ PSNet, Rapid Response Systems (primer). psnet.ahrq.gov/primer/rapid-response-systems
5. AHRQ PSNet, Failure to Rescue (primer). psnet.ahrq.gov/primer/failure-rescue
6. CDC, Caring for Patients with Sepsis. cdc.gov/sepsis/hcp/clinical-care
7. AHRQ TeamSTEPPS, SBAR. ahrq.gov/teamstepps-program/curriculum/commu…

Built from RN PocketPal course lessons: Vital signs: measuring and interpreting (c06-l01); Recognizing deterioration across body systems (c06-l08). Every line on this sheet comes from those lesson scripts.

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