

SUPPLEMENTARY CONTENT

Supplementary Table 1. Cardiac diagnoses by modified World Health Organization classification, frequency in Nationwide Readmissions Database, expected adverse cardiac event rate, and corresponding International Disease Classification, Tenth Revision, Clinical Modification codes.			
Diagnosis	ICD-10-CM code	Frequency of diagnosis N (%)	Expected maternal cardiac event rate
<i>Modified WHO classification I</i>			
Uncomplicated or mild pulmonary stenosis	Q221, I37.0, I09.89	615 (0.0)	2-5%
Uncomplicated or small patent ductus arteriosus	Q25.0	289 (0.0)	
Uncomplicated or mild mitral valve prolapse	I34.1	11,961 (0.1)	
Successfully repaired ASD	Q21.1, Q21.2, Q20.8, Q21.8, Q21.9	4,456 (0.0)	
Successfully repaired VSD	Q21.0	2,465 (0.0)	
Successfully repaired PDA	Q25.0	289 (0.0)	
Successfully repaired anomalous pulmonary venous return	Q26.2 or Q26.3	56 (0.0)	
Atrial ectopic beats	I49.1, I49.49	1,363 (0.0)	
Ventricular ectopic beats	I49.3	6,126 (0.0)	
<i>Modified WHO classification II</i>			
Unoperated ASD	*Same as above for repaired ASD	--	6-10%
Unoperated VSD	*Same as above for repaired VSD	--	
Repaired Tetralogy of Fallot	Q21.3	330 (0.0)	
Repaired aortic coarctation	Q25.1	515 (0.0)	
Supraventricular arrhythmias	I47.1, I48.91, I48.20, Z86.79, I48.92, I45.6	30,830 (0.2)	
Turner syndrome without congenital cardiac disease	Q96.x	1,004 (0.0)	
<i>Modified WHO classification II-III</i>			
Mild left ventricular impairment (EF >45%)	†	--	11-19%
Hypertrophic cardiomyopathy	I42.1, I42.2	635 (0.0)	
Mild mitral stenosis	I05.0, I34.2	314 (0.0)	
Moderate aortic stenosis	I06.0, I06.2, I35.0, I35.2, Q25.3, Q24.3, Q25.2, Q23.0, Q24.4	1,383 (0.0)	
Marfan or other HTAD syndrome without aortic dilation	Q87.40, Q79.60, Q79.61, Q79.63,	1,064 (0.0)	

Aorta < 45 mm in bicuspid aortic valve pathology	Q23.1	3,171 (0.0)	
Repaired coarctation without residua (non-Turner)	Excluded (see above in class II)	--	
<i>Modified WHO classification III</i>			
Previous peripartum cardiomyopathy with no residual left ventricular dysfunction	†	--	20-27%
Moderate left ventricular impairment (EF 30–45%)	I50.1, I50.2x, I50.3x, I50.4x, I50.9, I11.0	6,615 (0.0)	
Mechanical valve	Z95.2	1,746 (0.0)	
Systemic right ventricle with good or mildly decreased ventricular function	Q23.4, Q20.5	243 (0.0)	
Uncomplicated Fontan circulation	Q20.8	45 (0.0)	
Unrepaired cyanotic heart disease	Q20.0, Q20.8, Q20.3, Q22.9, Q26.2	173 (0.0)	
Moderate mitral stenosis	Same as above for mild mitral stenosis	--	
Severe asymptomatic aortic stenosis	Same as above for moderate aortic stenosis	--	
Moderate aortic dilation (40–45 mm in Marfan syndrome or other HTAD; 45–50 mm in bicuspid aortic valve; Turner syndrome ASI 20–25 mm/m ² ; Tetralogy of Fallot <50 mm)	Excluded as aortic aneurysm was included as part of composite outcome	--	
Ventricular tachycardia	I47.2	1,717 (0.0)	
<i>Modified WHO classification IV</i>			
Pulmonary arterial hypertension	I27.2, I27.21	3,447 (0.0)	>27%
Severe systemic ventricular dysfunction (EF 30%, NYHA III-IV)	Same as above for moderate left ventricular impairment	--	
Previous peripartum cardiomyopathy with any residual left ventricular dysfunction	I42.0, O90.3	3,880 (0.0)	
Severe mitral stenosis	Same as above for mild mitral stenosis	--	
Severe symptomatic aortic stenosis	Same as above for moderate aortic stenosis	--	
Systemic right ventricle with moderate to severely decreased ventricular function	Same as above for systemic right ventricle with good or mildly decreased ventricular function	--	

Severe aortic dilation (45 mm in Marfan syndrome or other HTAD; 50 mm in bicuspid aortic valve; Turner syndrome ASI .25 mm/m2 ; Tetralogy of Fallot 50 mm)	Excluded as aortic aneurysm was included as part of composite outcome	--	
Vascular Ehlers-Danlos	Q79.63 (only added in late 2019)	<10 (0.0)	
Severe (re)coarctation	Excluded (see above in class II)		
Fontan circulation with any complication	Same as above for uncomplicated Fontan circulation		

†Specific ICD-10 code not available.

Supplementary Table 2: Components of Composite Outcomes

	WHO Cardiac Category				p
	Overall (N=8,004,184) (Weighted N = 14,995,122)	No heart disease (N=7,959,609) (Weighted N = 14,911,251)	WHO I-II (N=24,947) (Weighted N = 46,541)	WHO II/III-IV (N=19,628) (Weighted N = 37,330)	
		Mean (Standard Deviation) or %			
Acute myocardial infarction	445 (0.0)	263 (0.0)	27 (0.1)	155 (0.4)	<0.001
Aneurysm	420 (0.0)	35 (0.0)	0 (0.0)	385 (1.0)	<0.001
Acute renal failure	17,403 (0.1)	16,080 (0.1)	185 (0.4)	1,138 (3.0)	<0.001
Adult respiratory distress syndrome	11,593 (0.1)	9,250 (0.1)	196 (0.4)	2,147 (5.8)	<0.001
Amniotic fluid embolism	731 (0.0)	622 (0.0)	28 (0.1)	82 (0.2)	<0.001
Cardiac arrest/ventricular fibrillation	1,245 (0.0)	933 (0.0)	45 (0.1)	267 (0.7)	<0.001
Conversion of cardiac rhythm	1,080 (0.0)	641 (0.0)	185 (0.4)	254 (0.7)	<0.001
Disseminated intravascular coagulation	25,473 (0.2)	24,789 (0.2)	210 (0.5)	474 (1.3)	<0.001
Eclampsia	12,315 (0.1)	11,995 (0.1)	78 (0.2)	243 (0.7)	<0.001
Heart failure/arrest during surgery or procedure	123 (0.0)	80 (0.0)	* (0.0)	40 (0.1)	<0.001
Puerperal cerebrovascular disorders	3,886 (0.0)	3,661 (0.0)	70 (0.2)	155 (0.4)	<0.001
Pulmonary edema / Acute heart failure	9,362 (0.1)	3,412 (0.0)	42 (0.1)	5,909 (15.8)	<0.001
Severe anesthesia complications	902 (0.0)	799 (0.0)	37 (0.1)	66 (0.2)	<0.001
Sepsis	13,796 (0.1)	12,979 (0.1)	195 (0.4)	622 (1.7)	<0.001
Shock	9,593 (0.1)	8,667 (0.1)	169 (0.4)	757 (2.0)	<0.001
Sickle cell disease with	1,857 (0.0)	1,726 (0.0)	34 (0.1)	96 (0.3)	<0.001

crisis					
Air and thrombotic embolism	4,694 (0.0)	4,309 (0.0)	115 (0.2)	270 (0.7)	<0.001
Blood products transfusion	164,049 (1.1)	161,306 (1.1)	985 (2.1)	1,758 (4.7)	<0.001
Hysterectomy	12,711 (0.1)	12,449 (0.1)	131 (0.3)	132 (0.4)	<0.001
Temporary tracheostomy	193 (0.0)	150 (0.0)	* (0.0)	37 (0.1)	<0.001
Ventilation	7,025 (0.0)	5,809 (0.0)	146 (0.3)	1,071 (2.9)	<0.001

P-values by weighted linear regression for continuous variables and weighted chi2 test for binary/categorical variables

* Value ≤ 10 suppressed due to data use agreement limitations

Supplementary Table 3: Covariate-adjusted outcomes for events following delivery hospitalization, not including NRD weighting and stratification

	Cardiac SMM during Delivery Hospitalization	No Cardiac SMM during Delivery Hospitalization
	Adjusted Hazard Ratio (95% Confidence Interval)*	
Any SMM or Death		
mWHO I-II	1.88 (1.11, 3.19)	1.53 (1.34, 1.74)
mWHO II/III-IV	1.75 (1.50, 2.05)	3.28 (2.96, 3.63)
Nontransfusion SMM or Death		
mWHO I-II	1.54 (0.85, 2.77)	1.57 (1.38, 1.81)
mWHO II/III-IV	1.75 (1.49, 2.05)	3.33 (2.99, 3.70)
Cardiac SMM or Death		
mWHO I-II	1.95 (0.84, 4.51)	2.07 (1.64, 2.61)
mWHO II/III-IV	3.10 (2.52, 3.83)	7.15 (6.20, 8.25)
Death		
mWHO I-II	†	0.68 (0.10, 4.53)
mWHO II/III-IV	2.36 (0.65, 8.55)	8.43 (4.77, 14.91)

* All comparisons versus patients without cardiac disease. Adjusted for age, delivery type, comorbid conditions, calendar year/quarter, and patient age

†Unable to estimate due to low event rate

Supplementary Figure 1: Adjusted in-hospital outcomes, stratified by modified World Health Organization cardiac category, compared to no heart disease, not including NRD weighting and stratification

