

Clinical skills, together.

Vital signs, blood-work reasoning and patient intake for PBS and Medical Interventions.



Vital Signs

Start here for blood-pressure sounds, human demonstrations, 25 simulated sounds and illustrated manuals.

mendozabiomed.org/learn/vital-signs

Blood Work

Read a report, explore 27 PLTW-connected entries and 14 other tests, then try simulated blood typing.

mendozabiomed.org/learn/blood-work

Patient Intake

Follow eight interview steps, rehearse a fictional visit and check the quality of your handoff.

mendozabiomed.org/learn/patient-intake

Use this PDF beside the live pages. Underlined titles open resources; audio and video need an internet connection. The live pages contain the interactive checklists, feedback and reset tools. Return to your dated Schoology lesson for the assigned work.

Practice with fictional records and approved models. Keep real health information private. This companion supports supervised learning; it does not authorize clinical testing or diagnosis.

Hear the blood-pressure endpoints.

Systolic is the first repeated tap. In the usual adult method, diastolic is the final audible beat at disappearance.

- 1. Prepare.** Get permission. Rest quietly for five minutes with back supported, feet flat and arm supported at heart level. Fit the correct cuff to a bare upper arm. Neither person talks.
- 2. Estimate.** Feel the wrist pulse while inflating. Note where it disappears, fully deflate and wait about one minute before the listening measurement.
- 3. Place and inflate.** Listen over the brachial artery near the inner elbow, below the cuff. Inflate 20 to 30 mm Hg above the pulse-disappearance estimate. Follow the equipment guide and teacher demonstration.
- 4. First taps: systolic.** Release about 2 mm Hg per second. Read the gauge at the first rhythmic tap, confirmed by the next beat. Do not wait for the loudest sound.
- 5. Final tap: diastolic.** Continue slowly. Record the last audible beat as sounds disappear. Listen another 10 mm Hg to confirm silence, then fully deflate. The lower confirmation pressure is not the recorded endpoint.
- 6. Record and review.** Record both values in mm Hg, arm, position and conditions. Report unclear sounds. Wait at least one minute before a repeat; follow the teacher plan.

Watch a human demonstration; replay real recordings.

UMedic: clinician demonstration of taking blood pressure

Open BP video and press Play. Compare the demonstration with the adult method above.

Thinklabs: real Korotkoff recording 1

Thinklabs: real Korotkoff recording 2

Five simulated cuff-sound examples (MP3)

Korotkoff phase 1: first repetitive taps, systolic onset

Korotkoff phase 2: swishing

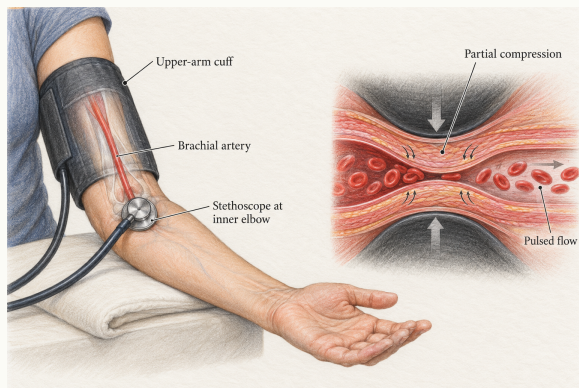
Korotkoff phase 3: clearer taps

Korotkoff phase 4: muffling

Complete staged blood-pressure measurement, 120/80 mm Hg, plays once

The 120/80 example is invented practice. All five clips are synthesized and lack clinical perceptual validation. Diastolic is an endpoint in one sound series, not a separate type of heartbeat.

Method source: AHA blood-pressure measurement statement



The brachial artery lies near the inner elbow. Listen below the cuff. The cutaway illustrates partial compression; it is not to scale.

[Open the labeled illustration to zoom](#)

Count, listen, record.

Keep the value, unit and method together. Heart sounds over the chest differ from Korotkoff sounds under a cuff.

Pulse. With permission and supervision, use two fingertips on the thumb side of the wrist. Record beats per minute and rhythm. Count a full minute for an irregular rhythm or when instructed.

Respiratory rate. One rise and fall is one breath. Observe resting breathing for a full minute with permission. Record breaths per minute, effort and limits.

Temperature. Follow the approved device method and cleaning directions. Record the value, degrees C or F, and measurement site or method.

Pulse oximetry. Follow the device instructions; keep the hand still and wait for a stable signal. Record SpO2 as a percentage. Motion, circulation, nail products and skin pigmentation can affect accuracy.

All 20 links below are synthesized teaching examples, not patient recordings. They have not received clinical perceptual validation. Use comfortable volume and the illustrated listening guide. A sound alone cannot identify a disease.

Lung sounds (MP3)

[Normal vesicular breath sounds](#)

[Normal bronchovesicular breath sounds](#)

[Normal bronchial and tracheal breath sounds](#)

[Expiratory wheeze](#)

[Biphasic wheeze](#)

[Fine late inspiratory crackles](#)

[Coarse inspiratory crackles](#)

[Rhonchi](#)

[Inspiratory stridor](#)

[Pleural friction rub](#)

[Normal versus reduced air entry comparison](#)

[Illustrated guide for every sound \(PDF\)](#)

[All 25 sounds and guide: offline study pack \(ZIP\)](#)

[Vital signs: definitions and reference information](#)

[Pulse oximetry: uses and limits](#)

Heart sounds (MP3)

[Normal S1 and S2 at 75 beats per minute](#)

[Physiological respiratory split of S2](#)

[Additional S3 heart sound](#)

[Additional S4 heart sound](#)

[Systolic ejection crescendo-decrescendo murmur](#)

[Holosystolic murmur](#)

[Early diastolic decrescendo murmur](#)

[Mid-diastolic low rumble](#)

[Pericardial friction rub](#)

Keep the manual beside the model.

Open the title you need. PDF guides, plain-text alternatives and models serve different purposes.

Manual blood pressure: illustrated guide (PDF)

Placement, listening, worked examples and faint-sound troubleshooting.

Blood-pressure guide: plain text

Blood-pressure listening and gauge model

Fictional interactive gauge with synthesized taps and text equivalents.

Eye examination and visual acuity: illustrated guide (PDF)

Chart-specific screening steps and the meaning of an acuity fraction.

Eye guide: plain text

Visual-acuity screening model

Fictional each-eye responses. This is not a calibrated eye chart.

How sound becomes a signal: ear, tuning fork and audiogram (PDF)

Decibels and audiograms: illustrated walkthrough (PDF)

Decibel and audiogram model

Decibel and audiogram guide: plain text

Ear and hearing-test guide (PDF)

One-page hearing reference card (PDF)

Four fictional hearing cases and blank audiogram grids (PDF)

16 hearing study flashcards (TSV)

Hearing-study conversation script (PDF)

Written two-voice dialogue; this is not an audio recording.

Hearing-study conversation script: plain text

Complete ear and hearing study pack (ZIP)

ADC Proscope 5210/5215: manufacturer instructions (PDF)

Identify the correct instrument and follow teacher-approved handling.

PBS and Medical Interventions course lab manuals

Study eye and ear exams with approved drawings and models. Do not insert instruments into a classmate's ear or use loud sounds to test hearing. Follow the teacher's directions for voluntary practice.

Read a blood-work report.

A test answers a particular question. Separate the observation from an explanation, then name what remains unknown.

- 1. Identify the report.** Read the fictional case code, specimen, collection time and test name. A specimen is the material tested, such as whole blood, serum (the liquid left after blood clots) or a swab. Mark any missing field as not supplied.
- 2. Find the target.** State what the test measures: cells, a chemical, an antigen, an antibody or genetic material. An antigen is a target recognized by an antibody; an antibody is an immune protein that binds a particular target.
- 3. Check the test's quality.** For a classroom assay, inspect its supplied positive and negative controls before interpreting an unknown. An assay is a laboratory test. A control is a sample with an expected result.
- 4. Read the value and its key.** Copy the value, units and the reference range or decision rule printed on that report. A reference range is the comparison interval for a particular test and population. For a pattern, use the supplied pattern key.
- 5. Explain within the evidence.** Describe whether the supplied result is above, below or within its printed range, or what its pattern supports. Separate that observation from a possible explanation. Compare time points only when their methods and units are comparable.
- 6. Name the next question.** State a missing fact, a test limitation or the further professional evaluation needed. Return to your assigned lesson for the actual product and submission directions.

Specimens carry different information.

Whole blood includes cells and liquid. **Plasma** is the liquid portion of blood kept from clotting and contains clotting proteins. **Serum** is the liquid remaining after blood clots. A swab or tissue sample is a different specimen. Read the report label before interpreting a result.

Self-check before interpreting.

- ☐ I can name the test, target, specimen and case code.
- ☐ I checked controls or stated that control information was not supplied.
- ☐ I kept each value with its units and the report's own reference rule.
- ☐ I separated the observation from a diagnosis and named one limitation.

Interactive blood-work library and simulated typing

[How to understand laboratory results: MedlinePlus](#)

[Pre-lab simulation catalog](#)

Use simulated blood and fictional reports. Do not collect blood, prick a finger or handle real specimens for this reference activity. No real health information is needed. These resources add no new assignment or submission.

PLTW connections, 1 of 2.

27 tests, components and related methods connected to local PBS and Medical Interventions materials. Each title opens its source.

These are course connections, not 27 separately verified PLTW activities. Methods may use non-blood specimens. Open the live Blood Work page for the full course context, steps, interpretation and limitations.

Kastle-Meyer: presumptive blood screening

PBS | A color reaction consistent with the activity of heme, the iron-containing part of hemoglobin. Presumptive means preliminary, requiring further evidence.

ABO blood typing

PBS/MI | Whether red blood cells carry A and/or B antigens. Agglutination means visible clumping when the corresponding antibody reacts.

Forensic toxicology screening

PBS | The presence or amount of selected drugs or other substances in a specified sample. Some tests use blood; others use urine or other materials.

Forensic DNA profiling

PBS | Patterns at selected DNA markers, which are locations used to compare samples. This is different from ABO blood typing.

Complete blood count (CBC)

PBS | Red blood cells, white blood cells and platelets, plus red-cell measurements such as hemoglobin and hematocrit. White cells help with immune defense; platelets help form clots.

Hemoglobin (Hb or Hgb)

PBS | The concentration of hemoglobin, the protein in red blood cells that carries oxygen.

Hematocrit (Hct)

PBS | The proportion of whole blood volume occupied by red blood cells. It may be reported as a percentage or a fraction.

Blood glucose

PBS | Glucose concentration at the time of testing. A laboratory plasma result and a home meter reading are not automatically interchangeable.

Cholesterol and lipid panel

PBS | Total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol and triglycerides, a type of fat. The report should identify measured or calculated components.

ELISA: antigen or antibody testing

MI | A particular antigen or antibody, using specific binding linked to a readable signal.

Serial dilution and standard curves

MI | A known series of concentrations provides a comparison for an unknown signal. Dilution means reducing concentration by adding more solvent.

Polymerase chain reaction (PCR)

MI | PCR makes many copies of a selected DNA region. Primers are short DNA pieces that select the region to copy.

DNA gel electrophoresis

PBS/MI | A pattern of DNA fragments separated mainly by size in a standard agarose-gel model. A DNA ladder supplies fragments of known sizes for comparison.

DNA and gene-expression microarrays

MI | Many selected genetic targets at once through binding to complementary probes. Expression arrays study RNA-derived signals about gene activity. RNA carries information copied from DNA. Other arrays study DNA variants, or sequence differences.

Full searchable catalogue, course filters and practice feedback

PLTW connections, 2 of 2.

27 tests, components and related methods connected to local PBS and Medical Interventions materials. Each title opens its source.

These are course connections, not 27 separately verified PLTW activities. Methods may use non-blood specimens. Open the live Blood Work page for the full course context, steps, interpretation and limitations.

Karyotyping: a chromosome picture

PBS | Chromosome number and large-scale structure. A chromosome is a packaged DNA molecule; a karyotype arranges chromosome images for inspection.

Blood urea nitrogen (BUN)

MI | Urea nitrogen, a waste product from protein breakdown that the kidneys normally remove from blood.

Creatinine and estimated GFR (eGFR)

MI | Creatinine is a muscle-related waste product measured in blood. Its result helps calculate an estimate of kidney filtration.

HLA tissue typing

MI | HLA types used to compare a donor and recipient. This comparison is distinct from ABO blood typing.

Donor-recipient crossmatch

MI | Evidence of an immune reaction relevant to that donor-recipient pair.

Restriction digestion and RFLP: the HaeIII connection

MI | Differences in the lengths of DNA fragments after cutting. RFLP means restriction fragment length polymorphism: a sequence difference can add or remove a recognized cut site. HaeIII is one restriction enzyme.

SNP genotyping and carrier-testing evidence

MI | A genotype at a tested DNA position. A single nucleotide polymorphism (SNP, pronounced snip) is a DNA-letter variant at one position. An allele is a version at a genetic location.

DNA sequencing

MI | The order of the A, T, C and G chemical letters, or bases, in a selected DNA region.

Protein gel electrophoresis and SDS-PAGE

MI | A pattern of separated proteins. In SDS-PAGE, sodium dodecyl sulfate helps make protein migration depend mainly on size as proteins move through a polyacrylamide gel.

Western blot: detecting a target protein

MI | Antibody-based detection of a particular protein after proteins have been separated and transferred to a membrane, a thin supporting sheet.

Alternate light source: visual screening

PBS | A visible response under the stated light and filter conditions. Fluorescence means material absorbs light and emits light at another wavelength.

Luminol: light from a chemical screen

PBS | A chemically generated glow that may indicate traces requiring further examination. Chemiluminescence means light produced by a chemical reaction.

DNA-sequence comparison with BLAST

MI | Similarity between a supplied DNA sequence and sequences in a database. A sequence is the order of DNA's chemical letters.

Full searchable catalogue, course filters and practice feedback

Other tests. Careful conclusions.

14 additional clinical examples. Their inclusion here does not claim that PLTW separately teaches each test.

Prenatal cell-free DNA screening (NIPT)

Patterns in cell-free DNA fragments in a pregnant person's blood.

Hemoglobin A1C (HbA1c)

The percentage of hemoglobin with glucose attached.

Rh(D) typing

Whether the D antigen, commonly called the Rh factor, is present on red blood cells.

Basic metabolic panel (BMP)

Glucose, calcium, sodium, potassium, chloride, carbon dioxide, BUN and creatinine.

Comprehensive metabolic panel (CMP)

The BMP measurements plus albumin, total protein, bilirubin and selected enzymes associated with liver assessment.

Liver panel

A selected group of substances, such as alanine aminotransferase (ALT) and aspartate aminotransferase (AST), two enzymes; albumin, a protein; and bilirubin, a waste from red-cell breakdown.

Thyroid-stimulating hormone (TSH)

TSH, a signal from the pituitary gland at the base of the brain that tells the thyroid to make thyroid hormones.

Clotting tests: PT/INR and aPTT

How long a sample takes to clot under specified laboratory conditions.

C-reactive protein (CRP)

A protein made by the liver that often increases during inflammation.

Ferritin and iron studies

Ferritin, a protein that stores iron.

Blood culture

Whether bacteria or fungi grow from a clinical blood specimen under the laboratory's conditions.

Cardiac troponin

Troponin I or T in blood, using a specific clinical assay.

Arterial blood gas (ABG)

Oxygen, carbon dioxide and acid-base information in an arterial blood sample.

Hemoglobin electrophoresis

The types and relative amounts of hemoglobin proteins in blood, including variants such as hemoglobin S.

Try these checks on the live page.

- ☐ If an assay control fails, can the unknown result be interpreted?
- ☐ Does a positive antibody result identify the exact time of an infection?
- ☐ Does one out-of-range value establish a diagnosis?

Open self-checks with explanations and hints

Try the five fictional blood-typing patterns

Includes an invalid-control example. Simplified forward typing does not authorize transfusion.

Use the printed report's reference interval and the assay's own decision rules. A result must be considered with specimen, method, timing and clinical context. Do not use a classroom example to diagnose yourself or a classmate.

Start with a careful conversation.

Patient intake gathers and checks the information needed before an examination. Use the fictional case on the live page.

- 1. Prepare privately.** Use a fictional case and assigned sheet. Keep actual health information off shared screens and recordings. Offer an observer role.
- 2. Introduce yourself; ask permission.** State your student role, match the case code, explain the practice and ask whether the person agrees. Stop if permission is withdrawn.
- 3. Ask an open question.** Ask, "What brings you in today?" Listen, then identify the main concern without suggesting a diagnosis.
- 4. Clarify the symptom story.** Ask when it began, where it occurs, what it feels like and what makes it better or worse. Ask one question at a time.
- 5. Check history, medicines and allergies.** Keep the supplied medicine name, amount and timing. Clarify an allergy substance and reaction. Unknown is different from none known.
- 6. Separate reported and measured.** Label symptoms as reported. Give measured values with units and conditions. Write "measurement not supplied" when a value is missing; absence does not prove it was never measured.
- 7. Summarize; check understanding.** Ask what needs correcting. Explain the teacher-directed next step, then ask the person to describe it in their own words. This teach-back checks your explanation.
- 8. Hand off facts and gaps.** State the concern, useful background, supplied findings and uncertainties. Request teacher review. Do not diagnose or recommend treatment.

Watch, then rehearse.

[Human demonstration: clear conversation during a visit](#)

[Patient intake voicemail: fictional cold open \(M4A\)](#)

[Human handoff examples and SBAR guide](#)

On AHRQ's Communicate Clearly page, open Dr. Clifford Coleman's human demonstration. The voicemail is a 34-second AI-generated fictional introduction, not a full intake demonstration.

- ☐ I kept unknowns visible and separated reported symptoms from measurements.
- ☐ I asked for corrections, checked the next step and requested teacher review.

[Fictional interview, handoff, checklist and feedback](#)

If a real person becomes unwell, stop the role-play and alert the teacher or school nurse immediately under the school emergency plan.

Find the exact section.

The PDF keeps the directions and resource links together. These live sections add practice, feedback, hints and reset tools.

Vital Signs

[Manual blood-pressure process](#)

[Real recordings and human video](#)

[Other vital signs and pulse practice](#)

[All 25 simulated sounds](#)

[Sights, manuals and models](#)

[Readiness checklist](#)

[Self-check with feedback](#)

Blood Work

[Read a report](#)

[PLTW-connected catalogue](#)

[Other tests](#)

[Five typing patterns](#)

[Course guides and models](#)

[Readiness checklist](#)

[Self-check with feedback](#)

Patient Intake

[Eight-step walkthrough](#)

[Full fictional interview, choices and handoff](#)

[Human demonstrations and course audio](#)

[Readiness checklist](#)

[Self-check with feedback](#)

[OHSU: Dr. Cliff Coleman, human communication demonstration](#)

[Student learning hub](#)

[Clinical-skills illustration: open full-size image](#)

[Google Drive: complete clinical reference resource folder](#)

[Complete online index: all Google Drive resource links](#)

Audio links provide clinical listening examples and a spoken course introduction. Video links provide human demonstrations. No music is included. Checklist state and practice feedback live on the reference pages; the PDF boxes are for your own review.

Google Drive: the sounds.

Direct links to the resource files. Some existing files stay in their original course folders; these links open those originals.

[Open the clinical reference folder and resource index](#)

All 25 MP3 files are synthesized teaching simulations, not patient recordings. They have not received clinical perceptual validation.

[Korotkoff phase 1: first repetitive taps, systolic onset \(MP3\)](#)

[Korotkoff phase 2: swishing \(MP3\)](#)

[Korotkoff phase 3: clearer taps \(MP3\)](#)

[Korotkoff phase 4: muffling \(MP3\)](#)

[Complete staged blood-pressure measurement, 120/80 mm Hg, plays once \(MP3\)](#)

[Normal S1 and S2 at 75 beats per minute \(MP3\)](#)

[Physiological respiratory split of S2 \(MP3\)](#)

[Additional S3 heart sound \(MP3\)](#)

[Additional S4 heart sound \(MP3\)](#)

[Systolic ejection crescendo-decrescendo murmur \(MP3\)](#)

[Holosystolic murmur \(MP3\)](#)

[Early diastolic decrescendo murmur \(MP3\)](#)

[Mid-diastolic low rumble \(MP3\)](#)

[Pericardial friction rub \(MP3\)](#)

[Normal vesicular breath sounds \(MP3\)](#)

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[Expiratory wheeze \(MP3\)](#)

[Biphasic wheeze \(MP3\)](#)

[Fine late inspiratory crackles \(MP3\)](#)

[Coarse inspiratory crackles \(MP3\)](#)

[Rhonchi \(MP3\)](#)

[Inspiratory stridor \(MP3\)](#)

[Pleural friction rub \(MP3\)](#)

[Normal versus reduced air entry comparison \(MP3\)](#)

Google Drive: guides and models.

Direct links to the resource files. Some existing files stay in their original course folders; these links open those originals.

[Open the clinical reference folder and resource index](#)

HTML models: download and open in a browser, or use the live portal version. ZIP packs: download and extract first. Text and written scripts are reading alternatives. The M4A is an AI-generated fictional course introduction.

[All 25 simulated sounds and listening guide \(ZIP\)](#)

[Patient intake: fictional spoken course introduction \(M4A\)](#)

[Blood-pressure guide: plain text](#)

[Manual blood pressure: illustrated guide \(PDF\)](#)

[Blood-pressure listening and gauge model](#)

[Eye guide: plain text](#)

[Eye examination and visual acuity: illustrated guide \(PDF\)](#)

[Visual-acuity screening model](#)

[Clinical-skills illustration: open full-size image](#)

[Open the labeled illustration to zoom](#)

[16 hearing study flashcards \(TSV\)](#)

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The external human videos remain on their creators' services. The blood-test sources remain on their clinical and method sites. Pages 2, 6, 7, 8, 9 and 10 link those sources directly; they are not copied into Drive.