CJLL
CLINICAL JUDGMENT LEARNING LAB™

STUDENT QUICK REFERENCE

Blood Pressure Measurement Sites

The upper arm is the reference site. Hypertension cut points come from upper arm readings. Do not apply them to leg readings.

Why sites read differently

- Systolic pressure rises as the pulse wave moves away from the heart.
- A cuff below heart level reads higher. Above heart level reads lower.
- Leg arteries are deeper and larger, so they need more cuff pressure.

If you must use another site

- Document the site, the side, and the patient's position.
- Use the same site every time for trending.
- Report any change in site during handoff.

How each site compares to the upper arm

Site	Expected systolic	What to know
Upper arm	Reference	Check both arms at a first assessment. A difference of 5 mmHg or more is linked to higher cardiovascular risk.
Forearm	Often slightly higher	Studies disagree. Individual readings can vary widely from the upper arm. Keep the cuff at heart level.
Wrist	Similar if positioned well	Use validated devices only. Very position sensitive. Reads falsely high if the wrist is low or bent.
Thigh	About 11 mmHg higher	Needs a large thigh cuff. Compare with the patient's own baseline at the same site.
Calf	About 13 to 24 mmHg higher	In one large study, a supine calf reading of 164/81 matched an arm reading of 140/90. Standing calf readings run far higher.
Ankle	About 14 mmHg higher	In obese adults, the bias came close to the 15 mmHg safety limit. A poor substitute.

Key point: Diastolic pressure and MAP stay closer to arm values than systolic does. When a patient must change sites, trend the MAP. See page 3.

Values are averages from adult studies. Individual patients vary.

Technique and Clinical Judgment

Technique errors can matter more than site

Error	Effect on reading (mmHg)
Arm resting on the lap	Systolic +3.9 / Diastolic +4.0
Arm hanging unsupported at the side	Systolic +6.5 / Diastolic +4.4
Regular cuff when the patient needs a large cuff	Systolic +4.8
Regular cuff when the patient needs an extra large cuff	**Systolic +19.5**
Regular cuff when the patient needs a small cuff	Systolic −3.6

Standard technique checklist (2025 AHA/ACC)

- ☐ Validated automated device
- ☐ No caffeine, exercise, or smoking for 30 min
- ☐ Empty bladder
- ☐ Seated, back supported, feet flat, legs uncrossed
- ☐ Rest at least 5 minutes before measuring
- ☐ Cuff sized by arm circumference
- ☐ Bare arm, supported, cuff at heart level
- ☐ No talking or phone use
- ☐ Two or more readings, 1 minute apart
- ☐ Both arms at a first assessment

Think it through

Case 1: Changing sites

Your patient has casts on both arms. A supine calf reading is 158/80. The last shift documented upper arm readings near 130/78.

Notice: What changed besides the number?

Interpret: Is this hypertension? What should you compare it to?

Respond: What will you document and report?

Case 2: Technique check

At triage, a patient's arm rests on her lap. A regular cuff is used. Her mid arm circumference calls for an extra large cuff. The reading is 152/94.

Notice: Which technique errors are present?

Interpret: Which way would each error shift the reading?

Respond: What will you do before documenting?

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Mean Arterial Pressure (MAP)

MAP is the average pressure in the arteries over one full heartbeat. It is the pressure that pushes blood into the organs. A low MAP means the brain, heart, and kidneys may not be getting enough blood flow.

CALCULATE IT

$$MAP = \frac{[(DBP \times 2) + SBP]}{3}$$

Diastole fills about two thirds of each heartbeat, so diastolic pressure counts twice.

WORKED EXAMPLE: 120/80

Double the diastolic: 80 × 2 = 160

Add the systolic: 160 + 120 = 280

Divide by 3: 280 ÷ 3 = **MAP about 93 mmHg**

Calculated vs displayed MAP

- An automated monitor finds MAP first. It is the cuff pressure where the pulse signal is strongest.
- The monitor then estimates systolic and diastolic with its own formula.
- Use the displayed MAP when you have it. The hand formula is less accurate with a fast heart rate or shock.

Why MAP matters

- In septic shock, the 2026 Surviving Sepsis Campaign guideline recommends an initial MAP target of 65 mmHg.
- Follow your orders and protocol for the MAP goal.
- MAP changes less than systolic across sites. Trend it when the cuff site must change.

Notice: signs that a low MAP is affecting perfusion

Brain: new confusion, restlessness, or drowsiness	**Kidneys:** urine output below 0.5 mL/kg/hr	**Skin:** cool, pale, or mottled; slow capillary refill
Heart: rising heart rate, chest pain	**Labs:** rising lactate	**Breathing:** rising respiratory rate

Practice: BP 88/52, heart rate 118

Calculate: What is the MAP? **Notice:** Which perfusion signs would you check first? **Respond:** Who do you notify, and what will you report?

Check your math: [(52 × 2) + 88] ÷ 3 = 192 ÷ 3 = 64 mmHg. The heart rate is fast, so compare with the monitor's displayed MAP.