

CARDIAC MEASUREMENTS

TABLE 38. REFERENCE VALUES FOR AORTIC ROOT INTERNAL DIAMETER, PULMONARY ARTERY, LEFT VENTRICLE, RIGHT VENTRICLE, LEFT ATRIUM, AND RIGHT ATRIUM (VALUES ARE SHOWN FOR 5TH, 50TH, AND 95TH PERCENTILES)

GA (wk)	Aortic root (mm) ^a			Pulmonary artery (mm) ^b			Left ventricle (mm) ^c		
	5th	50th	95th	5th	50th	95th	5th	50th	95th
14.0	1.2	1.8	2.4	1.3	1.9	2.5	1.2	2.3	3.5
15.0	1.4	2.0	2.7	1.6	2.2	2.8	1.8	3.0	4.3
16.0	1.6	2.3	2.9	1.8	2.5	3.1	2.4	3.7	5.0
17.0	1.9	2.5	3.2	2.1	2.8	3.4	2.9	4.3	5.8
18.0	2.1	2.8	3.5	2.3	3.0	3.8	3.4	5.0	6.5
19.0	2.3	3.0	3.7	2.6	3.3	4.1	3.9	5.6	7.2
20.0	2.5	3.3	4.0	2.8	3.6	4.4	4.4	6.1	7.9
21.0	2.8	3.5	4.3	3.1	3.9	4.7	4.8	6.7	8.5
22.0	3.0	3.8	4.6	3.3	4.2	5.0	5.2	7.2	9.2
23.0	3.2	4.0	4.8	3.6	4.5	5.3	5.6	7.7	9.8
24.0	3.4	4.3	5.1	3.8	4.7	5.6	6.0	8.2	10.4
25.0	3.6	4.5	5.4	4.1	5.0	5.9	6.4	8.7	11.0
26.0	3.9	4.8	5.6	4.4	5.3	6.3	6.7	9.1	11.5
27.0	4.1	5.0	5.9	4.6	5.6	6.6	7.0	9.5	12.0
28.0	4.3	5.3	6.2	4.9	5.9	6.9	7.3	9.9	12.5
29.0	4.5	5.5	6.5	5.1	6.2	7.2	7.6	10.3	13.0
30.0	4.8	5.7	6.7	5.4	6.4	7.5	7.8	10.6	13.4
31.0	5.0	6.0	7.0	5.6	6.7	7.8	8.0	10.9	13.9
32.0	5.2	6.2	7.3	5.9	7.0	8.1	8.2	11.2	14.3
33.0	5.4	6.5	7.5	6.1	7.3	8.4	8.4	11.5	14.7
34.0	5.7	6.7	7.8	6.4	7.6	8.8	8.5	11.8	15.0
35.0	5.9	7.0	8.1	6.6	7.9	9.1	8.6	12.0	15.4
36.0	6.1	7.2	8.4	6.9	8.1	9.4	8.7	12.2	15.7
37.0	6.3	7.5	8.6	7.1	8.4	9.7	8.8	12.4	16.0
38.0	6.5	7.7	8.9	7.4	8.7	10.0	8.9	12.5	16.2
39.0	6.8	8.0	9.2	7.6	9.0	10.3	8.9	12.7	16.5
40.0	7.0	8.2	9.4	7.9	9.3	10.6	8.9	12.8	16.7

GA (wk)	Right ventricle (mm) ^d			Left atrium (mm) ^e			Right atrium (mm) ^f		
	5th	50th	95th	5th	50th	95th	5th	50th	95th
14.0	1.4	2.5	3.5	2.2	3.2	4.2	2.4	3.5	4.7
15.0	2.0	3.1	4.3	2.8	3.9	5.0	3.0	4.2	5.4
16.0	2.5	3.8	5.1	3.3	4.5	5.7	3.5	4.8	6.2
17.0	3.0	4.4	5.8	3.8	5.1	6.4	4.0	5.5	6.9
18.0	3.6	5.1	6.6	4.3	5.7	7.1	4.6	6.1	7.6
19.0	4.0	5.7	7.3	4.8	6.3	7.8	5.1	6.7	8.3
20.0	4.5	6.3	8.0	5.3	6.9	8.4	5.6	7.3	9.0
21.0	5.0	6.9	8.7	5.7	7.4	9.1	6.0	7.9	9.7
22.0	5.5	7.4	9.4	6.2	8.0	9.7	6.5	8.5	10.4
23.0	5.9	8.0	10.1	6.6	8.5	10.3	7.0	9.0	11.1
24.0	6.3	8.5	10.7	7.0	9.0	10.9	7.4	9.6	11.7
25.0	6.7	9.1	11.4	7.5	9.5	11.5	7.8	10.1	12.4
26.0	7.1	9.6	12.0	7.8	10.0	12.1	8.3	10.6	13.0
27.0	7.5	10.1	12.6	8.2	10.5	12.7	8.7	11.1	13.6
28.0	7.9	10.6	13.3	8.6	10.9	13.2	9.1	11.6	14.2
29.0	8.3	11.0	13.8	8.9	11.4	13.8	9.5	12.1	14.8
30.0	8.6	11.5	14.4	9.3	11.8	14.3	9.8	12.6	15.4
31.0	8.9	12.0	15.0	9.6	12.2	14.8	10.2	13.1	16.0
32.0	9.2	12.4	15.5	9.9	12.6	15.3	10.5	13.5	16.5
33.0	9.6	12.8	16.1	10.2	13.0	15.8	10.9	14.0	17.1
34.0	9.8	13.2	16.6	10.5	13.4	16.2	11.2	14.4	17.6
35.0	10.1	13.6	17.1	10.8	13.7	16.7	11.5	14.8	18.1
36.0	10.4	14.0	17.6	11.0	14.1	17.1	11.8	15.2	18.6
37.0	10.6	14.4	18.1	11.2	14.4	17.6	12.1	15.6	19.1
38.0	10.9	14.7	18.6	11.5	14.7	18.0	12.4	16.0	19.6
39.0	11.1	15.1	19.0	11.7	15.0	18.4	12.7	16.4	20.1
40.0	11.3	15.4	19.5	11.9	15.3	18.8	12.9	16.7	20.6

GA, gestational age.

^aAorta = $0.247 \times \text{GA} - 1.6638$ (SD = $0.0146 \times \text{GA} + 0.16$).

^bPulmonary artery = $0.283 \times \text{GA} - 2.055$ (SD = $0.018 \times \text{GA} + 0.11$).

^cLeft ventricle (end diastole) = $-0.01152 \times \text{GA}^2 + 1.024 \times \text{GA} - 9.735$ (SD = $0.065 \times \text{GA} - 0.234$).

^dRight ventricle (end diastole) = $-0.006848 \times \text{GA}^2 + 0.866 \times \text{GA} - 8.306$ (SD = $0.071 \times \text{GA} - 0.359$).

^eLeft atrium = $-0.00698 \times \text{GA}^2 + 0.8422 \times \text{GA} - 7.2$ (SD = $0.05677 \times \text{GA} - 0.18$).

^fRight atrium = $-0.00587 \times \text{GA}^2 + 0.8246 \times \text{GA} - 6.846$ (SD = $0.0634 \times \text{GA} - 0.21$).

Data adapted from Shapiro I, Degani S, Leibovitz Z, Ohel G, Tal Y, et al. Fetal cardiac measurements derived by transvaginal and transabdominal cross-sectional echocardiography from 14 weeks of gestation to term. *Ultrasound Obstet Gynecol* 1998;12:404–418.