

M1L1 Grading Companion: Module 1 Lab 1: PLAX and Apical Fundamentals

Dr. Alice Matthews Echocardiography Scanning Lab I (course 98940)

Reference image library for SpeedGrader — generated from manifest.yaml

Assigned textbook: Reynolds T. The Echocardiographer's Pocket Reference, 5th ed. (Arizona Heart Institute Foundation, 2020)

Authoritative guideline: Lang RM, Badano LP, Mor-Avi V, et al. Recommendations for cardiac chamber quantification. JASE 2015; 28(1): 1-39.

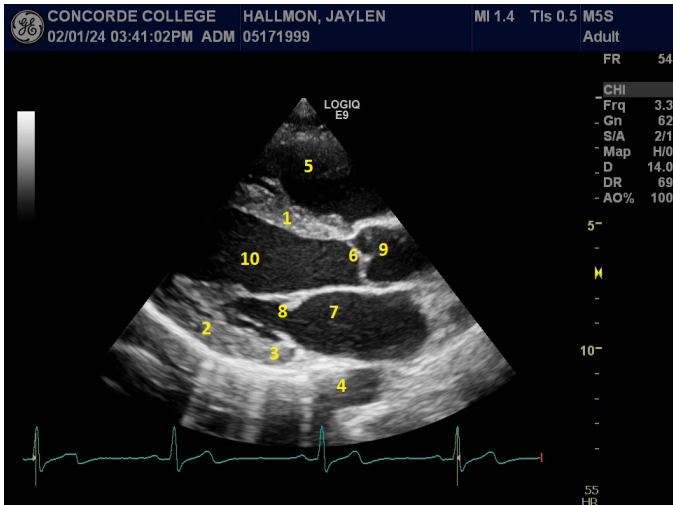
How to use: keep this PDF next to your laptop while grading. For each criterion the exemplar images and feedback snippets are below. The snippets are also in `snippets.md` for paste-into-SpeedGrader.

Criterion 1: PLAX (shallow) (5 pts)

Rubric note: At level of descending aorta; still image

Convention source: Reynolds 5e

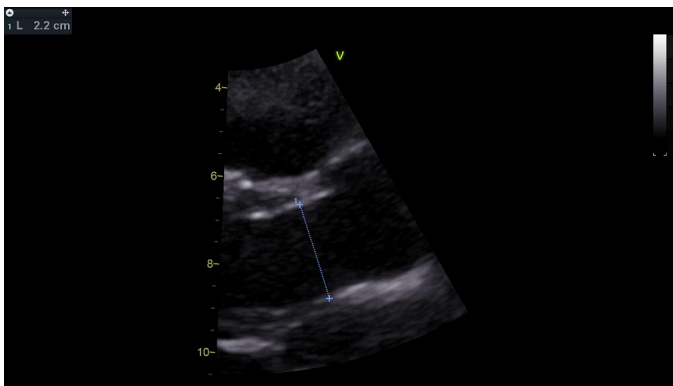
Reference exemplars



Concorde Master_Template labeled still

Why good: Standard PLAX framing: RV in near field, IVS, LV cavity, mitral valve in middle, LA and aortic root on the right. Use this as the baseline shape every PLAX should resemble.

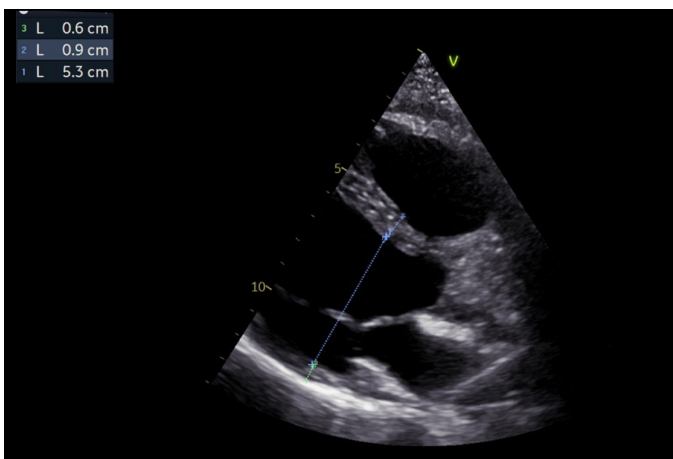
Addresses: off_axis, gain_too_high, gain_too_low



PragueICU PLAX gallery (captured 2026-05-02)

Why good: Descending thoracic aorta clearly visible as a round anechoic structure posterior to the LA. This is exactly what criterion 1 asks for.

Addresses: missing_descending_aorta, depth_mis_set



PragueICU PLAX teaching set (captured 2026-05-02)

Why good: Clean 2D PLAX with proper depth: AV cusps and mitral leaflets in plane, no foreshortening of the LV long axis.

Addresses: off_axis, depth_mis_set

- (pending: Reynolds 5e — figure to be extracted after physical book is ripped)
Why this will be good: Authoritative match to assigned textbook. (placeholder)

Feedback snippets

missing_descending_aorta: Your PLAX shallow is a clean LV view, but criterion 1 requires the descending thoracic aorta visible as a round anechoic structure posterior to the LA. Increase depth by 1-2 cm so the descending aorta sits at the bottom of the sector. Reference: https://cdn.prod.website-files.com/5ff99f5f7aec6fe4770f6b92/61474b8156c5836ca9ede994_aorta.png

off_axis: Your PLAX is off-axis: the LV looks tilted rather than running cleanly from the AV to the apex. Rotate the probe 5-10 degrees and re-tilt slightly toward the right hip. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/PLAX(1).jpg

depth_mis_set: Depth is off for this view. PLAX shallow needs the descending aorta just visible at the bottom of the screen. Adjust depth and recapture. Reference: https://cdn.prod.website-files.com/5ff99f5f7aec6fe4770f6b92/61474b8156c5836ca9ede994_aorta.png

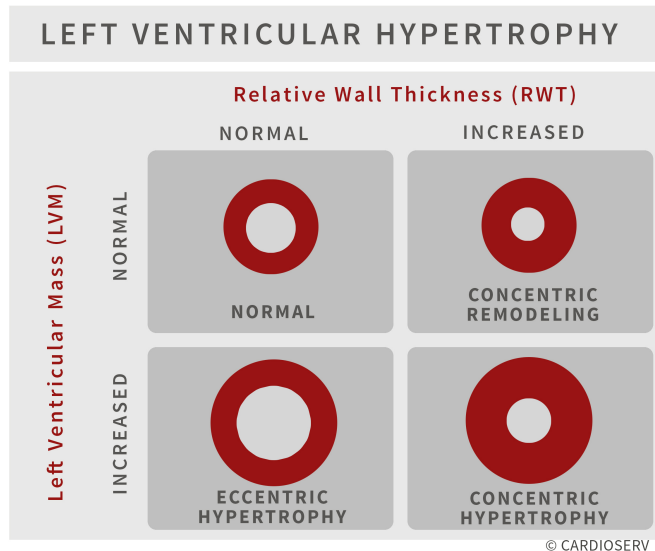
gain_too_high: Gain is too high; myocardium and chambers both look bright. Drop overall gain until the LV cavity is clean black and myocardium reads gray, not white. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/PLAX(1).jpg

Criterion 2: PLAX end-diastole linear measurements (5 pts)

Rubric note: RVIDd, IVSd, LVIDd, LVPWd, Ao root diameter; still

Convention source: Reynolds 5e (with ASE 2015 fallback)

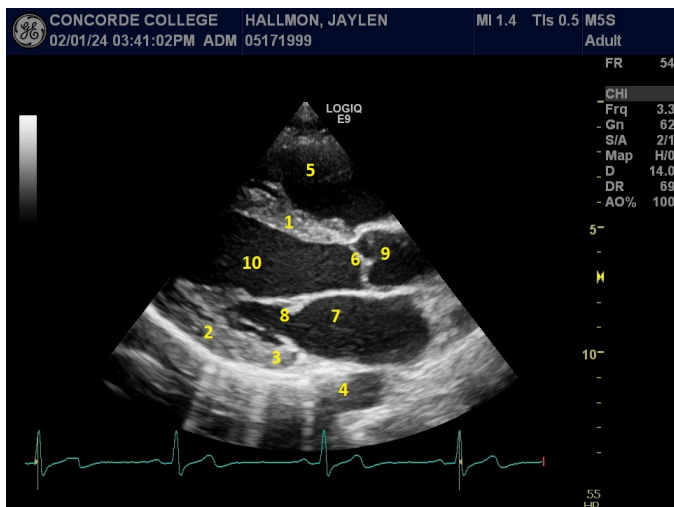
Reference exemplars



Cardioserv LV-mass walkthrough (captured 2026-05-02)

Why good: Five linear PLAX calipers placed at the chordal level just below MV tips, perpendicular to the LV long axis. Inner-edge to inner-edge, exactly the ASE 2015 chamber-quantification convention.

Addresses: caliper_placement_wrong_level, off_axis, end_diastole_mistimed



Concorde Master_Template labeled still (use as the underlying view; calipers not pre-placed)

Why good: Shows the same PLAX geometry your students should be measuring on. Trace where each caliper goes mentally.

Addresses: off_axis

Reference page (no embeddable image): <https://freelandsystems.com/echo-parameters-ventricular-dimensions/>

Freeland Systems echo parameters reference

Why good: Side-by-side normal-range reference for RVIDd, IVSd, LVIDd, LVPWd, Ao root with images. Use as a citation for normal vs abnormal.

Addresses: caliper_placement_wrong_level

- (pending: Reynolds 5e PLAX measurement plate — to extract)

Why this will be good: Authoritative convention match. (placeholder)

- (pending: Lang et al. JASE 2015 chamber quantification, Fig 4 or 5 — to extract)
Why this will be good: Authoritative ASE guideline figure. (placeholder)

Feedback snippets

caliper_placement_wrong_level: Your calipers are at the wrong LV level. PLAX linear measurements go just below the mitral leaflet tips, perpendicular to the LV long axis. Caliper too high (at the AV) or too low (at the papillary muscles) and the numbers will be wrong. Reference: <https://www.cardioserv.net/wp-content/uploads/2023/08/LV-MASS-V2.jpg>

off_axis: Your PLAX is angled, which inflates IVS and LVPW thickness and skews LVID. Re-aim to a true PLAX before measuring. Reference: <https://www.cardioserv.net/wp-content/uploads/2023/08/LV-MASS-V2.jpg>

end_diastole_mistimed: End-diastole was not at the R-wave. Use the ECG trace, not “looks biggest” — eyeballed timing introduces 5-10 mL of inter-beat noise. Reference: <https://www.cardioserv.net/wp-content/uploads/2023/08/LV-MASS-V2.jpg>

missing_measurement: Criterion 2 requires all five calipers visible on one frame: RVIDd, IVSd, LVIDd, LVPWd, Ao root. Recapture with all five visible. Reference: <https://www.cardioserv.net/wp-content/uploads/2023/08/LV-MASS-V2.jpg>

Criterion 3: PLAX end-systole linear measurements (5 pts)

Rubric note: LVIDs, LA diameter; still

Convention source: Reynolds 5e

Reference exemplars

*Reference page (no embeddable image): https://www.echopedia.org/index.php/Left_Ventricular_Dimensions
Echopedia LV Dimensions reference*

Why good: Shows ED and ES caliper placement side-by-side. LVIDs measured at smallest LV cavity, peak T-wave on ECG. LA AP diameter measured at level of aortic root, perpendicular to posterior aortic wall.

Addresses: end_systole_mistimed, caliper_placement_wrong_level

*Reference page (no embeddable image): <https://www.pragueicu.com/echo-content/parasternal-long-axis-view-plax>
PragueICU PLAX page (multiple stills with measurements)*

Why good: Shows LA AP diameter measurement frame at end-systole.

Addresses: caliper_placement_wrong_level

- *(pending: Reynolds 5e — to extract)*
Why this will be good: Reynolds-convention end-systole calipers. (placeholder)
- *(pending: ASE 2015 chamber quant — LA diameter convention figure)*
Why this will be good: Authoritative LA AP measurement convention. (placeholder)

Feedback snippets

end_systole_mistimed: End-systole frame is wrong. Scroll the cine to the smallest LV cavity (mitral valve closed and bowed toward LA, ECG at peak T-wave). The frame you submitted shows the LV mid-cycle. Reference: https://www.echopedia.org/index.php/Left_Ventricular_Dimensions

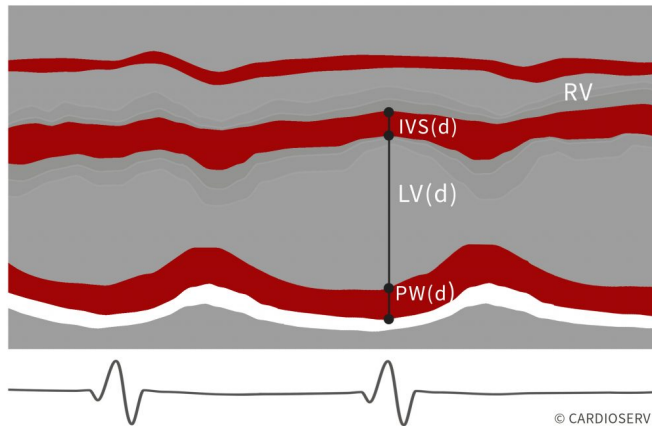
caliper_placement_wrong_level: LVIDs caliper should be at the same chordal level you used for LVIDd in criterion 2 — not at a different level. LA AP diameter goes perpendicular to the posterior aortic wall, leading-edge-to-leading-edge. Reference: https://www.echopedia.org/index.php/Left_Ventricular_Dimensions

missing_la_diameter: Criterion 3 requires both LVIDs and LA AP diameter on the same frame. Add the missing caliper and recapture. Reference: https://www.echopedia.org/index.php/Left_Ventricular_Dimensions

Criterion 4: PLAX M-mode at LV chordal level (5 pts)

Rubric note: Calipers at end-diastole AND end-systole on the same M-mode strip (IVS, LVID, LVPW); still
Convention source: Reynolds 5e

Reference exemplars



Cardioserv M-mode EF tracing (captured 2026-05-02)

Why good: Classic PLAX M-mode at chordal level. Cursor perpendicular to LV walls, IVS and LVPW thickness measurable, LVIDd and LVIDs both visible on the same strip. Calipers placed at R-wave (ED) and at smallest cavity dimension (ES).

Addresses: `mmode_cursor_not_perpendicular`, `missing_es_calipers`, `missing_ed_calipers`

Reference page (no embeddable image): <https://thoracickey.com/m-mode-echocardiography-and-2d-cardiac-measurements/Thoracic Key M-mode echo chapter>

Why good: Multiple labeled M-mode strips at different LV levels. Confirms cursor placement at chordal level (just below MV tips) is the correct one for LV chamber measurements.

Addresses: `mmode_cursor_not_perpendicular`, `mmode_cursor_wrong_level`

- *(pending: Reynolds 5e M-mode plate — to extract)*
Why this will be good: Reynolds-convention M-mode chordal level. (placeholder)
- *(pending: ASE 2015 chamber quant — M-mode example figure)*
Why this will be good: Authoritative ASE M-mode example. (placeholder)

Feedback snippets

`mmode_cursor_not_perpendicular`: Your M-mode cursor is angled rather than perpendicular to the LV walls. Off-axis M-mode artificially thickens IVS and LVPW. Re-aim the cursor through the IV septum and posterior wall at 90 degrees and re-run. Reference: https://www.cardioserv.net/wp-content/uploads/2023/08/M_ModeEF-1024x681-1.jpg

`mmode_cursor_wrong_level`: Your M-mode cursor is at the wrong level (looks like AV/papillary). Chordal level is just below the MV leaflet tips. Reposition the cursor and re-run. Reference: <https://thoracickey.com/m-mode-echocardiography-and-2d-cardiac-measurements/>

`missing_es_calipers`: Criterion 4 requires calipers at BOTH end-diastole AND end-systole on the same M-mode strip. You only marked ED. Add the ES set (IVSs, LVIDs, LVPWs) at peak T-wave. Reference: https://www.cardioserv.net/wp-content/uploads/2023/08/M_ModeEF-1024x681-1.jpg

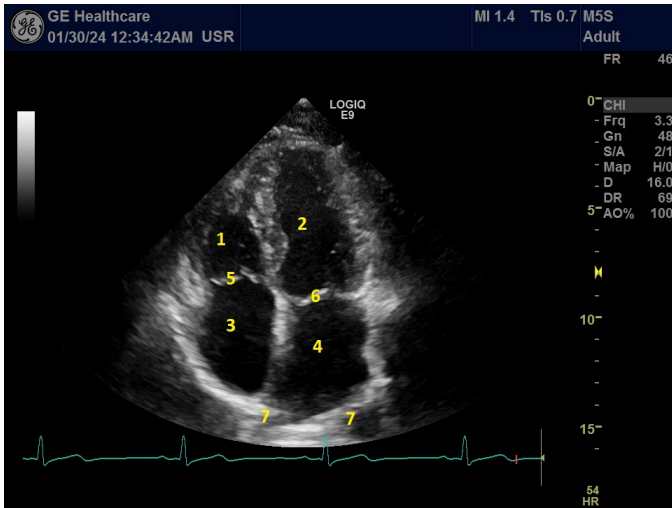
`missing_ed_calipers`: Criterion 4 requires both ED and ES calipers visible. You only marked ES. Add the ED set (IVSd, LVIDd, LVPWd) at the R-wave. Reference: https://www.cardioserv.net/wp-content/uploads/2023/08/M_ModeEF-1024x681-1.jpg

Criterion 5: Apical 4-Chamber (5 pts)

Rubric note: Still image

Convention source: Reynolds 5e

Reference exemplars



Concorde Master_Template labeled A4C still

Why good: All four chambers visible, LV apex at top of sector, IVS near-vertical, mitral and tricuspid annuli at bottom. RV roughly two-thirds the size of LV. Use as the baseline shape.

Addresses: foreshortened, off_axis, ivs_not_vertical

Reference page (no embeddable image): <https://pedecho.org/library/normal/echocardiogram/a4c-p3a>

Pediatric Echocardiography A4C reference

Why good: Labeled normal A4C with all four chambers and both AV valves clearly identified.

Addresses: chambers_not_all_visible

Reference page (no embeddable image): <https://www.echocardiographer.org/tte-apical4>

Echocardiographer.org A4C teaching gallery (13 stills)

Why good: Multiple A4C variants (standard, with color, with TAPSE). The first standard 2D image is the model end-diastole frame.

Addresses: foreshortened, off_axis

- (pending: Reynolds 5e A4C teaching figure — to extract)
Why this will be good: Reynolds-convention A4C. (placeholder)

Feedback snippets

foreshortened: Your A4C is foreshortened: the LV looks stubby because the apex has been dropped. Slide caudally one rib space and re-aim toward the patient's left shoulder. The LV cavity should be the longest possible from apex to mitral annulus. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_1.jpg

off_axis: Your A4C plane is angled. The IVS should run near-vertical down the middle of the screen with all four chambers symmetric. Rotate the probe slightly and recapture. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_1.jpg

ivs_not_vertical: IVS is tilted in your frame, suggesting an oblique cut. Adjust probe rotation so the septum bisects the screen vertically. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_1.jpg

chambers_not_all_visible: Criterion 5 requires all four chambers visible. Your frame is missing one (likely the

RA or RV is cropped). Decrease depth or re-center the LV. Reference: <https://pedecho.org/library/normal/echocardiogram/p3a>

depth_mis_set: Depth is off. The full LV plus the mitral and tricuspid annuli should be visible. Adjust depth so the entire LV fits without wasted space below. Reference: [/Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVS1.jpg](#)

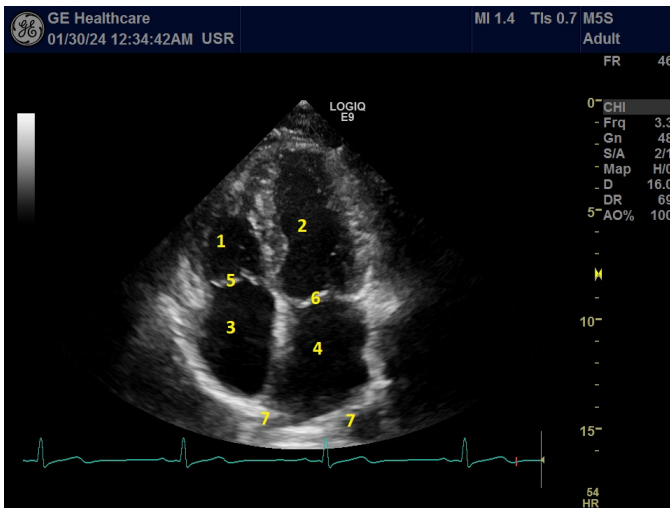
Criterion 6: Apical 4-Chamber: LV-focused view (5 pts)

Rubric note: Still image

Convention source: Reynolds 5e

Reference exemplars

- (pending: ASE 2015 chamber quant Fig 4 — to extract)
Why this will be good: Authoritative LV-focused A4C with sector narrowed to LV only. (placeholder)
- (pending: Reynolds 5e Simpson method intro — to extract)
Why this will be good: Reynolds-convention LV-focused framing. (placeholder)



Concorde Master_Template (standard A4C, NOT LV-focused — use as 'before' comparison)

Why good: Standard A4C with all chambers visible. The LV-focused view should crop the RV and atria out of this frame.

Addresses: sector_too_wide, chambers_still_visible

Reference page (no embeddable image): <https://www.echocardiographer.org/tte-apical4>

Echocardiographer.org A4C gallery

Why good: Multiple A4C variants; one of the latter images shows the LV-focused crop with the apex at the top and mitral annulus at the bottom.

Addresses: sector_too_wide

Feedback snippets

sector_too_wide: LV-focused view should crop the RV and atria out, with only the LV occupying the sector. Increase focus and reduce sector width to concentrate on the LV. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/1.jpg

mitral_annulus_cropped: Your LV-focused frame cuts off the mitral annulus at the bottom. Adjust depth so the apex is at the top and the full annulus is at the bottom of the sector. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/A4C_1.jpg

apex_not_at_top: LV apex should be at the very top of the sector in the LV-focused view; you have it lower. Re-aim the probe and recapture. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/1.jpg

chambers_still_visible: Criterion 6 wants the LV in isolation. Right ventricle and atria should be largely cropped out. Narrow the sector and recapture. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/1.jpg

Criterion 7: AP4 Simpson's biplane: end-diastole (5 pts)

Rubric note: End-diastole; still

Convention source: ASE 2015

Reference exemplars

- (pending: ASE 2015 chamber quant Fig 4 — to extract)
Why this will be good: Endocardial trace from lateral mitral annulus, around apex, back to septal mitral annulus. Stays on compacted myocardium, excludes papillary muscles and trabeculae. (placeholder)
- (pending: Reynolds 5e LV volume figure — to extract)
Why this will be good: Reynolds-convention Simpson trace. (placeholder)

Reference page (no embeddable image): <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

Thoracic Key — Quantification of LV Systolic and Diastolic Function

Why good: Worked example of Simpson biplane with LVEDV calculation. Shows the trace path and the volume readout.

Addresses: `simpson_traced_through_papillary`, `end_diastole_mistimed`

Reference page (no embeddable image): <https://www.generalistultrasound.com/accreditation/acce/left-ventricular-size-and-function/>

Generalist Ultrasound LV Size and Function module

Why good: Step-by-step Simpson tracing with the cart's measurement package active.

Addresses: `simpson_traced_through_papillary`

Feedback snippets

simpson_traced_through_papillary: Your Simpson trace runs through the papillary muscles, which makes the cavity look smaller and inflates the EF (you may see EF above 75 percent). Re-trace along the compacted endocardium, excluding papillary muscles and trabeculae. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

end_diastole_mistimed: Simpson ED frame must be at the R-wave when LV is largest. Your frame is mid-cycle. Scroll to the largest LV cavity at the R-wave and re-trace. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

foreshortened: The LV is foreshortened in your trace, which underestimates LVEDV and overestimates EF. Re-acquire the LV-focused A4C without dropping the apex, then re-trace. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

missing_volume_readout: The volume calculation (LVEDV) should be visible on the saved still. Capture the screen with the trace AND the reported volume. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

Criterion 8: AP4 Simpson's biplane: end-systole (5 pts)

Rubric note: End-systole; still

Convention source: ASE 2015

Reference exemplars

- (pending: ASE 2015 chamber quant — paired ES trace figure)
Why this will be good: ES trace at smallest LV cavity, near peak T-wave. Same path as ED, traced from one mitral annulus to the other. (placeholder)
- (pending: Reynolds 5e — paired ED/ES Simpson plate)
Why this will be good: Reynolds ES trace example. (placeholder)

Reference page (no embeddable image): <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

Thoracic Key LV systolic function chapter

Why good: Shows ES trace with LVESV readout and EF calculation.

Addresses: `simpson_traced_through_papillary`, `end_systole_mistimed`

Reference page (no embeddable image): <https://www.generalistultrasound.com/accreditation/acce/left-ventricular-size-and-function/>

Generalist Ultrasound LV Size and Function

Why good: ES timing: scroll to smallest LV cavity, near peak T-wave, just before mitral valve opens.

Addresses: `end_systole_mistimed`

Feedback snippets

simpson_traced_through_papillary: Your ES trace cuts through the papillary muscles. Trace the compacted endocardium only, exclude papillary and trabeculae. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

end_systole_mistimed: ES frame is wrong. The smallest LV cavity is near peak T-wave, just before the mitral valve opens. Your frame still shows the LV partially filled. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

ef_implausibly_high: Reported EF above 75 percent in a healthy young adult almost always means you traced through the papillary muscles. Re-trace ED and ES on the compacted endocardium. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

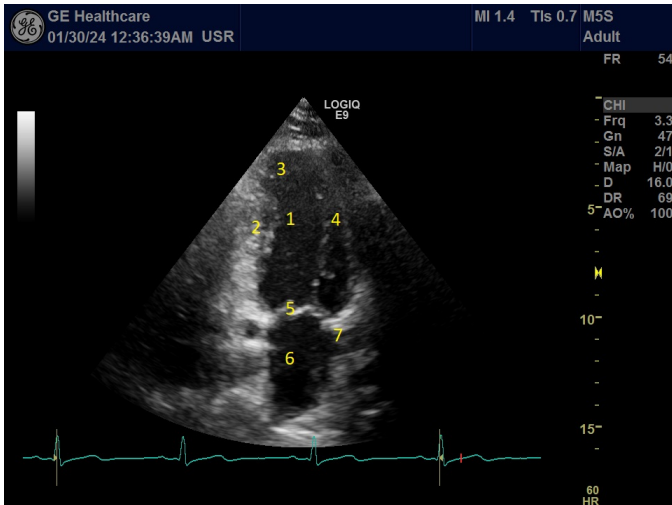
ef_implausibly_low: Reported EF below 45 percent in a healthy young adult almost always means a foreshortened apex or off-axis LV-focused image. Re-acquire and re-trace. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

Criterion 9: Apical 2-Chamber (5 pts)

Rubric note: Still image

Convention source: Reynolds 5e

Reference exemplars



Concorde Master_Template labeled A2C still

Why good: Anterior wall on the right, inferior wall on the left, LA at the bottom of the LV. RV and RA absent. Use as the A2C baseline shape.

Addresses: off_axis, rv_still_visible, foreshortened

Reference page (no embeddable image): <https://www.pragueicu.com/echo-content/apical-views>

PragueICU apical views page

Why good: Multiple apical view examples with anatomy labels; A2C and A3C clearly distinguished.

Addresses: off_axis

Reference page (no embeddable image): <https://www.echocardiographer.org/tte-apical4>

Echocardiographer.org apical gallery (A2C images included)

Why good: Side-by-side apical view comparison; helps clarify A2C vs A3C distinction.

Addresses: rv_still_visible

- (pending: Reynolds 5e A2C figure — to extract)

Why this will be good: Reynolds-convention A2C. (placeholder)

Feedback snippets

rv_still_visible: Your “A2C” still shows part of the RV, meaning the probe was not rotated far enough from the A4C plane. Rotate 60-90 degrees counterclockwise from A4C until the RV disappears entirely. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/Apical

off_axis: Your A2C plane is angled. The anterior wall should be on the right and the inferior wall on the left, with the LV running cleanly down the middle. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/Apical

foreshortened: Your A2C LV looks shortened. The apex is dropped. Slide one rib space and re-aim toward the apex. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/Apical

la_not_at_bottom: LA should be at the bottom of the LV in A2C. Your orientation is flipped or the depth is wrong. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/Apical

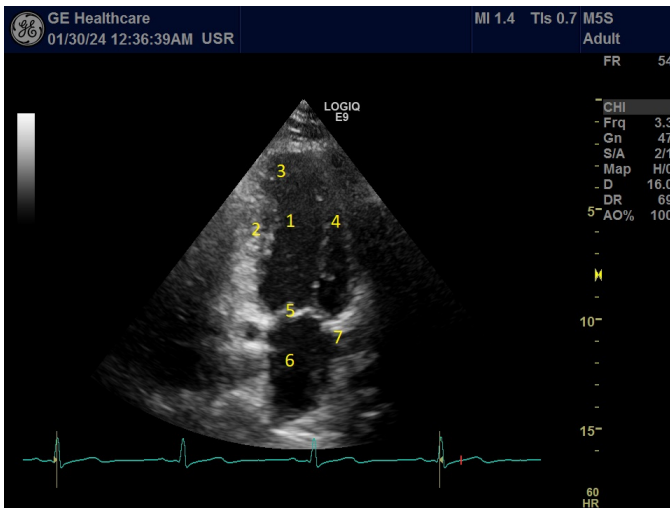
Criterion 10: Apical 2-Chamber: LV-focused view (5 pts)

Rubric note: Still image

Convention source: Reynolds 5e

Reference exemplars

- (pending: ASE 2015 chamber quant — A2C LV-focused figure)
Why this will be good: Sector narrowed to the LV only, apex at top, mitral annulus at bottom. (placeholder)
- (pending: Reynolds 5e A2C LV-focused — to extract)
Why this will be good: Reynolds LV-focused A2C. (placeholder)



Concorde Master_Template (standard A2C, NOT LV-focused — use as 'before' comparison)

Why good: Standard A2C. The LV-focused crop should narrow the sector around just the LV from this baseline.

Addresses: sector_too_wide

Reference page (no embeddable image): <https://www.generalistultrasound.com/accreditation/acce/left-ventricular-size-and-function/>

Generalist Ultrasound LV Size and Function

Why good: Worked example of A2C LV-focused framing prior to Simpson trace.

Addresses: sector_too_wide

Feedback snippets

sector_too_wide: LV-focused A2C should crop everything except the LV. Narrow the sector, increase focus, and re-capture. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/Apical_2_Chamber_LV_Focused_View/

mitral_annulus_cropped: Mitral annulus is cropped at the bottom of your LV-focused A2C. Adjust depth so the full annulus is visible. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/Apical_2_Chamber_LV_Focused_View/

apex_not_at_top: LV apex must be at the very top of the sector. Re-aim the probe. Reference: /Volumes/data_bolt/_github/concorde_pdx/_2604_Matthews/CVSG1240_Echo_Scan_Lab_I/Master_Template/Files/Apical_2_Chamber_LV_Focused_View/

Criterion 11: AP2 Simpson's biplane: end-diastole (5 pts)

Rubric note: End-diastole; still

Convention source: ASE 2015

Reference exemplars

- (pending: ASE 2015 chamber quant — A2C Simpson ED trace figure)
Why this will be good: ED trace in A2C, combined with the AP4 trace from criterion 7 to compute biplane LVEDV. (placeholder)
- (pending: Reynolds 5e — to extract)
Why this will be good: Reynolds A2C Simpson ED. (placeholder)

Reference page (no embeddable image): <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

Thoracic Key LV function chapter

Why good: Shows the biplane principle: A4C trace + A2C trace combined to give LVEDV.

Addresses: `simpson_traced_through_papillary`

Reference page (no embeddable image): <https://www.generalistultrasound.com/accreditation/acce/left-ventricular-size-and-function/>

Generalist Ultrasound

Why good: Worked A2C ED trace example with cart measurement package.

Addresses: `end_diastole_mistimed`

Feedback snippets

simpson_traced_through_papillary: A2C ED trace runs through the papillary muscles. Trace compacted endocardium only. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

end_diastole_mistimed: A2C ED frame must be at the R-wave (largest LV cavity). Your frame is mid-cycle. Reference: <https://www.generalistultrasound.com/accreditation/acce/left-ventricular-size-and-function/>

ap4_ap2_planes_inconsistent: The biplane calculation requires the AP4 and AP2 LV outlines to be roughly the same length. Yours differ, which suggests one view is foreshortened. Re-acquire whichever LV-focused view is shorter. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

Criterion 12: AP2 Simpson's biplane: end-systole (5 pts)

Rubric note: End-systole; still

Convention source: ASE 2015

Reference exemplars

- (pending: ASE 2015 chamber quant — A2C Simpson ES trace figure)
Why this will be good: ES trace in A2C completing the biplane; system reports final LVEDV, LVESV, EF. (placeholder)
- (pending: Reynolds 5e A2C Simpson ES — to extract)
Why this will be good: Reynolds A2C Simpson ES. (placeholder)

Reference page (no embeddable image): <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

Thoracic Key LV function chapter

Why good: Final biplane EF readout shown after ES trace completes.

Addresses: `simpson_traced_through_papillary`, `end_systole_mistimed`

Reference page (no embeddable image): <https://www.generalistultrasound.com/accreditation/acce/left-ventricular-size-and-function/>

Generalist Ultrasound LV Size and Function

Why good: Final biplane LVESV + EF computation example.

Feedback snippets

simpson_traced_through_papillary: A2C ES trace runs through papillary muscles. Re-trace the compacted endocardium only. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

end_systole_mistimed: A2C ES frame is wrong. Scroll to the smallest LV cavity, near peak T-wave. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

missing_ef_readout: Criterion 12 should show the final biplane EF on the saved frame. Capture the screen with trace AND volume AND EF visible. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

ef_implausibly_high: Final EF above 75 percent in a healthy young adult: re-check both AP4 and AP2 traces for papillary inclusion. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

ef_implausibly_low: Final EF below 45 percent in a healthy young adult: check for foreshortened apex on either view; re-acquire LV-focused images. Reference: <https://thoracickey.com/quantification-of-left-ventricular-systolic-and-diastolic-function/>

