



# Estimating the risk of severe maternal morbidity among pregnant people with congenital heart disease

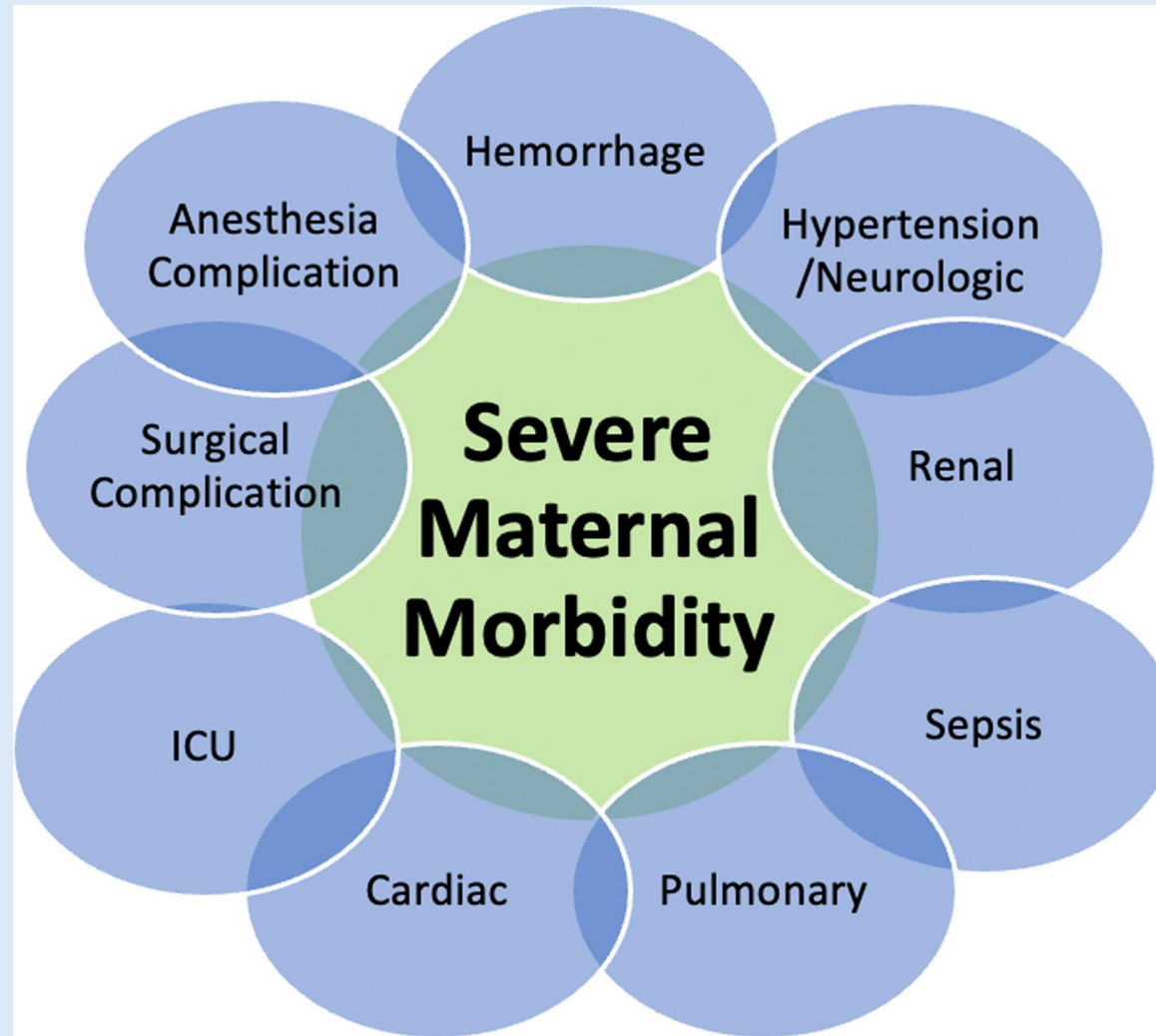
Elizabeth Sherwin, MPH

OHDSI Community Call

13 May 2025



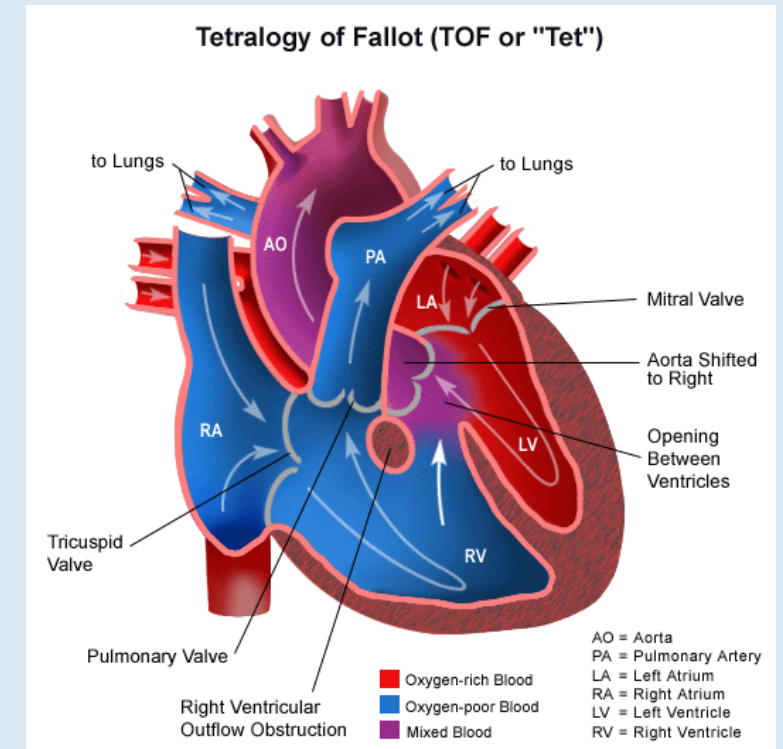
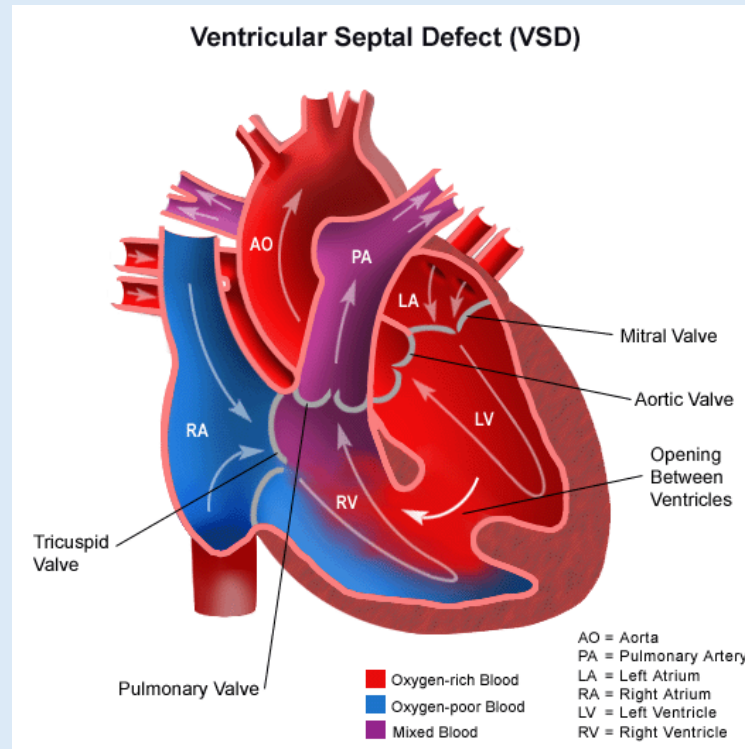
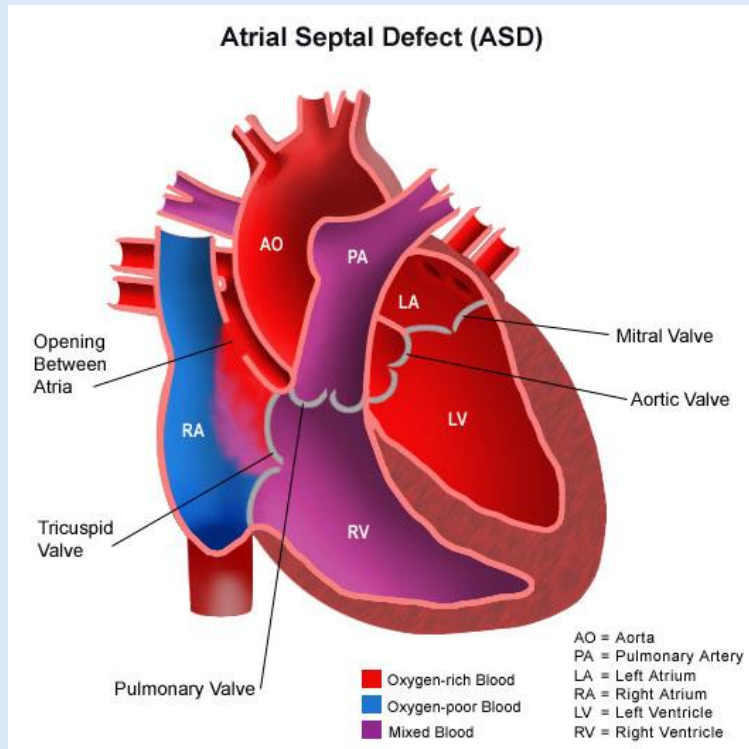
# Background



Source: Kern-Goldberger, AR, et al. 2023. *AJOG MFM*.



# Background





# Background



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Studies have shown that heart disease is associated with severe maternal morbidity (SMM)

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Few studies separate out congenital heart disease (CHD) from acquired, and CHD is likely underreported in large databases

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More people with CHD are surviving childhood to reach reproductive age



# Objective 1

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Describe the  
pregnant  
population  
with congenital  
heart disease  
(CHD)

## Cohort Characterization

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# Objective 1



Describe the  
pregnant  
population  
with congenital  
heart disease  
(CHD)

## Cohort Characterization

CHD Diagnoses

Demographics,  
comorbidities, SMM  
indicators



## Objective 2



Do patients with CHD have an increased risk of SMM compared to those without CHD?

**Population-Level Estimation**



## Objective 2



Do patients with CHD have an increased risk of SMM compared to those without CHD?

### Population-Level Estimation

**Target cohort:** women with a diagnosis of CHD prior to delivery

**Comparator cohort:** women without a diagnosis of CHD prior to delivery



## Objective 2



Do patients with CHD have an increased risk of SMM compared to those without CHD?

### Population-Level Estimation

**Target cohort:** women with a diagnosis of CHD prior to delivery

**Comparator cohort:** women without a diagnosis of CHD prior to delivery

**Outcome:** SMM (One month before delivery to 6 weeks postpartum, and 6 months postpartum)



# Creating a Concept Set for CHD in Atlas



**Concept Set Expression** Included Concepts **884** Included Source Codes Export Import Compare Versions Messages

Show  entries Filter:

Showing 1 to 1 of 1 entries Previous  Next

<input type="checkbox"/>	Concept Id	Concept Code	Concept Name	Domain	Standard Concept Caption	<input type="checkbox"/> Exclude	<input checked="" type="checkbox"/> Descendants	<input type="checkbox"/> Mapped
<input checked="" type="checkbox"/>	312723	13213009	<a href="#">Congenital heart disease</a>	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

☒ Classification ☒ Non-Standard ☒ Standard



# Creating a Concept Set for CHD in Atlas




This was our starting list from other studies	
ICD10	
Q20 - Congenital malformations of cardiac chambers and connections	
Q21 - Congenital Malformations of cardiac septa	
Q22 - Congenital malformations of pulmonary and tricuspid valves	
Q23 - Congenital malformations of aortic and mitral valves	
Q24 - Other congenital malformations of heart	
Q25 - Congenital Malformations of great arteries	
Q26.0 - Congenital stenosis of vena cava	
Q26.1 - Persistent left superior vena cava	
Q26.2 Total anomalous pulmonary venous connection	
Q26.3 Partial anomalous pulmonary venous connection	
Q26.4 - Anomalous pulmonary venous connection, unspecified	
Q26.8 - Other congenital malformations of great veins	
Q26.9 - Congenital malformation of great vein, unspecified	



# Creating a Concept Set for CHD in Atlas





SEARCH

SEARCH BY KEYWORD

Q21

Q21 x

ICD10 x

DOWNLOAD RESULTS

DOMAIN

CONCEPT

CLASS

VOCAB

filter

☐ CIM10 (1)

☐ EORTC QLQ (1)

☒ ICD10 (1)

ID	CODE	NAME	CLASS	CONCEPT
45572952	Q21	Congenital malformations of cardiac septa	ICD10 Hierarchy	Non-standard

Congenital malformations of cardiac septa

DETAILS	
Domain ID	Condition
Concept Class ID	ICD10 Hierarchy
Vocabulary ID	ICD10
Concept ID	45572952
Concept code	Q21
Validity	Valid
Concept	Non-standard
Valid start	01-May-1990
Valid end	31-Dec-2099

TERM CONNECTIONS (9)			
RELATIONSHIP	RELATES TO	CONCEPT ID	VOCABULARY
Is a	Congenital malformations of the circulatory system	40475181	ICD10
	Congenital septal defect of heart	4245646	SNOMED
Subsumes	Aortopulmonary septal defect	45592363	ICD10
	Atrial septal defect	45534366	ICD10
	Atrioventricular septal defect	45587447	ICD10
	Congenital malformation of cardiac septum, unspecified	45558395	ICD10
	Other congenital malformations of cardiac septa	45606732	ICD10
	Tetralogy of Fallot	45544078	ICD10
	Ventricular septal defect	45572953	ICD10



# Creating a Concept Set for CHD in Atlas



B	C	D	E	F	G	H	I	J	K	L	M
Category from ICD10 Level 1	Category from ICD10 Level 2	Id	Code	Name	Class	Standard	Con	RC	DRC	Domain	Vocabulary
Q22 or Q23		4322316	70320004	Congenital anomaly of heart valve	Clinical Findings	Standard		7,832	439,379	Condition	SNOMED
Q20 - Congenital malformations of cardiac chambers and conduction system		35615056	15964981000	Congenital anomaly of cardiac chamber	Clinical Findings	Standard		0	399,825	Condition	SNOMED
		42538528	762250009	Congenital anomaly of great vessel	Clinical Findings	Standard		0	383,909	Condition	SNOMED
		36676316	773139006	Congenital abnormality of cardiac ventricle	Clinical Findings	Standard		0	297,135	Condition	SNOMED
Q25 - Congenital Malformations of great arteries		314463	59877000	Congenital anomaly of aorta	Clinical Findings	Standard		14,245	252,764	Condition	SNOMED
Q21 - Congenital Malformations of cardiac septa		4245646	59494005	Congenital septal defect of heart	Clinical Findings	Standard		686	240,896	Condition	SNOMED
		4049296	123657001	Congenital stenosis of cardiac valve	Clinical Findings	Standard		0	218,514	Condition	SNOMED
		3656140	871668002	Congenital right ventricular anomaly	Clinical Findings	Standard		0	210,218	Condition	SNOMED
Q22 - Congenital malformations of pulmonary and tricuspid valve		319921	204339005	Congenital pulmonary valve abnormality	Clinical Findings	Standard		4,184	191,736	Condition	SNOMED
Q21 - Congenital Malformation: Q21.0 - Ventricular Septal Defect		35625532	768552007	Congenital ventricular septal defect	Clinical Findings	Standard		0	189,469	Condition	SNOMED
Q22 - Congenital malformation: Q22.1 - Congenital pulmonary valve stenosis		313005	67278007	Congenital stenosis of pulmonary valve	Clinical Findings	Standard		19,634	178,190	Condition	SNOMED
		4246554	93305002	Congenital malposition of aorta	Clinical Findings	Standard		0	170,840	Condition	SNOMED
		4103130	253511007	Congenital abnormality of ventricles and ventricular septum	Clinical Findings	Standard		0	160,395	Condition	SNOMED
Q21 - Congenital Malformation: Q21.3 - Tetralogy of Fallot		320835	86299006	Tetralogy of Fallot	Clinical Findings	Standard		158,556	158,556	Condition	SNOMED
		4273708	63934006	Overriding aorta	Clinical Findings	Standard		0	158,556	Condition	SNOMED
		4244029	93078006	Congenital hypertrophy of cardiac ventricle	Clinical Findings	Standard		0	158,556	Condition	SNOMED
		4012483	1131009	Congenital valvular insufficiency	Clinical Findings	Standard		0	124,988	Condition	SNOMED
Q23 - Congenital malformations of aortic and mitral valves		4030224	13689005	Congenital anomaly of aortic valve	Clinical Findings	Standard		0	124,061	Condition	SNOMED
Q23 - Congenital malformation: Q23.1 - Congenital insufficiency of aortic valve		321107	28656008	Congenital insufficiency of aortic valve	Clinical Findings	Standard		104,832	104,832	Condition	SNOMED
Q25 - Congenital Malformation: Q25.7 - Other congenital malformations of pulmonary artery		435646	36110001	Congenital anomaly of pulmonary artery	Clinical Findings	Standard		50,710	75,027	Condition	SNOMED
Q25 - Congenital Malformation: Q25.0 - Patent ductus arteriosus		315922	83330001	Patent ductus arteriosus	Clinical Findings	Standard		74,079	74,079	Condition	SNOMED
		4182328	297218007	Congenital abnormality of arterial duct	Clinical Findings	Standard		0	74,079	Condition	SNOMED
		4246484	93262004	Congenital hypoplasia of heart	Clinical Findings	Standard		0	61,867	Condition	SNOMED
		37312323	788533006	Congenital abnormality of atrium	Clinical Findings	Standard		0	60,822	Condition	SNOMED
Q23 - Congenital malformation: Q23.4 - Hypoplastic left heart syndrome		440207	62067003	Hypoplastic left heart syndrome	Clinical Findings	Standard		60,597	60,597	Condition	SNOMED
Q20 - Congenital malformation: Q20.5 - Discordant ventriculoarterial connection		432431	204296002	Discordant ventriculoarterial connection	Clinical Findings	Standard		43,746	53,727	Condition	SNOMED
Q20 - Congenital malformation: Q20.1 - Double outlet right ventricle		313867	7484005	Double outlet right ventricle	Clinical Findings	Standard		49,823	49,823	Condition	SNOMED
Q22 - Congenital malformations of pulmonary and tricuspid valve		4184499	4374004	Congenital anomaly of tricuspid valve	Clinical Findings	Standard		14,304	48,927	Condition	SNOMED
Q25 - Congenital Malformation: Q25.1 - Coarctation of aorta		321119	7305005	Coarctation of aorta	Clinical Findings	Standard		43,814	43,814	Condition	SNOMED
Q21 - Congenital Malformation: Q21.2 - Atrioventricular septal defect		4100152	253414002	Atrioventricular septal defect and common atrioventricular canal	Clinical Findings	Standard		41,509	41,509	Condition	SNOMED
Q20 - Congenital malformation: Q20.4 - Double inlet left ventricle		4102833	253281003	Double inlet ventricle	Clinical Findings	Standard		30,913	30,913	Condition	SNOMED



# Creating a Concept Set for CHD in Atlas



MHF Congenital Heart Disease

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📄

🔍

Optimize

🔒

🗑️

Concept Set Expression

Included Concepts 1107

Included Source Codes

Export

Import

Compare

Versions

Messages

Use this utility to compare the contents of two concept sets to see which concepts they may share: Concept Set Comparison

Concept Set 1:

MHF Congenital Heart Disease

Concept Set 2:

Congenital Heart Disease

Compare Concept Sets

Comparison Results

Save New Concept Set From Selection Below

View database record counts (RC) and descendant record counts (DRC) for: STARR CONFIDENTIAL LITE 02/17/2025

Show columnsCopyCSVShow 50 entriesFilter: Search...

Showing 1 to 50 of 1,251 entriesPrevious 1 2 3 4 5 ... 26 Next

	Match	Id	Code	Name	Class	RC	DRC	Domain	Vocabulary
▼ Match	Both (740)	Both	76798	17718000	Ostium primum defect	Clinical Finding	587	587	Condition SNOMED
1 Only (367)	1 Only	257660	68237008	Partial anomalous pulmonary venous connection	Clinical Finding	11,441	11,441	Condition SNOMED	
2 Only (144)	Both	259123	73660006	Congenital subaortic stenosis	Clinical Finding	7,953	7,953	Condition SNOMED	
▼ Class	Both	312723	13213009	Congenital heart disease	Clinical Finding	94,978	836,551	Condition SNOMED	
Clinical Finding (1251)	2 Only	312728	204354004	Congenital tricuspid atresia and stenosis	Clinical Finding	0	0	Condition SNOMED	
▼ Domain	Both								
Condition (1251)									
▼ Vocabulary									
SNOMED (1241)									
SNOMED Veterinary (8)									
Nebraska Lexicon (2)									



# Creating a Concept Set for CHD in Atlas



MHF Congenital Heart Disease

Optimize

Concept Set Expression

Included Concepts 1107

Included Source Codes

Export

Import

Compare

Versions

Messages

Show 50 entries

Filter: Search...

Previous 1 Next

Showing 1 to 17 of 17 entries

<input type="checkbox"/>	Concept Id	Concept Code	Concept Name	Domain	Standard Concept Caption	<input type="checkbox"/> Exclude	<input checked="" type="checkbox"/> Descendants	<input type="checkbox"/> Mapped
<input checked="" type="checkbox"/>	434462	30288003	Ventricular septal defect	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	432432	111323005	Total anomalous pulmonary venous return	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4147787	268185002	Supravalvar aortic stenosis	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	257660	68237008	Partial anomalous pulmonary venous connection	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4100733	253277003	Discordant atrioventricular connection	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4100815	27637000	Dextrocardia	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4245646	59494005	Congenital septal defect of heart	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4246484	93262004	Congenital hypoplasia of heart	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	315069	46619002	Congenital heart block	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4322316	70320004	Congenital anomaly of heart valve	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	42538528	762250009	Congenital anomaly of great vessel	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	321109	28574005	Congenital anomaly of coronary artery	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	35615056	15964981000119104	Congenital anomaly of cardiac chamber	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4182328	297218007	Congenital abnormality of arterial duct	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	441950	61959006	Common arterial trunk (truncus arteriosus)	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4289309	70142008	Atrial septal defect	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4061819	17024001	Aortopulmonary window	Condition	Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



# Creating a Concept Set for Deliveries in Atlas



created by sleo@stanford.edu on 2025-01-03 13:23, modified by sleo@stanford.edu on 2025-01-03 13:43

Deliveries - procedures only

Concept Set Expression

Included Concepts 79

Included Source Codes

Export

Import

Compare

Versions

Messages

Show 50 entries

Showing 1 to 8 of 8 entries

Filter: Search...

Previous 1 Next

	Concept Id	Concept Code	Concept Name	Domain	Standard Concept Caption	Exclude	Descendants	Mapped
<input type="checkbox"/>	2110320	59612	Vaginal delivery only, after previous cesarean delivery (with or without episiotomy and/or forceps)	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2110319	59610	Routine obstetric care including antepartum care, vaginal delivery (with or without episiotomy, and/or forceps) and postpartum care, after previous cesarean delivery	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2110307	59400	Routine obstetric care including antepartum care, vaginal delivery (with or without episiotomy, and/or forceps) and postpartum care	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2110322	59618	Routine obstetric care including antepartum care, cesarean delivery, and postpartum care, following attempted vaginal delivery after previous cesarean delivery	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2110315	59510	Routine obstetric care including antepartum care, cesarean delivery, and postpartum care	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	4114637	302383004	Forceps delivery	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	4015701	11466000	Cesarean section	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	4165077	41059002	Cesarean hysterectomy	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



# Creating CHD Cohort Definition in Atlas



### Cohort Entry Events

Events having any of the following criteria:

a procedure occurrence of **Deliveries - procedures only**

✗ with age: **Between** 12 and 55

✗ with a gender of: **✗ FEMALE**

✗ having **all** of the following criteria:

+ Add attribute...

+ Add criteria to group...

+ Add Initial Event...

Delete Criteria

with continuous observation of at least **60** days before and **0** days after event index date

Limit initial events to: **all events** per person.

Restrict initial events

### Inclusion Criteria

New inclusion criteria

1. Congenital Heart Disease

Congenital Heart Disease

Copy Delete

enter an inclusion rule description

having **any** of the following criteria:

+ Add criteria to group...

Delete Criteria

with **at least** 1 using all occurrences of:

a condition occurrence of **MHF Congenital Heart Diseases...**

+ Add attribute...

where **event starts** between

**All** days **Before** and **0** days **After** **index start date**

[add additional constraint](#)

The index date refers to the event from the Cohort Entry criteria.

☐ restrict to the same visit occurrence

☐ allow events from outside observation period

17



# Results



Cohort	Site A N deliveries	Site B N deliveries
Congenital Heart Disease	959	903
No Congenital Heart Disease	53,830	35,838



# Results



Demographics	Deliveries among People with CHD		Deliveries among People without CHD	
	SITE A N=959	SITE B N=903	SITE A N=53,830	SITE B N=35,838
<b>Race</b>				
White	457 (47.65%)	546 (60.47%)	21,365 (39.69%)	16,769 (46.79%)
Asian	238 (24.82%)	24 (2.66%)	18,528 (34.42%)	1,959 (5.47%)
Black or African American	28 (2.92%)	221 (24.47%)	1,751 (3.25%)	10,305 (28.75%)
Native Hawaiian or Other Pacific Islander or American Indian or Alaska Native	16 (1.67%)	-	957 (1.78%)	-
<b>Hispanic or Latino</b>	275 (28.68%)	42 (4.65%)	11,184 (20.78%)	2,021 (5.64%)
<b>Age</b>				
15-24	78 (8.13%)	82 (9.08%)	3,091 (5.74%)	4,061 (11.33%)
25-29	157 (16.37%)	167 (18.49%)	8,163 (15.16%)	7,032 (19.62%)
30-34	333 (34.72%)	299 (33.11%)	21,174 (39.33%)	12,903 (36.00%)
35-39	279 (29.09%)	248 (27.46%)	16,701 (31.03%)	9,157 (25.55%)
40-49	111 (11.57%)	107 (11.8%)	4,650 (8.64%)	2,647 (7.39%)

Note: totals do not add up due to missing demographic data



# Results



Congenital Heart Disease Condition	Number of Deliveries (Percent of total with CHD, n=959)	Number of Deliveries (Percent of total with CHD, n=903)
	SITE A	SITE B
Ventricular septal defect	235 (24.50%)	244 (27.02%)
Atrial septal defect	159 (16.58%)	185 (20.49%)
Tetralogy of Fallot	122 (12.72%)	80 (8.86%)
Congenital insufficiency of aortic valve	71 (7.40%)	67 (7.42%)
Coarctation of aorta	66 (6.88%)	56 (6.20%)
Double outlet right ventricle	54 (5.63%)	47 (5.20%)
Discordant ventriculoarterial connection	46 (4.80%)	31 (3.43%)
Hypoplastic left heart syndrome	45 (4.69%)	26 (2.88%)
Persistent left superior vena cava	36 (3.75%)	18 (1.99%)
Congenital anomaly of aorta	35 (3.65%)	19 (2.10%)
Congenital anomaly of coronary artery	34 (3.54%)	15 (1.66%)
Congenital stenosis of aortic valve	33 (3.44%)	17 (1.88%)
Congenital stenosis of pulmonary valve	33 (3.44%)	29 (3.21%)
Congenital anomaly of pulmonary artery	23 (2.40%)	17 (1.88%)
Patent foramen ovale	21 (2.19%)	54 (5.98%)
Atrioventricular septal defect and common atrioventricular junction	19 (1.98%)	38 (4.21%)



# Creating SMM Concept Set in Atlas



[PRHeG] Severe maternal morbidity								
Show 25 entries			Filter: Search...					
Showing 1 to 25 of 32 entries			Previous 1 2 Next					
<input type="checkbox"/>	Concept Id	Concept Code	Concept Name	Domain	Standard Concept Caption	Exclude	Descendants	Mapped
<input type="checkbox"/>	437894	71908006	Ventricular fibrillation	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4195473	43988005	Temporary tracheostomy	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	432923	21454007	Subarachnoid hemorrhage	Condition	Standard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	198307	16217003	Shock due to anesthesia	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	201965	27942005	Shock	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	196236	76571007	Septic shock	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	132797	91302008	Sepsis	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2788036	5A1935Z	Respiratory Ventilation, Less than 24 Consecutive Hours	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	440417	59282003	Pulmonary embolism	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4078925	19242006	Pulmonary edema	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4051932	233154000	Procedure for arrhythmia	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4020879	213026003	Malignant hyperpyrexia due to anesthetic	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	4127886	236886002	Hysterectomy	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	26942	417425009	Hemoglobin SS disease with crisis	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2805869	5A	Extracorporeal or Systemic Assistance and Performance @ Physiological Systems (Procedure)	Procedure	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	443700	15938005	Eclampsia	Condition	Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	436093	67406007	Disseminated intravascular coagulation	Condition	Standard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	441874	71444005	Cerebral thrombosis	Condition	Standard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	443454	432504007	Cerebral infarction	Condition	Standard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	376713	274100004	Cerebral hemorrhage	Condition	Standard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# Results



	Deliveries among People with CHD		Deliveries among People without CHD	
	SITE A N=959	SITE B N=903	SITE A N=53,830	SITE B N=35,838
SMM within 6 months postpartum	62 (6.47%)	34 (3.77%)	948 (1.83%)	844 (2.36%)



# Next Steps

- Set up Analysis
  - Strategus pipeline
- Invite other sites to participate



# Our Team



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Katie Sherwin, MS PA-C

Katherine Bianco, MD

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supporting this work!