Table 1. Stylistic Do's and Don'ts

Do	Don't	Examples
• Use simple sentences or phrases in the report.	• Use excessively wordy or "teaching" statements.	• Recommended: "Mitral annular disjunction is present" • Discouraged: There is separation between the mitral valve annulus, the left atrial wall, and the basal portion of the inferolateral left ventricular myocardium during systole. Therefore, mitral annular disjunction is present."
• Use consistent vocabulary in echocardiography reports within a laboratory and health system to describe the certainty of findings and grading of pathology.	• Allow individual readers within a laboratory to use inconsistent words to describe the certainty of findings or grading of pathology.	• Recommended: "A bicuspid AoV is (present, suspected)" • Recommended: "Mild paravalvular regurgitation" • Recommended: "The LV is dilated (or enlarged)" • Recommended: "Global vs. generalized LV systolic dysfunction"
• Use guideline-defined terminology and grading of pathology when this is available and lab-specific terminology when universal nomenclature is not available. A grading range may be used when data are not exclusively within a single grade (e.g., moderate-to-severe aortic stenosis may indicate moderate or severe stenosis and additional testing may be needed).	• Grading specific pathology when grades do not exist in current guidelines and/or use inconsistent grading of pathology within a laboratory.	• Recommended: "mild, moderate, or severe aortic stenosis" • Discouraged but permissible: "moderate-to-severe aortic stenosis" • Discouraged: "mild, moderate, or severe aortic valve calcification" (unless internal lab definition) • Discouraged: "3+ mitral regurgitation"
• Only utilize standard abbreviations that can be easily understood by a	• Use non-standard, complex, or outdated abbreviations or terms	• Recommended: "There is severe asymmetric hypertrophy of the

non-cardiologist, use them consistently, and define abbreviations when feasible.	that are unlikely to be understood by a non-cardiologist. • Use the same word for multiple definitions (e.g., MVR could mean either mitral valve replacement, mitral valve repair, or mitral valve regurgitation).	interventricular septum and systolic anterior motion of the mitral valve, consistent with hypertrophic cardiomyopathy." • Discouraged: "Severe asymmetric hypertrophy of IVS and SAM, suspect HOCM."
• Avoid prepositional phrases. Examples of prepositional words are: "in," "at," "on," "of," and "to."	• Use excessively wordy statements.	• Recommended: "The following segments are akinetic: …" (5 words) • Discouraged: "All *of the* following segments are akinetic: …" (7 words)- these add up
• Describe structure and function in that order.	• Inconsistently describe functional statements and anatomic descriptions.	• Recommended: "The aortic valve is normal in structure. There is no aortic stenosis or regurgitation." • Discouraged: "There is no aortic regurgitation. Tri leaflet aortic valve. Normal aortic valve velocity."
• Numerical values, such as transvalvular gradients across a prosthetic valve or chamber volumes, should state whether the values are normal or abnormal with any proviso statements if necessary.	• Ignore abnormal values that may be explained by extenuating physiologic conditions.	• Recommended: "AoV gradients are increased which may be related to high stroke volume." "Left atrium is dilated, which may be normal in post-transplant heart" (describe the finding and provide insight). Discouraged (error): "Normal LA size (LAVi 50 ml/m2)."
• Numerical tables and qualitative and quantitative interpretive statements must agree throughout the report.	• Inconsistency in qualitative assessment and quantitative measurements. • Inconsistency in LVEF reporting.	• Recommended: "There is moderate LV systolic dysfunction with an LVEF of 35%". • Discouraged: "There is moderate LV systolic dysfunction with a visually assessed LVEF of

		35%, 3D derived LVEF 42%, and 28% by biplane Simpson's method".
• Generate a summary statement highlighting key findings to answer pertinent clinical questions, and abnormal or critical findings, using simple points that can be interpreted independently.	• Generate a lengthy summary that repeats numerous "findings" statements not linked to exam indication or providing clinical relevance or data synthesis.	• Recommended: summary statement should include at least three elements: ventricular function, pathologic findings, and a comparison statement. Describe pertinent findings such as pericardial effusion when clinically relevant or as part of the exam indication. • Discouraged: Include a description of the pericardium in all report summaries. • Encouraged: when study indication is "new cardiac murmur.", Summary with pertinent negative finding: "No significant valve disease detected."
• The summary statement should include a comparison with prior echo studies and/or studies using other imaging modalities. • State whether the comparison was made by reviewing the prior study images or only a report.	• Fail to compare and document significant interval changes available in the electronic health record.	• Recommended: Compare LVEF and regional wall motion changes with a prior exam and describe any differences. For example: "Compared with the prior TTE images (report) dated XX, LVEF has declined." • Discouraged: Failing to make and report such comparisons or simply comparing written report findings when images are available (especially when interval changes are considered clinically significant).

• Documenting critical results communicated to the care team in the summary statement.	• Fail to communicate critical results to the care team and document this communication (see Table 9).	• Recommended: "These findings were discussed with the care team." • Discouraged: No documentation of critical findings.

Table 2. Recommended Abbreviations and Abbreviations to Avoid

Table 2A. Permitted Abbreviations

Abbreviation	***Definition***
2D	2-dimensional
3D	3-dimensional
4D	4-dimensional
Ao Arch	Aortic arch
AoRoot	Aortic root
AoRoot SV	Aortic root sinus Valsalva
AR	Aortic regurgitation
AS	Aortic stenosis
ASD	Atrial septal defect
AscAo	Ascending aorta
ASE	American Society of Echocardiography
AVA	Aortic valve area
bpm	Beats per minute
BSA	Body surface area
cm	Centimeter(s)
cm/s	Centimeter(s) per second
CW	Continuous wave
DSE	Dobutamine stress echocardiography
ECMO	Extracorporeal membrane oxygenation
EROA	Effective regurgitant orifice area
IABP	Intra-aortic balloon pump
IAS	Interatrial septum (septal)
in	inch
IVC	Inferior vena cava
kg	kilogram
lb	pound
LA	Left atrium (atrial)
LAA	Left atrial appendage
LV	Left ventricle (ventricular)
LVAD	Left ventricular assist device

LVEDD	Left ventricular end diastolic dimension
LVEDV	Left ventricular end diastolic volume
LVEDVi	Left ventricular end diastolic volume index
LVEF	Left ventricular ejection fraction
LVESD	Left ventricular end systolic dimension
LVESV	Left ventricular end systolic volume
LVESVi	Left ventricular end systolic volume index
LVH	Left ventricular hypertrophy
LVOT	Left ventricular outflow tract
m	meter
m/s	meter(s) per second
max	maximal
MCS	Mechanical circulatory support
METS	Metabolic equivalents
MR	Mitral regurgitation
MS	Mitral stenosis
ms	millisecond
MV	Mitral valve
MVA	Mitral valve area
MVP	Mitral valve prolapse
PA	Pulmonary artery
PASP	Pulmonary arterial systolic pressure
PDA	Patent ductus arteriosus
PFO	Patent foramen ovale
PISA	Proximal isovelocity surface area
POCUS	Point of care ultrasound
PS	Pulmonary stenosis
PValve	Pulmonic valve
PVein	Pulmonary vein
PVL	Paravalvular leak
Qp:Qs	Pulmonary-to-systemic flow ratio
RA	Right atrium (atrial)
RAP	Right atrial pressure
RV	Right ventricle (ventricular)
RVAD	Right ventricular assist device
RVEF	Right ventricular ejection fraction
RVOT	Right ventricular outflow tract
RVSP	Right ventricular systolic pressure
s	second
STE	Speckle Tracking Echocardiography
SVC	Superior vena cava

TAPSE	Tricuspid annular plane systolic excursion
TAVR/TAVI	Transcatheter aortic valve replacement/implantation
TDI	Tissue Doppler imaging
TEE	Transesophageal echocardiography
THV	Transcatheter heart valve
TR	Tricuspid regurgitation
Transverse Ao	Transverse aorta
TS	Tricuspid stenosis
TTE	Transthoracic echocardiography
TV	Tricuspid valve
UEA	Ultrasound enhancing agent
v	Velocity
VC	Vena contracta
ViR	Valve in ring
ViV	Valve in valve
Vmax	Maximum velocity
VSD	Ventricular septal defect
VTI	Velocity time integral

Table 2B. Abbreviations to Avoid due to multiple meanings

Abbreviation	***Possible Definitions***
AI	Aortic insufficiency, artificial intelligence
AV	Aortic valve, atrioventricular, arteriovenous
BAV	Bicuspid aortic valve, balloon aortic valvuloplasty
CA	Coronary artery, cardiac amyloidosis, cardiac arrest, competitive athletes
CS	Coronary sinus, conscious sedation, cardiogenic shock
DT	Deceleration time, deep transgastric, destination therapy
IE	Infective endocarditis, interventional echo
MI	Mechanical index, myocardial infarction
MVR	Mitral valve replacement, mitral valve repair
PE	Pulmonary embolism, pericardial effusion
PV	Pulmonic Valve, pulmonary vein
PVR	Pulmonic valve regurgitation, pulmonary valve replacement, paravalvular regurgitation, pulmonary vascular resistance
PW	Pulsed wave Doppler, posterior wall
SV	Single ventricle, stroke volume
VA	Ventriculoatrial, venoarterial, ventricular arrhythmia
PA	Pulmonary artery, pulmonary atresia
PPM	Patient-prosthesis mismatch, permanent pacemaker

Table 2C. Suggested Strategies to Disambiguate Confusing Commonly Used Abbreviations

Abbreviation	***Possible Definitions***
Ao	aorta
AoV	aortic valve
AoVReplaced	not AVR
AoVRepaired	not AVR
MVReplaced	not MVR
MVRepaired	not MVR
TVReplaced	not TVR
TVRepaired	not TVR
PVReplaced	not PVR
PVRepaired	not PVR
PValve	not PV
PVein	not PV

Table 3. Reporting Standards Assumptions

Reporting Standards Recommendations apply to the following protocols:
• Adult comprehensive transthoracic echocardiography (TTE)
• Adult limited (aka problem focused exam)
• Adult transesophageal echocardiography (TEE)
• Adult stress echo for ischemic heart disease
• Adult stress echo for structural heart disease
• Indicated techniques and associated maneuvers (e.g., three-dimensional [3D], strain, Valsalva, IV saline contrast) (see Table 6)
• Simple adult congenital heart disease assessment when present (e.g., shunt assessment)
• Mechanical circulatory support reporting includes device type and implant sites
Reporting Standard Recommendations do not address the following protocols:
• Pediatric echocardiography
• Comprehensive adult congenital heart disease
• Point-of-care ultrasound (POCUS)
Exams are performed by adult echocardiography laboratory
Reporting recommendations do not address staff training, credentialing, or privileging
Recommendations do not address billing or reimbursement matters
Reports include the following data fields
• **Header** Health facility name and echo lab site address
• **Protocol** including basic and special protocols

• **Date & time** information adequate to assess workflow (turnaround times)
  • Date & time ordered-to-date & time performed
  • Date & time performed-to-date & time interpreted (and distributed)

• **Prior exam identification** (if known/available)
• **Indication(s)** should be listed and appropriate in the context of the clinical history, physical findings (including lab and ECG data), and prior imaging studies
• **Clinical information** (known/suspected disease [signs, symptoms, related interventions], and related other prior imaging studies)
• **Demographic information** adequate to analyze and improve local/internal health system quality of care and compatible with research registries   ○ Age, gender, race/ethnicity, height, weight, body surface area
• **Priority** (e.g., routine, high priority, urgent, stat) see Table 6
• **Cardiac rhythm and rate** (baseline cardiac rhythm and significant paroxysmal rhythm disturbances during the exam; bradycardia/tachycardia)
• **Blood pressure** obtained at the bedside concurrent with the start of exam (not copied from records). For physiologic interventions (maneuvers) or at stages of stress testing the concurrent blood pressure is re-entered in a sequential fashion as appropriate
• **Measurements Table (see Table 4)**
• Hemodynamic and volume measurements (e.g., calculated pressures, stroke volumes, regurgitant volumes, LVEF, LA Volume) should be reported as whole numbers

• When bracketed ranges may be appropriate (e.g., RAP = 0-5 mmHg, SPAP = 25-30 mmHg, the average of such ranges may be used [single number]) • Reporting precision should be appropriate. Velocity, Area, and most linear measurements should not be reported with accuracy >0.1 (e.g., AoV Vmax = 4.2 m/sec is appropriate [not 4.21 m/sec], AVA= 1.2 cm^2 is appropriate [not 1.22 cm^2], Aortic Root Sinus of Valsalva = 4.2 cm is appropriate [not 4.21 cm]
• **Multiple measurements: Baseline, after maneuver(s), stages of stress protocols** • Analysis and reporting systems should provide multiple repeated measurement fields that are tagged to the appropriate stage of the exam, enabling repeated sampling and pertinent calculations to accommodate the wide range of protocols recommended for ischemic and structural heart disease stress protocols, maneuvers, and mechanical circulatory support device changes. • Rather than provide an exhaustive list of potential scenarios for stress echo and physiologic maneuver reporting, we recommend maximal flexibility in the ability for laboratories to carefully define protocols and interventions and then to be able to readily navigate and activate the needed observational statements and/or measurement packages at each “stage” of a protocol
• **Interpretation:** anatomical and functional descriptions of the 4 cardiac chambers, the 4 valves, pulmonary veins (as appropriate), pericardium, aorta, pulmonary artery, SVC, IVC, and any pertinent devices or extracardiac structures
• **Summary Statement:** (important findings synthesis, integration, diagnosis, comparison, and reconciliation with prior echo or other imaging findings; may suggest other complementary imaging modality). “Critical findings” should be labeled as such and appear obvious to the reader (e.g., first summary entry).
• **Personnel**
• **Ordering** clinician (+ contact information)
• **Performing** (sonographer/physician)
• **Trainee Performing** (when applicable)
• **Trainee Interpreting** (when applicable)
• **Interpreting** physician “signature” with date/time stamp
• **Other Fields** (e.g., teaching case, credentialing case, research names)
Report distribution (including critical results) is **timely** in accordance with institutional policy
Report formats are **electronic** and **print-ready** for distribution according to the healthcare facility's internal standards in accordance with patient confidentiality standards
Abbreviations use should be limited and carefully defined (see Table 2)
Acronym Abbreviations (clinical trial names) should be avoided or defined by full name within the report

Table 4. Measurement Dictionary

Name of Measurement	Abbreviation	Unit	Suggested number of decimal places
Left Ventricle (LV)			
LV internal diastolic dimension	LVIDd	cm	1
LV internal systolic dimension	LVIDs	cm	1
Interventricular septal wall diastolic dimension	IVSD	cm	1
LV posterior wall diastolic dimension	LVPWD	cm	1
Relative wall thickness	RWT		2
LV end-diastolic volume (Simpson's)	LVEDV (Simpson's)	ml	0
LV end-diastolic volume (3 dimensional)	LVEDV (3D)	ml	0
LV end-diastolic volume index	LVEDVi	ml/m^2	0
LV end-systolic volume (Simpson's)	LVESV (Simpson's)	ml	0
LV end-systolic volume (3 dimensional)	LVESV (3D)	ml	0
LV end-systolic volume index	LVESVi	ml/m^2	0
LV ejection fraction	LV EF	%	0
LV fractional shortening	LV FS	%	0
Left ventricular outflow tract diameter	LVOTd	cm	1
Left ventricular outflow tract velocity time integral	LVOT VTI	cm	0
LVOT peak gradient at rest	LVOT peak PG (rest)	mmHg	0
LVOT peak gradient (Valsalva)	LVOT peak PG (Valsalva)	mmHg	0
LVOT mean gradient		mmHg	0
Stroke volume	SV	cm^3	0
Stroke volume index	SVi	cm	0
Cardiac output	CO	l/min	1
Cardiac index	CI	$l/min/m^2$	1
Left ventricular global longitudinal strain	LV GLS	%	1
LV regional wall motion score	LV RWMS	NA	0
LV regional wall motion score index	LV WMSI	NA	0
LV regional thickness	NA	cm	1
LV regional thickness percent	NA	%	0
Right Ventricle (RV)			
Right ventricular systolic pressure	RVSP	mmHg	0
Pulmonary artery systolic pressure	PASP	mmHg	0
Tricuspid annular plane systolic excursion	TAPSE	cm	1
Tricuspid annular peak systolic velocity	TAPSV	cm/s	1
Right ventricular ejection fraction	RV EF	%	0

Right ventricular fractional area change	RV FAC	%	0
Right ventricular outflow tract dimension	RVOTd	cm	1
Right ventricular outflow tract velocity time integral	RVOT VTI	cm	0
Right ventricular outflow tract peak velocity	RVOT peak vel	m/s	1
Right ventricular outflow tract peak pressure gradient	RVOT peak PG	mmHg	0
Right ventricular outflow tract mean pressure gradient	RVOT mean gradient	mmHg	0
Right ventricular free wall longitudinal strain	RVFWS	%	1
Right ventricular global longitudinal strain	RVGLS	%	1
Left Atrium (LA)			
LA volume	LAV	ml	0
LA volume index	LAVi	ml/m^2	0
LA area	LA area	cm^2	1
LA anteroposterior dimension	LA AP	cm	1
LA posterior-to-annulus dimension (length)	NA	cm	0
LA pressure	LAP	mmHg	0
LA strain (LA reservoir strain, LA conduit strain, LA contractile strain)	LAS (LASr, LAScd, LASct)	%	1
LA Appendage (LAA)			
LAA orifice area	NA	cm^2	1
LAA ostium and landing zone (0, 45, 90, 135 degrees)	NA	mm	0
LAA depth (0, 45, 90, 135 degrees)	NA	mm	0
LAA filling velocity	NA	cm/s	0
LAA emptying velocity	NA	cm/s	0
Right Atrium (RA)			
Right atrial area	RA area	cm^2	1
Right atrial pressure	RAP	mmHg	0
RA posterior-to-annulus dimension (length)	NA	cm	0
RA major dimension	NA	cm	0
RA minor dimension	NA	cm	0
RA volume	RAV	ml	0
RA volume index	RAVi	ml/m^2	0
Mitral Valve (MV)			
MV peak E-wave velocity	MV E	cm/s	1
MV peak A-wave velocity	MV A	cm/s	1
MV E to A velocity ratio	E/A	NA	1

MV peak pressure gradient	MV peak PG	mmHg	0
MV mean pressure gradient	MV mean PG	mmHg	0
MV E wave deceleration pressure half-time	MV PHT	msec	0
MV E wave deceleration time	MV DT	msec	0
MV area (continuity equation)	MVA (continuity)	cm^2	1
MV area (pressure half-time)	MVA (PHT)	c cm^2	1
MV area (planimetry)	MVA (planimetry)	cm^2	1
MV velocity time integral	MV VTI	cm	0
mitral annular lateral e' velocity	lateral e'	cm/s	1
mitral annular medial e' velocity	medial e'	cm/s	1
MV E wave velocity to lateral e' velocity ratio	lateral E/e'	NA	0
MV E wave velocity to medial (septal) e' velocity ratio	medial E/e'	NA	0
Average lateral E/e' and medial E/e'	average E/e'	NA	0
Mitral regurgitation peak velocity	MR peak Vel	cm/s	0
Mitral regurgitation peak pressure gradient	MR peak PG	mmHg	0
Mitral regurgitation dp/dt	MR dp/dt	mmHg/s	0
MR vena contracta	MR VC	cm	1
Aortic Valve (AoV)			
AoV peak velocity	AoV peak vel	m/s	1
AoV peak gradient	AoV peak PG	mmHg	0
AoV mean gradient	AoV mean PG	mmHg	0
AoV area (continuity equation)	AVA (continuity)	cm^2	1
AoV velocity time integral	AoV VTI	cm	0
AoV dimensionless velocity index (also known as dimensionless index)	AoV DVI	NA	2
AoV dimensionless velocity time integral index	AoV DVTI	NA	2
Aortic regurgitation vena contracta	AR VC	mm	0
Aortic regurgitation peak velocity	AR peak vel	m/s	1
Aortic regurgitation pressure half-time	AR PHT	ms	0
AoV prothesis acceleration time	AoV AT	ms	0
Tricuspid Valve (TV)			
Tricuspid regurgitation peak velocity	TRmax Vel	m/s	1
Tricuspid regurgitation peak gradient	TRmax PG	mmHg	0
TV mean gradient	NA	mmHg	0
Pulmonic Valve (Pvalve)			
PValve acceleration time	PValve AT	msec	0
Pulmonary regurgitation pressure half-time	PR PHT	msec	0
Pulmonary valve regurgitation diastolic peak velocity	PRmax Vel diastolic	m/s	1

Pulmonary valve regurgitation end-diastolic velocity	PR Vel end-diastolic	m/s	1
Doppler			
Pressure half time	PHT	s	0
Ratio of pressure change over time	dp/dt	mmHg/s	0
Pulmonic flow: systemic flow	Qp:Qs	NA	1
Other			
Aortic valve annular dimension	AoAnn	cm	1
Aortic root	AoR	cm	1
Sinotubular junction	STJ	cm	1
Ascending aorta	AscAo	cm	1
Aortic arch	ArchAo	cm	1
Descending aorta	DescAo	cm	1
Abdominal aorta	AbdAo	cm	1
Coronary Artery			
Left main coronary artery diameter	LM diameter	mm	0
Left main coronary artery height from aortic valve insertion	LM height	mm	0
Right coronary artery diameter	RCA diameter	mm	0
Right coronary artery height from aortic valve insertion	RCA height	mm	0
Atrial sepum / fossa ovalis			
Fossa ovalis dimensions	NA	mm	0
Atrial septal rims	NA	mm	0
Pulmonary Artery			
Main pulmonary artery diameter	mPA	cm	1
Right pulmonary artery diameter	rPA	cm	1
Left pulmonary artery diameter	lPA	cm	1
Systemic Veins			
Inferior vena cava dimension	IVC	cm	1
Vital signs			
Body mass index	BMI	kg/m^2	1
Body surface area	BSA	m^2	2
Height (meters or inches)	HT	m or in(s)	2 or 0
Weight (kilograms or pounds)	WT	kg(s) or lb(s)	1 or 0
Respiratory rate*	RR	per min	0
Blood pressure	BP	mmHg	0
Heart rate (beats per minute)	HR	bpm	0
Mechanical Circulatory Support			

Ventricular septal direction	L/R/Neutral	NA	NA
AoV opening pattern	Y/N/barely/intermittent	NA	NA
AoV opening duration	AVOdur	ms	0
Inflow cannula peak velocity	NA	m/sec	1
Outflow graft peak systolic velocity	NA	m/sec	1
Outflow graft nadir diastolic velocity	NA	m/sec	1

*Optional

Table 5 Left Ventricular Segment Names and Wall Motion Score

Four Chamber View	**Segment Names**
	Basal inferoseptum
	Mid Inferoseptum
	Apical Septum
	Basal Anterolateral
	Mid anterolateral
	Apical Lateral
Two Chamber	
	Basal Inferior
	Mid Inferior
	Apical Inferior
	Basal Anterior
	Mid Anterior
	Apical Anterior
Long Axis	
	Basal Inferolateral
	Mid Inferolateral
	Apical Lateral
	Basal Anteroseptum
	Mid Anteroseptum
	Apical Septum
	(apical cap)
Segmental Analysis (inward motion / systolic thickening)	**Wall motion score**
Normal, hyperkinesis, thickening > 50%	1
Hypokinesis	2
Akinesis, severe hypokinesis, thickening < 10%	3
Dyskinesis (paradoxical systolic motion)	4
Aneurysmal (diastolic deformation)	5

Table 6. Reporting Standards Terminology and Definitions

Terminology	***Definition***
Clinical Echocardiography Laboratory	Performs and interprets clinically indicated examinations for an appropriately licensed medical facility.
Core Echocardiography Laboratory	Part of a cardiovascular research center, offering expert independent interpretation of echo exams for clinical trials, partnering as a research collaborator with trial investigators including academic and industry sponsors. Core labs may perform their own exams or interpret exams performed by clinical echo labs that have been formally trained as clinical research sites through contractual agreements.
Registry	Third-party clinical research data repository.
Consultative Echocardiography	A limited or comprehensive examination requested by a patient's primary treating clinician, typically performed and interpreted by a separate specialist team having specialized training (sonographer or physician) in an echocardiography laboratory with full-feature cardiovascular ultrasound equipment. This definition is distinctive from POCUS below.
Comprehensive echocardiography	A complete TTE evaluation as defined by Mitchell et al. or a complete TEE exam as defined by Hahn, et al. including all standard imaging views and techniques along with additional imagining methods (e.g., strain, 3D, ultrasound enhancing agents [UEA], maneuvers, IV saline contrast or specific quantitative calculations) depending upon the reason for exam and encountered findings.[14-15]
Limited (i.e., problem-focused exam) echocardiography	An exam performed using an abbreviated protocol, typically as a follow-up to a recent comprehensive exam to focus on answering specific clinical questions. The limited exam is also performed by the consultative echo lab using a full-feature machine employing basic and advanced imaging and quantitative measurement techniques as necessary for addressing the clinical indication.
POCUS[7]	"The acquisition, interpretation, and immediate clinical integration of ultrasonographic imaging performed by a treating clinician. Importantly, the general term is not defined by the location where the exam is performed, the capability of the imaging device, or the practitioner's specialty."
Draft report	Measurements, worksheets, and findings may be entered in writing or electronically generated by experienced sonographers and physicians-in-training for use internally. A draft report is one that has not been reviewed or approved by an interpreting physician. Therefore, a draft report should not be visible in the electronic record or otherwise issued to external care providers. A draft report can only be provided to the interpreting physician for subsequent editing and approval.
Preliminary report	A verbal or written report generated by an appropriately trained physician, that is approved for clinical use but has not yet been finalized by the interpreting physician. A preliminary report does not include all recommended reporting components but provides preliminary findings to the ordering provider and is sometimes visible in the electronic health record when needed for expedient clinical decision-making.
Final report	A written complete report that has been reviewed, signed, and dated manually or electronically by the interpreting physician. The final report should identify and reconcile any differences with any previously issued preliminary report(s).

Amended report	Whenever changes are made to a previously "final report," an amended report is created. The amended report will refer to the prior reference report by date and time and include clear language that highlights clinically relevant revisions from the prior report. Reporting systems should then allow reporting of only the most recently amended report by the interpreting physician.
Priority assignments	
Routine	Clinically indicated exam, stable patient, can be performed as soon as possible per lab policy.
High Priority	Stable patient but pressing need for clinical decision-making.
Urgent	Requires prompt medical attention due to impending unstable clinical state (may complete other current in-progress exam expeditiously before promptly performing the urgent exam).
Emergent (Stat)	Needed immediately, preempting other tasks, including in-progress exams if necessary.
Descriptions	
Morphology	The study of how things are put together. Bio-morphology deals with the form and structure of living things. Because echocardiography is used to study cardiovascular structure(s), the echo report includes morphological descriptions. A recommended taxonomy and morphological descriptive terms are found in Table 7.
Structure(s)	Normal, normal variant or pathologic tissues or other prosthetic or uncertain cardiac findings.
Severity	
Mild(ly), Moderate(ly), and Severe(ly)	ASE guidelines-based descriptions for abnormalities of function (regurgitation or stenosis) and size (volume or thickness) based on quantitative and semi-quantitative measures. Note: some cardiac structures with abnormal features have *not* been categorized into grades (e.g., degree of leaflet thickening) and in these cases, labs are encouraged to develop internal standards for consistency.
Mild(ly)	A clearly detected observation (or degree of other abnormality) usually of no suspected current clinical significance that may or may not be due to a structural or functional abnormality, but it is defined by reference values in ASE guidelines.
Moderate(ly)	An obvious abnormal observation of suspected current or future clinical significance and defined by reference values in ASE guidelines.
Severe(ly)	An obvious abnormal observation of suspected current or future clinical significance and defined by reference values in ASE guidelines.
Massive and Torrential	May describe subgroups of severe tricuspid regurgitation but these terms are not otherwise typically recommended.[20]
Mild-to-Moderate and Moderate-to-Severe	These descriptors do not exist in ASE guidelines tables. They should be used only sparingly when missing or discrepant data prohibits a "mild", "moderate" or "severe" designation. If used, they should have an accompanying statement regarding the reasons this mixed graded category was necessary.
Acuity of Findings	
Routine	Findings clinically warrant no special prioritization for communication.
Significant	Findings are clinically impactful and should be highlighted in the report summary. Significant findings can include important changes which can be further

	characterized as “new”, “resolved”, “worse”, or “improved”. Findings may or may not warrant an interpreting physician’s direct communication to the care team.
Urgent	Findings are significant abnormalities or changes from prior testing that require clinical action within hours. Direct personal notification to the care provider is recommended.
Critical	Findings represent a threat to life and require immediate direct verbal notification to the ordering provider (communication within minutes).

Table 7. Select Descriptors

Descriptor	Definition	Examples (phrases)	Imaging Examples in CASE or ASE Guidelines
Abutting	Mass, foreign body or lesion that touches an adjacent cardiac structure	Inflow cannula ***abutting*** LV septal endocardium	https://doi.org/10.1016/j.echo.2015.05.008 https://doi.org/10.1016/j.echo.2013.06.023
Adjacent to	next to or nearby	The pacing lead is ***adjacent*** to the fossa ovalis	
Aneurysm (aneurysmal)	An outward bulging of a structure (vessel, chamber, septum)	LV apex appears ***aneurysmal***	
Attached to	Connected with	A small mobile mass is ***attached*** to the AoV right coronary cusp	NA
Billowing	Motion of redundant leaflet or other tissue over a large area.	***Billowing*** TV anterior leaflet motion	NA
"Blueberry-on-top"	Colloquial term for the central blue surrounded by red pattern on global longitudinal strain bull's eye map. May indicate apical hypertrophic cardiomyopathy; should	***Blueberry-on-top*** GLS bull's eye map appearance of isolated apical abnormality suggests apical hypertrophic cardiomyopathy	NA

	not be used in isolation		
Calcified / calcific	Calcium deposits that are hyperechoic with acoustic shadowing	***Calcified*** appearance of posterior MV annulus	https://doi.org/10.1016/j.case.2022.02.006
"Cherry-on-top"	Colloquial term for the central red surrounded by blue pattern on global longitudinal strain bull's eye map. May indicate cardiac amyloidosis; should not be used in isolation	***Cherry-on-top*** GLS bull's eye map appearance of apical sparing suggests cardiac amyloidosis	NA
Circumscribed/ demarcated	Clear or distinguished borders	The mass appears well ***circumscribed***	NA
Collapsed / collapse	Shrinking of a cardiac chamber or vessel	There is early RV diastolic ***collapse***	https://doi.org/10.1016/j.echo.2013.06.023
Compressed / compressing	Physical deformation of / by adjacent or surrounded structure	Markedly dilated aortic root ***compresses*** the LA.	https://doi.org/10.1016/j.case.2022.01.008
Curvilinear	Bent line	A ***curvilinear*** pacing lead	NA
Cylindroid / tubular dilatation	Lengthy dilatation in	***Cylindroid / tubular*** aneurysmal dilation of the descending thoracic aorta	NA

	the form of a cylinder		
Cystic	Appearing to have a fluid-filled sac	The echo-free area is well-demarcated (***cystic* appearance**)	https://doi.org/10.1016/j.case.2020.10.002
Dehiscence	Separation along a line of weakness	***Dehiscence*** of posterior aspect of bioprosthetic MV sewing ring	NA
Diastolic doming	Often used to describe rheumatic mitral valve appearance in diastole	**MV *diastolic doming* suggests rheumatic degeneration**	NA
Dilatation	Enlargement of a vessel	Aortic ***dilatation***	https://doi.org/10.1016/j.case.2022.11.005
Dilated	Expanded, enlarged, or widened normally or abnormally in all dimensions	***Dilated*** left ventricle	https://doi.org/10.1016/j.case.2020.05.014
Doming	Leaflets adopting an architectural dome shape during forward flow	Systolic ***doming*** suggests bicuspid AoV	NA
D-shaped	Shape of RV chamber in cross-section view associated with RV pressure overload	(See septal flattening instead)	https://doi.org/10.1016/j.case.2018.07.010
"Dumbbell appearance"	Colloquial term associated with Atrial septal thickening	The atrial septum in cross section has a ***dumbbell appearance*** suggesting atrial septal hypertrophy	https://doi.org/10.1016/j.case.2017.06.005

	that spares the fossa ovalis		
Dyssynchronous	In coordinated movement	***Dyssynchronou***s septal motion	https://doi.org/10.1016/j.case.2020.09.003
Hyperechoic/echogenic/	Reflecting ultrasound waves well	***Hyperechoic*** mass	https://doi.org/10.1016/j.case.2022.02.006
Hypoechoic/echolucent	Describing structures that poorly reflects ultrasound waves. also referred to as echo-free	***Hypoechoic*** areas within the mass	https://doi.org/10.1016/j.case.2020.10.002
Ectatic / ectasia	Enlargement or distension of a tubular structure such as an artery	***Ectatic*** coronary artery	https://doi.org/10.1016/j.case.2021.07.004
Fibrinous	The appearance of containing fibrin	***Fibrinous*** pericardial effusion	NA
Fibrotic appearance	Abnormally hyperechoic areas within a structure or strands within a fluid collection.	Stranded material in the pleural space appears ***fibrotic***. The non coronary cusp appears fibrotic (hyperechoic)	https://doi.org/10.1016/j.case.2017.01.014
Filamentous / filiform	Thin in diameter resembling a thread	A highly mobile ***filamentous*** mass on the RA pacing lead	https://doi.org/10.1016/j.case.2017.01.007
"Fish mouth" appearance	Cross section view of the rheumatic mitral valve with	MV ***fish mouth appearance*** suggests rheumatic degeneration	NA

	commissural fusion		
Fixed	Immobile/stationary/non-mobile		https://doi.org/10.1016/j.case.2021.09.012
Flail	Uncontrolled movement due to injury	***Flail*** MV anterior leaflet motion	NA
Flattened	Flat	Ventricular septal systolic ***flattening*** suggests RV pressure overload (D-shaped septum)	NA
Friable	Appearing to be easily crumbled	Vegetation / myxoma appears ***friable***	https://doi.org/10.1016/j.case.2023.02.008
Frondlike	Spreading segmented leaf-like appearance (like a fern or palm plant frond)	Mobile ***frondlike*** mass attached to the . . .	https://doi.org/10.1016/j.case.2019.12.004
Fungating	Large, complex irregular, protruding mass	***Fungating*** mass surrounds the RA pacing lead	https://doi.org/10.1016/j.case.2018.09.004
Fusiform	Gradual/progressive dilatation to describe aneurysm shape; spindle-shaped	***Fusiform*** aortic aneurysm	NA
Gelatinous	Amorphous semi-solid mass, semimobile, largely hypoechoic in appearance	***Gelatinous*** appearance suggests fresh thrombus	https://doi.org/10.1016/j.case.2018.01.003

Globular	Roughly in the shape of a globe or sphere	A ***globular*** mass (8 mm) suggestive of fibroelastoma	NA
Heterogeneous	Having dissimilar elements or constituents	***Heterogeneous*** internal appearance suggests abscess formation	https://doi.org/10.1016/j.case.2018.07.011
"Hockey stick deformity"	Colloquial term used to describe MV rheumatic degeneration; should not be used in isolation.	MV anterior leaflet diastolic doming and distal leaflet thickening and restricted motion (***"hockey stick"*** deformity) suggests rheumatic degeneration	NA
Highly mobile	Unrestricted motion	A ***highly mobile*** mass	https://doi.org/10.1016/j.case.2016.11.002
Homogeneous	Uniform appearance	***Homogeneous*** appearance is unchanged	https://doi.org/10.1016/j.case.2019.10.011
Honeycombed	Multiple septated structure in a regular pattern	Cystic structure with a ***honeycombed*** appearance.	NA
Hypertrophy (hypertrophic enlargement)	Thickening of a cardiac wall	***Hypertrophy*** appears limited to the basal anterior septum.	https://doi.org/10.1016/j.case.2022.08.001
Impinging	Compressing	Suspected loculated pericardial suspected hematoma ***impinges*** upon the RV.	https://doi.org/10.1016/j.case.2022.01.008
Infiltration	Invading or penetrating tissue planes	Suspect basal lateral RV free wall ***infiltration***	https://doi.org/10.1016/j.case.2022.04.007
Intramural	Within the boundaries of a structure	Consistent with ***intramural*** hematoma (e.g., of myocardial / aortic segment)	https://doi.org/10.1016/j.case.2017.01.014
Irregularly shaped	A shape with edges or	Sessile mass with ***irregular*** surface	

	sides of varying lengths, angles or degrees.		https://doi.org/10.1016/j.case.2019.10.011
Laminar flow	Fluid flowing in parallel layers with no disruption	Color Doppler confirms ***laminar flow*** in the LVOT	https://doi.org/10.1016/j.case.2017.10.008
Layered	Arranged in layers or striations	Mural thrombus with a ***layered*** appearance	https://doi.org/10.1016/j.case.2022.12.010
Linear	Arranged in a straight line	Hyperechoic ***linear*** mobile mass on the . . .	https://doi.org/10.1016/j.case.2023.09.008
Lobe	Gross anatomical division	Left ***lobe*** of the liver is seen in the PLAX view	NA
Lobule	Smaller division of a lobe	Irregular mass with multiple internal ***lobules***	NA
Loculated	Trapped within separate compartments	***Loculated*** pericardial effusion	https://doi.org/10.1016/j.case.2023.05.006
Locule	Small chamber or cavity	Multiple internal ***locules*** suggest echinococcal cyst	NA
Membranous	Thin usually mobile tissue layer / mass	***Membranous*** dissection flap	https://doi.org/10.1016/j.case.2023.09.008
Multilobar / multilobular	Consisting of multiple lobes or lobules	***Multilobular*** mass	https://doi.org/10.1016/j.case.2021.09.012
Myxomatous degeneration	Characteristic thickening and redundancy affecting various valve components	Leaflet thickening, redundancy and mobility suggests ***myxomatous*** degeneration	NA

Necrotic	Disorganized, amorphous, irregular, heterogenous echoic material within a tissue structure	***Necrotic*** appearance due to central heterogeneous echo lucency	https://doi.org/10.1016/j.case.2022.04.004
Nodular	Protuberances shaped like small rounded lumps	***Nodular*** aortic plaque	NA
Organized	Well circumscribed, hyperechoic mass with different texture from the surrounding tissues	An ***organized*** apical thrombus	https://doi.org/10.1016/j.echo.2013.07.009
Oval shaped / ovoid	Rounded but elongated in one direction (egg-like)	***Ovoid*** mass	NA
Paradoxical	Having seemingly contradictory phases or process	***Paradoxical*** interventricular septal motion suggests RV volume overload.	https://doi.org/10.1016/j.case.2017.01.004
Pedunculated	Attached by a thin stalk enabling movement	***Pedunculated*** mass	https://doi.org/10.1016/j.case.2019.10.011
Polypoid	Looks like a polyp –a growth projecting from a mucous membrane	Sessile ***polypoid*** mass; ***polypoid*** vegetation	https://doi.org/10.1016/j.case.2020.06.005

	(can be sessile or pedunculated)		
Prolapse	Slipping or bulging backwards past normal location	MV posterior leaflet ***prolapse***	NA
Protruding	Appearing to stick out from a reference structure	***Protruding*** mass	https://doi.org/10.1016/j.case.2023.01.008
Redundant	Excessive, usually applied to tissue	***Redundant*** chordae tendineae; ***redundant*** mitral valve leaflet	https://doi.org/10.1016/j.echo.2021.07.006
Respirophasic	Motion or signal that is related to respiratory effort	***Respirophasic*** change in ventricular septal position suggests constrictive physiology	https://doi.org/10.1016/j.echo.2013.06.023
Restricted	Limited movement	***Restricted*** leaflet motion	https://doi.org/10.1016/j.case.2023.11.005
Reverse doming	Leaflets adopting an architectural dome shape during regurgitant flow	***Reverse doming***(prolapse) suggests bicuspid aortic valve	NA
Spherical	Shaped like a ball	***Spherical*** mass	https://doi.org/10.1016/j.case.2017.08.002
Saccular	Shaped like a sack - to describe aneurysm shape	***Saccular*** aneurysm of the ascending aorta	https://doi.org/10.1016/j.case.2019.07.004
Sail-like	Often used to describe elongated	***Sail-like*** appearance of TV anterior leaflet	NA

	anterior tricuspid leaflet in Ebstein's anomaly		
Sclerotic	Tissue stiffening from hyperechoic suspected connective tissue infiltration	Aortic valve cusps appear ***sclerotic***	NA
Septated (septate)	Divided into parts by a septum (or septae)	Multiple ***septations*** suggest hydatid (echinococcal) cyst	NA
Septum (pl. septae)	A partition that divides two cavities	Akinetic LV ***septum***	NA
Sessile	Attached by a broad base that prohibits significant movement	Protruding immobile ***sessile*** mass	https://doi.org/10.1016/j.case.2022.12.011
Tethered	Confined or with restricted range of motion	The leaflets are apically displaced and ***tethered***	https://doi.org/10.1016/j.echo.2017.01.007
Thickened	Abnormally larger in width or thickness	***Thickened*** leaflet base	https://doi.org/10.1016/j.case.2019.09.007
Thinned	Smaller in width or thickness	Basal inferior myocardial ***thinning***	https://doi.org/10.1016/j.case.2020.05.014
Ulcer / ulcerated	Disrupted lining of a tissue or organ with smooth or usually irregular	An ***ulcerated*** plaque in the superior aortic arch	NA

	surface; ulcer crater		
Verrucous	Raised growths with a wart-like appearance on a leaflet or other endocardial surface	Location of multiple small leaflet masses suggest ***verrucous*** endocarditis	https://doi.org/10.1016/j.case.2023.02.004
Well circumscribed/ well demarcated	With clear or distinguished borders	***Well circumscribed / well –demarcated*** appearance suggestive of a myocardial fibroma	https://doi.org/10.1016/j.case.2023.02.007
Examples of commonly described Imaging Artifacts			
Acoustic shadowing	Strongly reflecting structures greatly diminish echos from deeper structures	The LA is not well visualized due to strong aortic valve prosthesis ***acoustic shadowing***	NA
Acoustic Speckle	Near field artifact	Prominent LV apical near-field ***acoustic speckle*** artifact. Recommend UEA to better exclude LV apical thrombus	NA
Comet tail	Merged close reverberations extending deeper than reflector	The unusual hyperechoic signal in the LV likely represents ***comet tail*** artifact from a proximal extra cardiac foreign body and not a thrombus	NA
Mirror image	Deeper duplicate image of real anatomy	Cardiac ***mirror image artifact*** is noted within the left pleural effusion (PSLAX view)	NA

Refraction	Side-by-side duplicate image	Unusual appearance of the aortic valve in short axis is likely ***refraction artifact*** and not aortic root dissection	NA
Reverberation	Multiple equally spaced reflections	Prominent RV lead ***reverberation*** in the subcostal 4 chamber impairs ability to exclude RV thrombus	NA
Side lobes	A strong reflector outside the central beam	Suspect aortic root sinotublar junction calcium -related ***side lobe artifacts*** and less likely, aortic root dissection	NA

Table 8. Recommendations for Comprehensive Transthoracic and Transesophageal Echocardiography Structured Reporting

Cardiac Structure	Categories	Parameters	TTE	TEE	Recommended Reported Findings
Left Ventricle*	Morphology / Structure	Size	Yes	Yes†	Normal or abnormal (small or dilated), grading (e.g., mild, moderate, severely dilated).
		Wall thickness	Yes	Optional†	Normal or abnormal, increased or decreased (thinned), grading (e.g., mild, moderate, severely increased).
		Left ventricular mass	Yes	No	Normal or abnormal, LV hypertrophy, concentric or eccentric, grading (e.g. mild, moderate, severe).
		Intracavitary or myocardial masses	Yes, if present	Yes, if present	Normal variant or, if abnormal, report suspected etiology (consistent with), and description. (see Table 7)
		Aneurysm, pseudoaneurysm or diverticulum	Yes, if present	Yes, if present	Describe location, size, associated thrombus or masses.

	Function: Systolic	Global systolic function	Yes	Yes	Normal, hyperdynamic or reduced, grading (e.g., mild, moderate, severely reduced).
		Ejection fraction	Yes	Optional	Normal or abnormal, percentage or range, and method utilized for evaluation (e.g., two dimensional [2D] linear, 2D/3D volumetric, or visual, or a combination).
		Regional/segmental wall motion abnormalities	Yes	Yes	Absent or present, region and/or segmental location, grading (e.g. normal or hyperkinetic, hypokinetic, akinetic, dyskinetic).
		Obstructive lesions (dynamic or structural)	Yes, if present	Optional	Presence or absence. Report peak gradient at rest, and with physiologic maneuvers if dynamic. (see Table 9)
		Myocardial strain	When indicated	Optional	Percent global longitudinal strain (GLS), normal or abnormal, comparison with previous findings.
	Function: Diastolic	Diastolic function or LV relaxation	Yes	Optional	Normal, abnormal (impaired), or indeterminate.
		Filling pressures	Yes	Optional	Normal, elevated or indeterminate (optional referring to left atrial pressure or LV end-diastolic pressure).
		Grade of LV diastolic dysfunction (if abnormal)	Yes, if present	Optional	Grade 1 (I), 2 (II), or 3 (III).
Interventricular Septum*	Morphology / Structure	Defect: Presence or absence, location and description	Yes, if present	Yes, if present	e.g., perimembranous, inlet, muscular, outlet, size, number.
	Physiology	Abnormal motion	Yes, if present	Yes, if present	e.g., flattening in systole and/or diastole, dyssynchronous, paradoxical motion (and reason or explanation).
	Shunt	Size / location / detection technique	Yes, if present	Yes, if present	Presence or absence, detection technique (e.g. color flow Doppler, continuous wave Doppler [CWD], pulsed wave Doppler [PWD]), direction, and quantification if feasible (including Qp:Qs).

Right Ventricle*	Morphology / Structure	Size	Yes	Yes†	Normal or abnormal (small or dilated). Grading when reliably measurable (e.g., mild, moderate, severely dilated).[17]
		Wall thickness (if increased)	Yes	Yes	Normal or increased.
		Intracavitary or myocardial masses	Yes, if present‡	Yes, if present	Normal variant or, if abnormal, report suspected etiology (consistent with), and description. (see Table 7)
		Catheters or device leads	Yes, if present‡	Yes, if present	Describe location, associated masses.
	Function: Systolic	Global systolic function	Yes	Yes†	Normal, or reduced. Grading when reliably measurable (e.g., mild, moderate, severely reduced).
		Additional RV function parameters (minimum of one parameter measured)	Yes	Optional†	Normal or abnormal: tricuspid annular plane systolic excursion (TAPSE), RV fractional area change (RV FAC), Doppler tissue imaging-derived tricuspid lateral annular systolic velocity wave (S'), right ventricular index of myocardial performance (RIMP), myocardial strain (free wall and/or global), 3D-ejection fraction.
		Regional wall motion abnormalities	Yes, if present	Yes, if present	Absent or present, location, grading (normal or hyperkinetic, hypokinetic, akinetic, dyskinetic).
Left Atrium*	Morphology / Structure	Size	Yes	Optional†	Normal or dilated, grading in TTE (mild, moderate, severely dilated).
		Intracavitary masses	Yes, if present‡	Yes, if present	Presence or absence, suspected etiology (consistent with), and description per Table 7.
	Left Atrial Appendage	Morphology	No	Optional	Simple or complex, shape (windsock, cauliflower, broccoli, cactus, other), describe number and location of accessory lobes.
		Size (if screening for structural heart interventions)	No	Optional	2D and/or 3D measurements of ostium, depth and device-specific landing zone measurements (as per sizing recommendations).
		Intracavitary masses	Yes, if present‡	Yes, if present	Presence or absence, suspected etiology (consistent with), and description per Table 6.
		Spontaneous echo contrast	Yes, if present‡	Yes	Presence or absence, grading (mild, moderate, severe, or 0-4+).

		Emptying velocity	No	When indicated	Normal or reduced, optionally provide qualitative assessment or velocity in cm/s.
		Devices	Yes, if present‡	Yes, if present	Describe left atrial appendage (LAA) device type and size (if known), any pathologic findings including device malposition, peri-device leak, or thrombus, if adequately visualized to make this assessment.
	Pulmonary Veins	Number and location	No	Optional	Normal or abnormal
		Flow pattern	When indicated	When indicated	Normal, systolic blunting, systolic reversal.
	Function	Left atrial strain	When indicated	No	Normal or abnormal.
Right Atrium*	Morphology / Structure	Size	Yes	Yes†	Normal, or dilated (optional qualitative assessment although reference ranges are currently unavailable).
		Intracavitary masses	Yes, if present‡	Yes, if present	Presence or absence, suspected etiology (including prominent normal structures such as Eustachian valve, Crista terminalis), and description per Table 7.
		Spontaneous echo contrast	Yes, if present‡	Yes, if present	Presence or absence
		Catheters or device leads	Yes, if present‡	Yes, if present	Describe location, associated masses.
Interatrial Septum*	Morphology / Structure	Structural abnormalities	Yes	Yes	Including lipomatous hypertrophy, aneurysmal septum, bowing, patent foramen ovale or atrial septal defect.
		Interatrial septal communications	When indicated‡	When indicated	Presence or absence, description.
		Devices	Yes, if present‡	Yes, if present	Describe atrial septal device type and size (if known), any pathologic findings including device malposition, peri-device leak, or thrombus, if adequately visualized to make this assessment.
	Shunt	Shunt description	Yes, if present	Yes, if present	Presence or absence, direction, location (intracardiac vs intrapulmonary), and quantification if feasible (including Qp:Qs).

		Detection technique	Yes, if present	Yes, if present	Color flow Doppler and or agitated saline.
Aortic Valve*	Morphology / Structure	Structurally normal	Yes	Yes	Report whether the aortic valve is structurally normal (assumes no structural abnormalities). Additionally reporting a trileaflet valve is recommended.
		Structural abnormalities	Yes, if present‡	Yes, if present	Bicuspid (describe type), unicuspid, quadricuspid. Thickening, annular or valvular calcification, perforation, masses and suspected etiology, other valvular abnormalities.
		Abnormal motion	Yes, if present‡	Yes, if present	Restricted leaflet motion, doming, flail.
	Function: Stenosis	Presence and severity	Yes, if present	Yes, if present	Presence or absence. Grading (mild, moderate, severe). Report mechanism, if possible.
		Quantitative measurements	Yes	Yes	Peak velocity and gradient, mean gradient, aortic valve area and method (continuity equation, 2D or 3D planimetry), dimensionless index.
	Function: Regurgitation	Presence and severity	Yes	Yes	Presence or absence. Grading (mild, moderate, severe). Report mechanism (primary, secondary, or mixed), if possible.
		Quantitative and semi-quantitative mesurément	Yes	Yes	Vena contracta width or area, jet percentage of LVOT diameter, pressure-half time, diastolic flow reversal in the descending aorta, effective regurgitant orifice, regurgitant volume, regurgitant fraction.
Mitral Valve*	Morphology / Structure	Structurally normal	Yes	Yes	Report whether the mitral valve is structurally normal (assumes no structural abnormalities).
		Structural abnormalities (if present)	Yes, if present‡	Yes, if present	Thickening, annular or valvular calcification, clefts or perforations, masses and suspected etiology, abnormalities of the subvalvular apparatus or chordae tendineae.
		Abnormal motion (if present)	Yes, if present‡	Yes, if present	Restricted leaflet motion, prolapse, flail. Identify affected scallops if possible.
	Function: Stenosis	Presence and severity	Yes, if present	Yes, if present	Presence or absence. Progressive (mild, moderate), or

					severe. Report mechanism (rheumatic, calcific, other) if possible.
		Quantitative measurements	Yes	Yes	Mean gradient (provide rhythm and heart rate), mitral valve area and method (continuity equation, 2D or 3D planimetry), pressure half time.
	Function: Regurgitation	Presence and severity	Yes	Yes	Presence or absence. Grading (mild, moderate, severe). Report mechanism (primary, secondary, or mixed), if possible.
		Quantitative and semi-quantitative measurements	Yes	Yes	Vena contracta width or area, systolic flow reversal in pulmonary veins, effective regurgitant orifice, regurgitant volume, regurgitant fraction.
Pulmonic Valve*	Morphology / Structure	Structurally normal	Yes‡	Yes	Report whether the pulmonic valve is structurally normal (assumes no structural abnormalities), if adequately visualized to make this assessment.
		Number of leaflets	No	Optional	Trileaflet, bicuspid, quadricuspid, if adequately visualized to make this assessment.
		Structural abnormalities (if present)	Yes, if present‡	Yes, if present	Thickening, annular or valvular calcification, perforation, masses and suspected etiology, other valvular abnormalities.
		Abnormal motion (if present)	Yes, if present‡	Yes, if present	Restricted leaflet motion, doming, flail.
	Function: Stenosis	Presence and severity	Yes	Yes	Presence or absence. Grading (mild, moderate, severe). Report mechanism, if possible.
		Quantitative measurements	Yes	Optional	Peak velocity, peak gradient.
	Function: Regurgitation	Presence and severity	Yes	Yes	Presence or absence. Grading (mild, moderate, severe). Report mechanism (primary, secondary, or mixed, if possible.
		Quantitative and semi-quantitative measurements (if feasible)	Yes	Yes	Vena contracta width, jet percentage of pulmonary annulus diameter, pressure-half time, diastolic flow reversal in pulmonary artery branches.

Tricuspid Valve*	Morphology / Structure	Structurally normal	Yes	Yes	Report whether the tricuspid valve is structurally normal (assumes no structural abnormalities). Reporting number of leaflets is recommended when sufficiently well visualized to make this assessment (especially if not trileaflet).
		Structural abnormalities	Yes, if present‡	Yes, if present	Thickening, annular or valvular calcification, abnormal leaflet insertion, perforation, masses and suspected etiology, presence and effect of any device leads.
		Abnormal motion	Yes, if present‡	Yes, if present	Restricted leaflet motion, prolapse, flail. Identify affected leaflet, if possible.
	Function: Stenosis	Presence or absence	Yes	Yes	Present or absent. Report mechanism, if possible.
		Quantitative measurements	Yes	Yes	Mean gradient (provide rhythm and heart rate), and if feasible tricuspid valve area and method (continuity equation, PHT, 2D or 3D planimetry).
	Function: Regurgitation	Presence and severity (qualitative)	Yes	Yes	Presence or absence. Mild, moderate, severe. Report mechanism (primary, secondary, or mixed), if possible.
		Quantitative and semi-quantitative measurements	Yes	Yes	Vena contracta width or area, effective regurgitant orifice, regurgitant volume, regurgitant fraction, systolic flow reversal in hepatic veins.
		Right ventricular systolic pressure	Yes	Yes	Estimated right ventricular systolic pressure (or pulmonary artery systolic pressure) derived from peak TR gradient and estimated RAP, when available. If unable to calculate it, explain the reason (e.g. TR jet insufficient for estimation of RVSP)
Prosthetic Valves or Repaired Valves	Morphology / Structure	Prosthetic valve or repair	Yes	Yes	Mechanical (describe type), bioprosthetic (describe material, stented or stentless), or repair (describe type and device as appropriate).
		Valve motion	Yes	Yes	Normal or abnormal, including rocking motion, dehiscence, leaflet restriction.

		Pathologic findings	Yes‡	Yes	Leaflet thickening or perforation, abscess, fistula, fracture, other prosthetic valve abnormalities. Describe location and leaflet affected, if possible.
		Masses	Yes‡	Yes	Presence or absence, suspected etiology (thrombus, or vegetation). Report size, location, leaflet affected, and description per Table 6.
	Function: Stenosis	Presence	Yes	Yes	Present, absent, or possible. Describe other abnormalities that may affect valve velocity and gradients (e.g., patient-prosthesis mismatch, high flow).
		Quantitative measurements as applicable	Yes	Yes	Peak velocity and gradient, mean gradient, effective orifice area (+/- index), dimensionless index (aortic valve), acceleration time (aortic valve), Velocity time integral (VTI) MV (mitral valve)/VTI LVOT, planimetered valve area by 2D or 3D if performed (bioprosthetic valves).
	Function: Regurgitation	Presence and severity (qualitative)	Yes	Yes	Presence or absence. Mild, moderate, severe. Describe if valvular or paravalvular.
		Quantitative and semi-quantitative measurements as applicable	Yes‡	Yes	Vena contracta width or area, effective regurgitant orifice, regurgitant volume, regurgitant fraction as appropriate, jet percentage of LVOT width or circumference (aortic valve), left atrium (mitral valve) or pulmonary annulus (pulmonic valve), pressure-half time, diastolic flow reversal in the descending aorta (aortic valve) or pulmonary artery (pulmonic valve), systolic flow reversal in the pulmonary veins (mitral valve) or hepatic veins (tricuspid valve).
Pericardium*	Morphology / Structure	Describe pericardial abnormalities	Yes	Yes	Thickening, calcification, cysts, masses or other abnormalities.
	Effusion	Presence and size (semi-quantitative)	Yes	Yes	Presence or absence of effusion, and size (small, medium, large),

					consider providing measurements for serial follow-up.
		Location	Yes	Yes	Circumferential or localized (near LV, RV, LA, RA, transverse sinus).
		Content / appearance	Yes	Yes	Hypoechoic, fibrinous, stranding, adhesions, clots.
	Physiology	Tamponade physiology or constriction	Yes	Yes	Presence or absence of tamponade physiology or constriction, chamber collapse, respiratory variation of valvular flow.
Aorta*	Morphology / Structure	Size (minimum of two locations measured)	Yes	Yes	Describe dilatation if present, providing measurements at multiple levels (annulus, sinuses of Valsalva, sino-tubular junction and ascending aorta).
		Describe abnormalities at any level of the examined portions of the thoracic aorta	Yes‡	Yes	Atheroma or plaque, aneurysms, grafts, dissection, coarctation.
Pulmonary Artery	Morphology / Structure	Size	Optional	Optional	Normal, small or dilated, if adequately visualized to make this assessment or if associated with other pathology.
		Describe other abnormalities visualized	Yes, if present	Yes, if present	Including patent ductus arteriosus, thrombus, mass, compression, hypoplasia.
Inferior Vena Cava	Morphology / Structure	Size	Yes	Optional	Normal or dilated, and respiratory change in dimension, estimated right atrial pressure. (see Table 9)
		Intracavitary masses or devices	Yes, if present	Yes, if present†	Presence of catheters, lines, or other masses if present.
	Physiology	Hepatic vein flow pattern	Optional	Optional	Normal, systolic blunting, systolic reversal, constriction- related diastolic flow reversal.
Extracardiac **	Morphology / Structure	Describe extracardiac abnormalities	Yes, if present	Yes, if present	Describe extracardiac abnormalities visualized in echocardiographic windows, and differential diagnosis when possible. Examples may include pleural effusion, ascites, abnormalities in the lung, abdomen or neck within the field of viewP.

Mechanical Circulatory Devices (if present) **	Morphology / Structure	Describe the type of mechanical circulatory device	Yes, if present	Yes, if present	Intra-aortic balloon pump (IABP), Impella, TandemHeart, Veno-arterial extracorporeal membrane oxygenation (VA-ECMO), left ventricular assist device (LVAD) (type and model, if available). Annotate device settings and/or speed.
		Describe the location and position of the device components	Yes	Yes	As applicable depending on device type: inflow cannula or conduit, outflow graft, distance of Impella inlet position in the LV from the aortic annulus.
		Pathologic findings	Yes	Yes	Masses or thrombi associated with any of the device components, malposition, kinking, abnormal interaction with valvular structures or chamber walls.
	Function	Device flow	Yes	Yes	Inflow cannula and/or outflow graft velocity (normal, increased or decreased) or regurgitation, LVAD output, assessed by a combination of CWD, PWD and color-flow Doppler.
		Hemodynamic impact	Yes	Yes	LV and RV size, interventricular septum (IVS) position, LV and RV function, aortic valve opening, valvular regurgitation, total cardiac output, right atrial pressure (RAP) estimate. These parameters can be described in the sections corresponding to each cardiac structure, but integration of these findings is recommended in the presence of a mechanical circulatory support (MCS) device.

* Elements that are standard requirements by IAC
† No normative data or reference range for TEE is currently available in ASE guidelines, and/or grading or additional descriptive elements may not be possible
‡ The sensitivity of TTE to assess these structures is lower than TEE and therefore all descriptive elements may not be possible
** Though it may be desirable to include separate sections for these structures, laboratories whose structured reports do not allow for this can consider incorporating them into other sections, as long as it is done consistently for all readers.

Table 9. Physiological Maneuvers at the Time of Study when Indicated

Report Section	Maneuver	Report Description
Atrial Septum (interatrial septal communication / shunt)	Normal respiration + IV saline	Describe presence or absence of shunt before maneuver and during maneuver
	Valsalva (release) + IV saline	
	Cough + IV saline	
	Abdominal (IVC) compression + IV saline	
	Forced expiration + IV saline	
	Bed tilt + IV saline	
Mitral Valve (mitral regurgitation [MR] severity)	Valsalva	Describe change in severity of MR with maneuver
LV (dynamic LV/LVOT obstruction)	Valsalva	Describe peak velocity of dynamic LVOT gradient before maneuver and during maneuver
	Standing	
	Squatting	
	Exercise (supine bicycle ergometry)	
	Exercise (post exertion [treadmill test], supine bicycle ergometry)	
	Amyl nitrite inhalation	
LV (diastolic function)	Valsalva	Describe mitral inflow before maneuver and during maneuver to distinguish normal LV filling from pseudonormal or to determine whether restrictive LV filling is reversible
IVC (RA pressure)	Inspiration / sniff	Describe change in IVC diameter with maneuver and whether IVC collapses >50%, examples: IVC diameter >2.1 cm that collapses <50% with a sniff suggests high RA pressure of 15 mmHg (range, 10–20 mmHg). This type of description is

		optional. Reporting RA pressure is sufficient.
Venous anomaly (congenital persistence of left superior vena cava)	IV saline (left arm)	Describe left arm agitated saline contrast injection and evidence of contrast in coronary sinus prior to right heart

References[14,16,18,23,27,29]

Table 10. Stress Echocardiographic Descriptors

Cardiac Structure	Parameter	Findings and Essential Measurements	Additional Detailed Information
Left Ventricle*	Structure	Chamber size (indexed LVIDd/LVIDs). LV volume measurements are optional.	Normal, small, or dilated
Left Ventricle*	Structure	Morphology	Normal, concentric or eccentric hypertrophy, spherical, regional hypertrophy
Myocardium*	Structure	Morphology	Normal, thin, thick, echo-bright
Left Ventricle*	Systolic function	Global	LVEF: normal, reduced, increased
Left Ventricle*	Systolic function	Regional wall motion score	Wall motion score (WMS) (16-64); WMS index (1.0-4.0)
Left Ventricle*	Systolic function	Regional motion	Normokinesis (NK), hypokinesis (HK), akinesis (AK) or dyskinesis (DK) per 16, 17-segment model
Left Ventricle*	Systolic function	Regional thickening	Normal (40%), HK (11-39%), AK (0-10%), DK (0%)
Left Ventricle*	Systolic function	Regional display	Bull's eye display
Right ventricle	Structure	Chamber Size	Normal, small, or dilated
Right ventricle	Structure	Morphology	Normal, hypertrophy
Right ventricle	Systolic function	Global	Normal, reduced; TAPSE
IV septum	Structure	Morphology	Normal, rightward or leftward; systolic or diastolic flattening
Mitral valve	Structure	Morphology	Normal; mitral valve prolapse; mitral stenosis
Mitral valve	Physiology	Regurgitation	Absent; mild; moderate; severe
Mitral inflow	Physiology	PWD	E wave (avg)
Mitral annulus	Physiology	Tissue Doppler Imaging (TDI)	E/e' ratio (avg)
Tricuspid valve	Physiology	Regurgitation	Absent; mild; moderate; severe; massive; torrential
Tricuspid valve	Physiology	Color flow Doppler (CFD)-guided CWD	TRmaxV
Aortic valve	Physiology	Regurgitation	Pres Absent; mild; moderate; severe

*Needed for ischemic indications. Other variables may be needed based on unexpected baseline findings or indications.

Table 11. Baseline and Stress Comparisons for Stress Echocardiography

Stage Comparisons			
Left Ventricle	Structure	Chamber size (indexed LVIDd/LVIDs; optional indexed LV volumes)	Unchanged; increased; reduced
Left Ventricle	Systolic function	Global	LVEF: normal, reduced, increased
Left Ventricle	Systolic function	Regional wall motion score	Unchanged; increased; reduced
Right ventricle	Structure	Chamber Size	Unchanged; increased; reduced
IV septum	Structure	Morphology	Normal, rightward or leftward; systolic or diastolic flattening
Mitral valve	Physiology	Regurgitation	Unchanged; increased; reduced MR
Mitral annulus	Physiology	Tissue Doppler Imaging	Unchanged; increased E/e' ratio (average)
Tricuspid valve	Physiology	Color-flow-Doppler-guided continuous wave Doppler	Unchanged; increased TRmaxV

NOTE: for other protocols, variation in reporting elements should match specific indications[33,34]

Table 12. Examples of Critical or Urgent Consultation Findings in Echocardiography Reports*

Acuity of Echocardiography Findings and Communication	Examples of Pathology
Critical findings: Findings that represent a threat to life and require immediate clinical action. Direct verbal notification to the ordering provider or clinician immediately after the finding is identified is recommended (communication in minutes).	• Suspected cardiac tamponade • Suspected aortic dissection or acute aortic syndrome • Complications of myocardial infarction, including ventricular septal rupture, ventricular or papillary muscle rupture • Thrombus in transit
Urgent findings: Findings that represent a significant abnormality or change from prior testing and may require clinical action in the short term. Direct personal notification to the ordering provider or clinician is recommended, either verbally or utilizing other means of communication at the discretion of the interpreting physician (communication in hours).	• Acute RV dysfunction and suspected acute pulmonary embolism • New large pericardial effusion without tamponade • New severe left or right ventricular dysfunction • New suspected vegetation, intracardiac mass or thrombus • Left ventricular assist device or VA ECMO complications • Orthotopic heart transplant with signs of acute rejection, including newly depressed LVEF • Severe valve obstruction/stenosis in prosthetic or native valves, especially if acute or new • Severe valvular regurgitation in prosthetic or native valves, especially if acute or new • Suspected cardiogenic shock, low cardiac output in hypotensive patients • New LV outflow tract obstruction (pre-Valsalva resting gradient >30 mmHg) • High-risk findings on a stress echocardiogram

Significant findings: Significant findings in the echocardiogram that may warrant consultation and additional or follow-up testing (in addition to critical and urgent findings detailed above).	• Significant reduction in the LV systolic or diastolic function • Significant change in RV systolic function • Significant aortic dilatation • Findings suggesting specific cardiomyopathies (e.g., hypertrophic cardiomyopathy, infiltrative cardiomyopathy, cardiac amyloidosis) • Change in the size of a pericardial effusion • Known valve stenosis or regurgitation in prosthetic or native valves that is progressing to severe

* The reporting physician should consider the indication, patient history, acuity of a finding, and exert clinical judgment when determining the urgency and method for communication of these findings.

Table 13. Examples of echocardiography findings that are new or significant and may warrant consultation and/or follow-up testing

Cardiovascular Structure	Examples of Significant Changes	Examples of Comparison Statements
Left Ventricle	Significant reduction in the LVEF (more than 10-point reduction for any reason **and** <53%) Significant change in LV diastolic function, leading to increased filling pressures Worsening in LV global longitudinal strain below lower limits of normal for equipment and software utilized in the echocardiography lab or a relative change in GLS >15% from baseline)[51]	"LVEF is now mildly/moderately/severely reduced." "The reported change in LV systolic function might be due to:" (consider selecting from the following: an actual worsening in the LV systolic function; or may not be an actual worsening in the LV systolic function but is likely due to a difference in imaging or measurement technique; change in imaging quality; LV foreshortening; change in rhythm or heart rate; change in BP; change in therapy such as inotropes or IABP; interval surgery) "Significant diastolic dysfunction" or "Increased LV filling pressures are evident" "LV global longitudinal strain (GLS) is abnormal" or "There is a significant / non-significant change in global left ventricular strain." Depending on the clinical context, this can be reported as subclinical LV dysfunction (e.g., a relative change in GLS >15% from baseline)[51]
Right Ventricle	Change from normal to abnormal RV systolic function as assessed by a combination of qualitative and quantitative parameters[16] Qualitative (subjective) change in RV systolic function, which requires visual comparison with images from the prior study	"RV systolic function is reduced" "RV systolic function has worsened / improved" "The reported change in RV systolic function might be due to:" (consider selecting from the following: an actual worsening in the RV systolic function; or may not be an actual worsening in the RV systolic function but might be due to a difference in imaging, measurement technique, or parameter utilized to

		determine RV systolic function; change in rhythm or heart rate; interval surgery)
Atria	Change in LA or RA size from normal to abnormal (knowing technical caveats) Any new masses or other abnormal structures	"Left atrium is now mild/moderately/severely enlarged" "Right atrium is now mild/moderately/severely enlarged"" "There is a thrombus in the left atrial appendage" "There is a mobile mass attached to the device lead in the right atrium"
Valves	Changes in the severity of native or prosthetic valvular stenosis or regurgitation, especially if progression to severe Changes in valve morphology and structure, including flail or flail leaflet, perforation, dehiscence, papillary muscle rupture Any masses or other abnormal structures affecting the cardiac valves	"Aortic/mitral/tricuspid/pulmonic stenosis/regurgitation is now severe" "There is new (+/-mild)/moderate/severe aortic/mitral/tricuspid/pulmonic stenosis/regurgitation" "The reported change in AS gradient severity might be due to:" (consider selecting from the following: - an actual worsening in the severity of the AS - an actual worsening in the AS severity - might be due to a difference in imaging or measurement technique; change in imaging quality - change in LV stroke volume - change in BP)
Aorta	Severe aortic dilation (aneurysm ≥5.5 cm and >5.0 cm in patients with a bicuspid aortic valve)	"There is new aortic root / ascending aorta dilatation" "The aortic root / ascending aorta diameter has increased from [] to [] cm"

Pericardium	Change in the size of a pericardial effusion, especially if changes are rapid Change in the hemodynamic significance of a pericardial effusion, development of cardiac tamponade physiology	"There is a new small/medium/large pericardial effusion when compared with the pre-procedure images one hour prior" "Pericardial effusion size has increased from small/medium to medium/large" "There is echocardiographic evidence of tamponade / constrictive physiology"

Table 14. Recommended Report Elements for ACHD Echocardiography

ACHD Type	Report should Include:
Atrial septal defect (ASD)	• ASD number and location (secundum, primum, sinus venosus, coronary sinus) • Defect size (2 axes) • Direction of shunting and mean gradient • Right heart chamber sizes • Qp:Qs calculation when possible • Evidence of pulmonary hypertension • For device intervention: rim diameters and total septal length • Residual shunt, device position if post-repair or device intervention
Ventricular septal defect (VSD)	• VSD number and location • Defect size (2 axes) • Direction of shunting and peak gradient • Left heart chamber sizes • Qp:Qs calculation when possible • Evidence of pulmonary hypertension • For device intervention: adequacy of rims, adjacent structures, +/-aortic valve prolapse/insufficiency • Residual shunt, device position if post-repair or device intervention
Sub-aortic stenosis	• Type (membrane, ridge, LVOT hypoplasia, mixed) • Size and shape of ridge or membrane • Relationship with aortic valve and aortic valve function • Peak and mean LVOT gradient • LV size and thickness • Residual stenosis if post-repair or intervention
Bicuspid aortic valve – updated nomenclature[41]	• Number of aortic sinuses and commissures • Location and degree of commissural fusion • Aortic valve function • Aortic root and ascending aortic diameters (+/- asymmetric dilation) • LV size and thickness • Rule out coarctation of the aorta • Residual valve function if post-repair or intervention
Coarctation of the aorta	• Narrowest diameter and length of narrowing at coarctation • Degree of obstruction (peak and mean gradient) • Diastolic flow continuation at coarctation • Location in relationship to the origin of subclavian artery • Transverse arch and post-coarctation diameters • Aortic arch branching and sidedness • Presence of patent ductus arteriosus or collateralization • Blunted/abnormal Doppler pattern in the abdominal aorta • Residual gradient and presence of aortic dilation, aneurysm, or dissection if post-repair or intervention

Patent ductus arteriosus (PDA)	• PDA diameter and location • Direction of shunt with peak gradient • Left heart chamber sizes and function • For device intervention: PDA length and shape • Residual shunt, device position if post-repair or device intervention
Congenital persistence of left superior vena cava	• Drainage (coronary sinus, unroofed coronary sinus, left atrium) • Presence of a bridging vein

Table 15. Recommended Levels of Segmental Anatomy for ACHD Reporting

Segmental Anatomy
Visceral/atrial situs
Systemic veins
Pulmonary veins
Atria
Atrial septum
Atrio-ventricular valves
Ventricles
Ventricular septum
Outflow tracts/arterial valves
Great arteries
Coronary arteries
Branch pulmonary arteries
Aortic arch

Table 16. Recommended Echo Exam Quality Review Statements When Appropriate

Overall Echo Image Quality: excellent/good/fair/poor/non-diagnostic	**Further Explanations if Known**
The echo study quality was suboptimal (fair, poor or non-diagnostic).	Large body habitus, pulmonary disease, small rib spaces, breast implants, difficulty in positioning, etc.
All acoustic windows were present and interpretable	
The following windows were not present and/or not interpretable:	Parasternal, apical, subcostal, suprasternal notch
Diagnostic Adequacy (excellent/good/inadequate, in respective of overall image quality)	Inadequate diagnostic value should be addressed in the conclusion