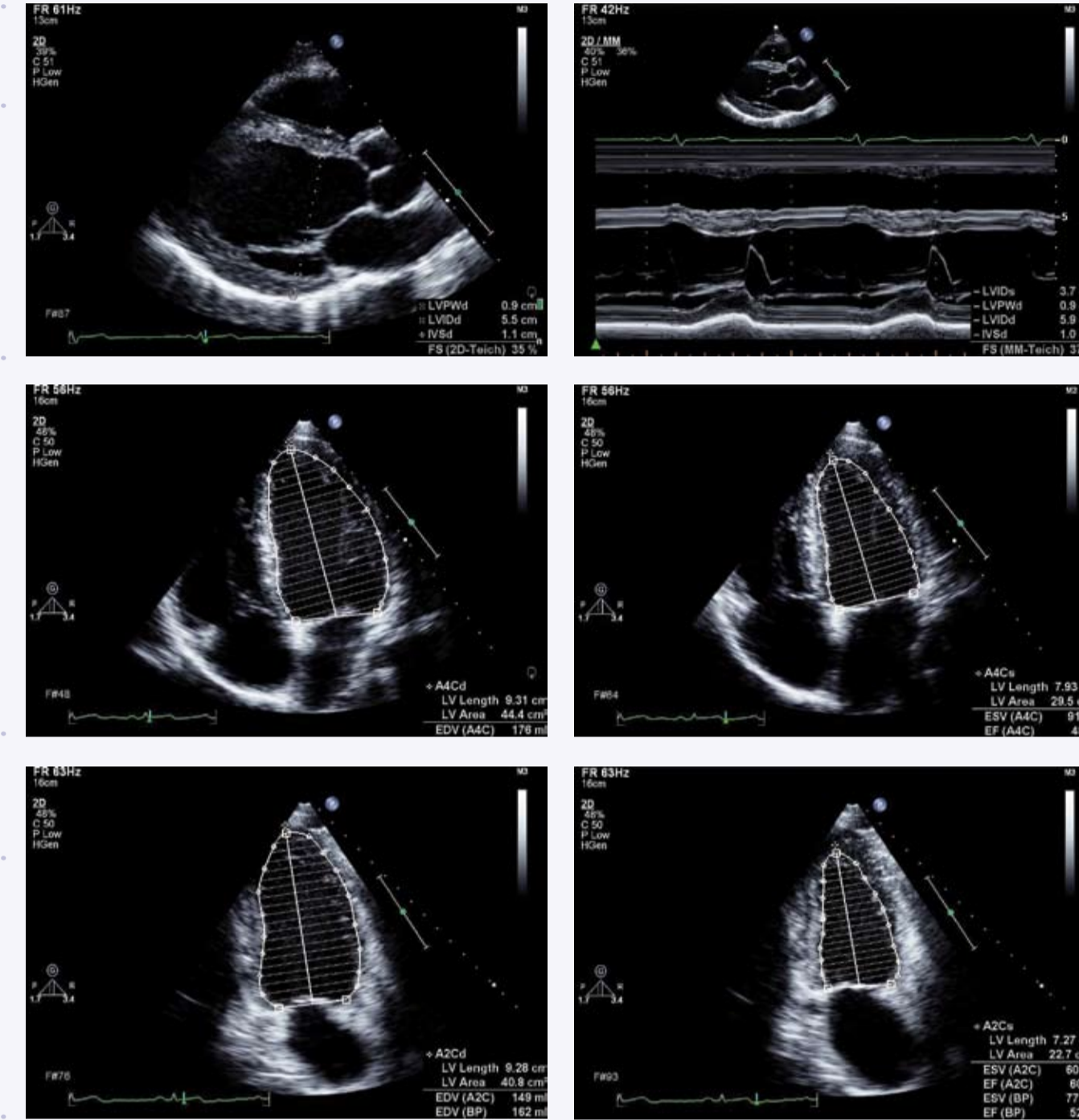


## Left ventricular size, mass & function

	Normal	Mild	Moderate	Severe
<b>LV wall thickness</b>				
IVSd / PWd (cm)	0.6–1.2	1.3–1.5	1.6–1.9	≥2.0
<b>LV dimension, women</b>				
LVIDd (cm)	3.9–5.3	5.4–5.7	5.8–6.1	≥6.2
LVIDd / BSA (cm/m <sup>2</sup> )	2.4–3.2	3.3–3.4	3.5–3.7	≥3.8
<b>LV dimension, men</b>				
LVIDd (cm)	4.2–5.9	6.0–6.3	6.4–6.8	≥6.9
LVIDd / BSA (cm/m <sup>2</sup> )	2.2–3.1	3.2–3.4	3.5–3.6	≥3.7
<b>LV volume, women</b>				
LV diastolic volume (ml)	56–104	105–117	118–130	≥131
LV systolic volume (ml)	19–49	50–59	60–69	≥70
<b>LV volume, men</b>				
LV diastolic volume (ml)	67–155	156–178	179–201	≥202
LV systolic volume (ml)	22–58	59–70	71–82	≥83
<b>LV volume index</b>				
LV diastolic volume/BSA (ml/m <sup>2</sup> )	35–75	76–86	87–96	≥97
LV systolic volume/BSA (ml/m <sup>2</sup> )	12–30	31–36	37–42	≥43
<b>LV function</b>				
Fractional shortening (%)	25–43	20–24	15–19	<15
Ejection fraction (%) EF by Biplane Simpson's method*	≥55	45–54	36–44	≤35
<b>LV mass, women</b>				
LV mass (g)	66–150	151–171	172–182	>182
LV mass / BSA (g/cm <sup>2</sup> )	44–88	89–100	101–112	>112
<b>LV mass, men</b>				
LV mass (g)	96–200	201–227	228–254	>254
LV mass / BSA (g/cm <sup>2</sup> )	50–102	103–116	117–130	>130



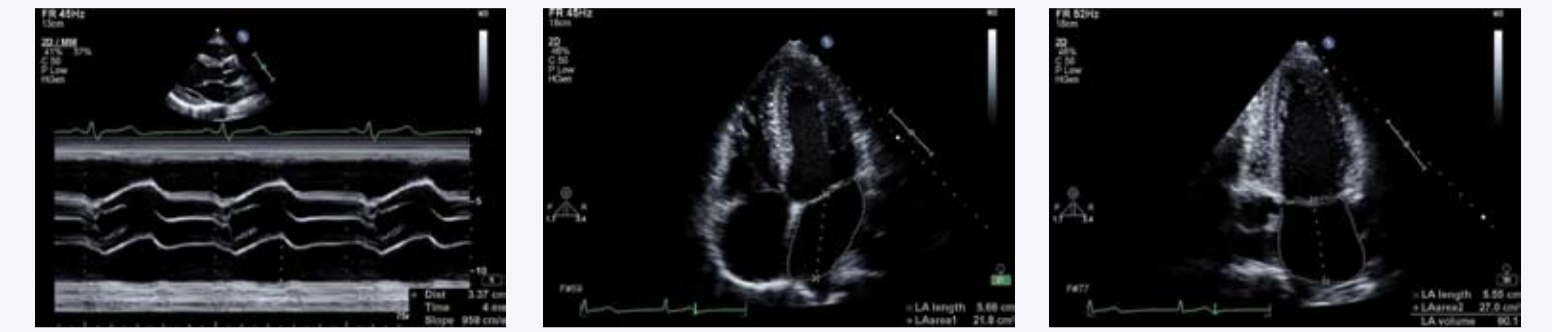
\*Please see explanatory note

## Left ventricular diastolic function

	Normal	Mild	Moderate	Severe
		↓ Relaxation	↓ Relaxation ↓ Compliance ↑ LVEDP	↓ Relaxation ↓ Compliance ↑↑ LVEDP
		Abnormal relaxation	Pseudo-Normal	Restrictive filling
<b>LV inflow Doppler</b>				
E/A ratio	1–2	<1	1–2	>2
IVRT (ms)	50–100	>100	50–100	<50
DT (ms)	150–200	>200	150–200	<150
<b>Pulmonary venous Doppler</b>				
PV <sub>s</sub> /PV <sub>d</sub>	PV <sub>s</sub> > PV <sub>d</sub>	PV <sub>s</sub> > PV <sub>d</sub>	PV <sub>s</sub> < PV <sub>d</sub>	PV <sub>s</sub> << PVD
PVa (m/s)	<0.35	<0.35	≥0.35	≥0.35
a <sub>dur</sub> -A <sub>dur</sub> (ms)	<20	<20	≥20	≥20
<b>Mitral annular tissue Doppler</b>				
E <sub>m</sub> /A <sub>m</sub>	1–2	<1	<1	<<1
E/E <sub>m</sub> (septum)	<8	-	>15	-
E/E <sub>m</sub> (lateral)	<10	-	>10	-

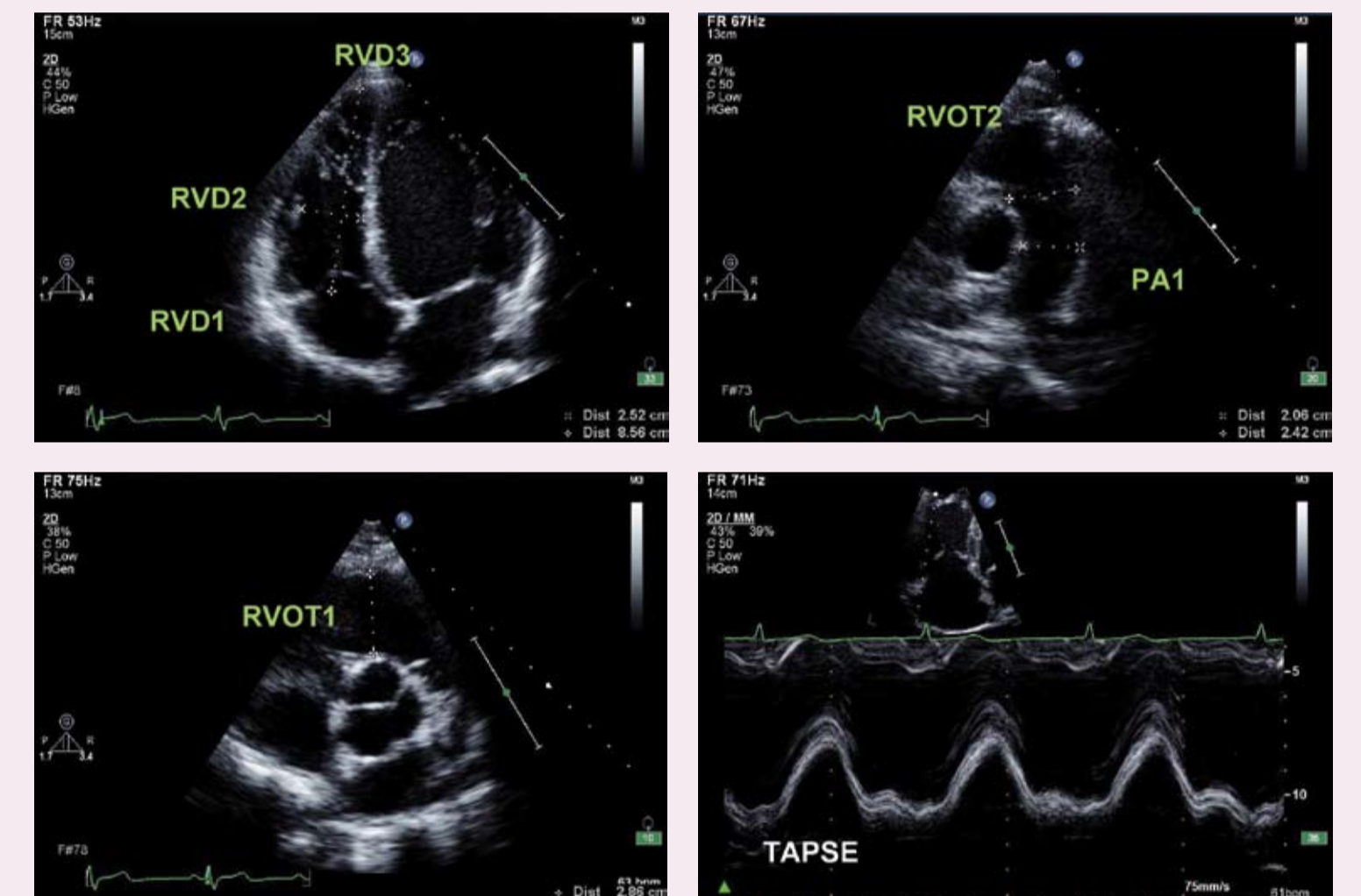
## Left atrial size

	Normal	Mild	Moderate	Severe
<b>LA size, women</b>				
LA diameter (cm)	2.7–3.8	3.9–4.2	4.3–4.6	≥4.7
LA volume (ml)	22–52	53–62	63–72	≥73
<b>LA size, men</b>				
LA diameter (cm)	3.0–4.0	4.1–4.6	4.7–5.2	≥5.3
LA volume (ml)	18–58	59–68	69–78	≥79
<b>LA size, index</b>				
LA diameter (cm/m <sup>2</sup> )	1.5–2.3	2.4–2.6	2.7–2.9	≥3.0
LA volume (ml/m <sup>2</sup> )	16–28	29–33	34–39	≥40



## Right ventricular size & function

	Normal	Mild	Moderate	Severe
<b>RV dimensions (apical 4 chamber)</b>				
Basal RV diameter (RVD1) (cm)	2.0–2.8	2.9–3.3	3.4–3.8	≥3.9
Mid RV diameter (RVD2) (cm)	2.7–3.3	3.4–3.7	3.8–4.1	≥4.2
Base to apex length (RVD3) (cm)	7.1–7.9	8.0–8.5	8.6–9.1	≥9.2
<b>RVOT diameters (parasternal SAX)</b>				
RVOT at AV level (RVOT1) (cm)	2.5–2.9	3.0–3.2	3.3–3.5	≥3.6
RVOT at PV annulus (RVOT2) (cm)	1.7–2.3	2.4–2.7	2.8–3.1	≥3.2
<b>PA diameter (parasternal SAX)</b>				
Main PA (PA1) (cm)	1.5–2.1	2.2–2.5	2.6–2.9	≥3.0
<b>RV area</b>				
RV diastolic area (cm <sup>2</sup> )	11–28	29–32	33–37	≥38
RV systolic area (cm <sup>2</sup> )	7.5–16	17–19	20–22	≥23
<b>RV function</b>				
Fractional area change (%)	32–60	25–31	18–24	≤17
TAPSE	16–20	11–15	6–10	≤5



## Right atrial pressure

	0–5mmHg	5–10	10–15	15–20	>20
<b>IVC</b>					
size (cm)	<1.5	1.5–2.5	1.5–2.5	>2.5	>2.5
Respiratory/sniff variation	collapse	↓ >50%	↓ <50%	↓ <50%	No change
<b>Other</b>					
RA size	normal	normal	↑	↑↑	↑↑
Hepatic vein size	normal	normal	↑	↑↑	↑↑

## Explanatory note & references

These guidelines have been developed by the Education Committee of the British Society of Echocardiography. They have been adapted from the international recommendations and guidelines referenced below. Where there are differences between published values, or there is a lack of clear evidence, recommended values have been developed on the basis of consensus opinion.

**It is vital that echocardiographic measurements are made using standard, correct techniques and that all values are reported and interpreted in clinical context.**

### Chamber Quantification

Adapted from:  
Recommendations for Chamber Quantification: A Report from the American Society of Echocardiography's Guidelines and Standards Committee and the Chamber Quantification Writing Group, Developed in Conjunction with the European Association of Echocardiography, a Branch of the European Society of Cardiology. Lang RM et al. *J Am Soc Echocardiogr* 2005; 18:1440–1463

### Right Ventricular Function

Adapted from:  
Assessment of right ventricular function using two-dimensional echocardiography. Kaul S et al. *Am. Heart J* 1984;107:526–31

### Diastolic Function

Adapted from:  
Canadian consensus recommendations for the measurement and reporting of diastolic dysfunction by echocardiography: from the Investigators of Consensus on Diastolic Dysfunction by Echocardiography. Rakowski H et al. *J Am Soc Echocardiogr* 1996;9:736–760

Optimal Noninvasive Assessment of Left Ventricular Filling Pressures. A Comparison of Tissue Doppler Echocardiography and B-Type Natriuretic Peptide in Patients With Pulmonary Artery Catheters. Dokainish H et al. *Circulation*. 2004;109:2432–2439