



STS 2018 Risk Model Calculator

What You Need to Know

STS Risk Calculator – 2018 Risk Model

- 2018 Risk Models went live with ACSD Version 2.9 in July 2017
 - Risk Models contain approximately 40 additional variables
 - Updated Risk Calculator functions the same as previous calculator
 - Risk Model updated to calculator available November 1, 2018
 - Two manuscripts published May 2018 available in *The Annals*
-
- Questions about the calculator email:
sts.support@ARMUS.com

2018 Risk Model Manuscripts

- **The Society of Thoracic Surgeons 2018 Adult Cardiac Surgery Risk Models: Part 1—Background, Design Considerations, and Model Development:** <https://doi.org/10.1016/j.athoracsur.2018.03.002>



2018 Risk Model Manuscripts

- **The Society of Thoracic Surgeons 2018 Adult Cardiac Surgery Risk Models: Part 2—Statistical Methods and Results:**
<https://doi.org/10.1016/j.athoracsur.2018.03.003>





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2018 Risk Calculator

CALCULATE SUPPORT

Procedure Type

- Isolated CAB
- Isolated AVR
- Isolated MVR
- AVR + CAB
- MVR + CAB
- AVR + MVR
- MV Repair
- MV Repair + CAB

Click on Menu
button

- Choose Short-term Risk Calculator
- Read/Agree to Terms and Conditions as appropriate
- Select Case Type
- Scroll Down to view variable

2018 Risk Calculator

Procedure Type

- Isolated CAB
- Isolated AVR
- Isolated MVR
- AVR + CAB
- MVR + CAB
- AVR + MVR
- MV Repair
- MV Repair + CAB

STS Adult Cardiac Surgery Database Version 2.9

RISK SCORES

No procedure selected

CALCULATE

Risk of Mortality: NA
Renal Failure: NA
Permanent Stroke: NA
Prolonged Ventilation: NA
DSW Infection: NA
Reoperation: NA
Morbidity or Mortality: NA
Short Length of Stay: NA
Long Length of Stay: NA

PRINT CLEAR

Details of Selected Field:
No field selected

No field details available

- After clicking on Menu Button the Calculator will open
- Click on 'Calculate' when patient's risk factors have been entered
- You may print from this screen as well

2018 Risk Calculator

Procedure Type

Isolated CAB
Isolated AVR
Isolated MVR
AVR + CAB
MVR + CAB
AVR + MVR
MV Repair
MV Repair + CAB

Age

Enter a value between 1 and 110

Gender

Male Female

Race - Black/African American

☐ Select for Yes

Race - Asian

☐ Select for Yes

Race - American Indian / Alaskan Native

☐ Select for Yes

Race - Native Hawaiian / Pacific Islander

☐ Select for Yes

- After selecting case type, scroll down and enter patient values for risk variables

2018 Risk Calculator

https://risk-calc-buttontest.armus-dev.armus.com/stowe Online STS Risk Calculator

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CALCULATE SUPPORT

☐ Select for Yes

Primary Payor

Select a value

Weight Kg

Enter a value between 10.0 and 250.0

Height Cm

Enter a value between 20.0 and 251.0

Hematocrit

Enter a value between 1.00 and 99.99

WBC Count

Enter a value between 0.10 and 99.99

Platelet Count

Enter a value between 1000 and 900000

Last Creatinine Level

Enter a value between 0.10 and 30.00

Dialysis

☐ Select for Yes

Hypertension

☐ Select for Yes

Weight (kg)

Indicate the weight of the patient in kilograms closest to the date of procedure.

- Click on field name for definition

2018 Risk Calculator

STS Adult Cardiac Surgery Database Version 2.9

RISK SCORES

No procedure selected

CALCULATE

Risk of Mortality: NA
Renal Failure: NA
Permanent Stroke: NA
Prolonged Ventilation: NA
DSW Infection: NA
Reoperation: NA
Morbidity or Mortality: NA
Short Length of Stay: NA
Long Length of Stay: NA

PRINT CLEAR

Details of Selected Field:
No field selected

No field details available

Model Endpoints

- When all of the patient variables are entered hit 'CALCULATE' for the patient's risk scores

2018 Risk Calculator

- Required Values
 - Age
 - Gender
- If no Value is Available, Leave Blank
 - Values will be imputed for specific variables
 - If not value is available the risk will still calculate

2018 Risk Calculator – Imputed Values if Left Blank

Model Variable	Model Imputation Information
Body Surface Area (BSA)	If gender is Male set BSA = 2.00m ² If gender is Female set BSA = 1.75m ²
Ejection Fraction (EF)	<p>If EF is missing or <10%:</p> <p>CABG Model</p> <p>If HeartFailTmg is Chronic or missing and gender is Male, set EF = 55%</p> <p>If HeartFailTmg is Chronic or missing and gender is Female, set EF = 58%</p> <p>If HeartFailTmg is Acute or Both and gender is Male, set EF = 40%</p> <p>If HeartFailTmg is Acute or Both and gender is Female, set EF = 45%</p> <p>Valve Model</p> <p>AVR:</p> <p>If HeartFailTmg is Chronic or missing and gender is Male, set EF = 60%</p> <p>If HeartFailTmg is Acute or Both and gender is Male, set EF = 55%</p> <p>If gender is Female, set EF = 60%</p> <p>MV Replace:</p> <p>If HeartFailTmg is Chronic or missing and gender is Male, set EF = 58%</p> <p>If HeartFailTmg is Chronic or missing and gender is Female, set EF = 60%</p> <p>If HeartFailTmg is Acute or Both and gender is Male, set EF = 55%</p> <p>If HeartFailTmg is Acute or Both and gender is Female, set EF = 58%</p> <p>MV Repair:</p> <p>If HeartFailTmg is Chronic or missing and gender is Male, set EF = 60%</p> <p>If HeartFailTmg is Chronic or missing and gender is Female, set EF = 60%</p> <p>If HeartFailTmg is Acute or Both and gender is Male, set EF = 56%</p> <p>If HeartFailTmg is Acute or Both and gender is Female, set EF = 57%</p>

Valve+CABG Model

AVR+CABG:

If HeartFailTmg is Chronic or missing and gender is Male, set EF = 60%

If HeartFailTmg is Chronic or missing and gender is Female, set EF = 60%

If HeartFailTmg is Acute or Both and gender is Male, set EF = 53%

If HeartFailTmg is Acute or Both and gender is Female, set EF = 58%

MV Replace:

If HeartFailTmg is Chronic or missing and gender is Male, set EF = 55%

If HeartFailTmg is Chronic or missing and gender is Female, set EF = 56%

If HeartFailTmg is Acute or Both and gender is Male, set EF = 50%

If HeartFailTmg is Acute or Both and gender is Female, set EF = 53%

MV Repair:

If HeartFailTmg is Chronic or missing and gender is Male, set EF = 50%

If HeartFailTmg is Chronic or missing and gender is Female, set EF = 52%

If HeartFailTmg is Acute or Both and gender is Male, set EF = 37%

If HeartFailTmg is Acute or Both and gender is Female, set EF = 40%

Last Preop Creatinine	Set CreatLst = 1.0
Last Hematocrit (HCT)	If gender is Male, set HCT = 36.5 If gender is Female, set HCT = 40.0
Last WBC Count (WBC)	If WBC is missing, set WBC = 7.5
Platelets	If platelets is missing, set platelets = 204,000
ADP Inhibitors Discontinuation	If MedADPIDis is missing, set MedADPIDis = 2 Days

Additional Resources

- Risk Variable Chart
 - Lists the Endpoints (Operative Mortality, Renal Failure, Prolonged Vent, etc.) for each case type (CAB, Valve, CAB + Valve) and the risk variables that are used in calculating the risk score for each endpoint
 - These are the same variables used in the updated risk calculator
- Procedure Identification Chart
 - Lists the inclusion criteria for a case to belong within a specific operative category

Risk Model Variables

- STS Website:
- <https://www.sts.org/registries-research-center/sts-national-database/adult-cardiac-surgery-database/data-collection>
- → Version 2.9 → Additional Resources → Risk Model Variables Chart

Procedure Type

Table 13 STS Risk Model Variables – 2017 Models v 2.9

ENDPOINTS

Risk
Variables

CABC	Operative Mortality	Stroke	Renal Failure	Prolonged Ventilation	Deep Stern Inf.	Reop	Mortality/Morbidity	Length of Stay> 14	Length of Stay<6
B. Demographics									
Age (70)	x	x	x	x	x	x	x	x	x
Gender (75)	x	x	x	x	x	x	x	x	x
RaceBlack (160)	x	x	x	x	x	x	x	x	x
RaceAsian (165)		x	x	x	x	x	x	x	x
Ethnicity (185)		x	x	x	x	x	x	x	x
RaceNativeAm (170)			x	x	x	x	x	x	x
RacNativePacific (175)			x	x	x	x	x	x	x
C. Hospitalization									
SurgDt (310)			x	x	x	x	x	x	x
PayorPrim (291)	x	x	x	x	x	x	x	x	x
PayorSecond (293)	x	x	x	x	x	x	x	x	x
D. Risk Factors									
WeightKg (335)	x	x	x	x	x	x	x	x	x
HeightCm (330)	x	x	x	x	x	x	x	x	x
Diabetes (360)	x	x	x	x	x	x	x	x	x
DiabCtrl (365)	x	x	x	x	x	x	x	x	x
Hct (575)	x	x	x	x	x	x	x	x	x
WBC (565)	x	x	x	x	x	x	x	x	x
Platelets (580)	x	x	x	x	x	x	x	x	x
CreatLst (585)	x	x	x	x	x	x	x	x	x
Dialysis (375)	x	x	x	x	x	x	x	x	x
HyperIn (380)		x	x	x			x		x
InfEndTy (840)					x				

InfEndo (385)									
ChrLungD (405)	x	x	x	x	x		x	x	x
ImmSupp (490)	x		x	x	x		x	x	x
PVD (505)	x	x	x	x	x	x	x	x	x
CVD (525)	x	x	x	x			x	x	x
CVA (530)	x	x	x	x			x	x	x
CVAWhen (535)	x	x	x	x			x	x	x
CVDtIA (540)	x	x	x	x			x	x	x
CVDStenRt (550)	x	x	x	x			x	x	x
CVDStenLft (555)	x	x	x	x			x	x	x
CVDPCarSurg (560)	x	x		x					x
IVDrugAb (470)				x		x		x	x
Alcohol (480)	x	x	x	x	x	x	x	x	x
Pneumonia (465)			x	x			x	x	x
MediastRad (495)	x			x				x	x
Cancer (500)		x							
TobaccoUse (400)			x	x	x		x	x	x
FHCAD (355)		x	x	x			x	x	x
HmO2 (450)	x			x			x	x	x
SlpApn (460)		x		x			x		x
LiverDis (485)	x		x	x		x	x	x	x
UnrespStat (520)	x	x		x			x		
Syncope (515)	x			x		x	x		x
E. Previous Interventions									
PrCAB (670)	x		x	x	x	x	x	x	x
PrValve (675)			x	x	x	x	x	x	x
PrValveProc1 (695)				x		x	x	x	x

Valve (AVRepl, MVRepl, MVRepr)	Operative Mortality	Stroke	Renal Failure	Prolonged Ventilation	Deep Stern Infx	Reop	Mortality/ Morbidity	Length of Stay>14	Length of Stay<6
B. Demographics									
Age (70)	x	x	x	x	x	x	x	x	x
Gender (75)	x	x	x	x	x	x	x	x	x
RaceBlack (160)		x	x	x	x	x	x	x	x
RaceAsian (165)				x		x			x
Ethnicity (185)			x	x	x	x	x	x	x
RaceNativeAm (170)				x					
RacNativePacific (175)									
C. Hospitalization									
SurgDt (310)		x	x	x	x	x	x	x	x
PayorPrim (291)	x	x	x	x	x	x	x	x	x
PayorSecond (293)	x	x	x	x	x	x	x	x	x
D. Risk Factors									
WeightKg (335)	x	x	x	x	x	x	x	x	x
HeightCm (330)	x	x	x	x	x	x	x	x	x
Diabetes (360)	x	x	x	x	x		x	x	x
DiabCtrl (365)	x	x	x	x	x		x	x	x
Hct (575)	x	x	x	x	x	x	x	x	x
WBC (565)	x	x	x	x	x	x	x	x	x
Platelets (580)	x	x	x	x	x	x	x	x	x
CreatLst (585)	x	x	x	x	x	x	x	x	x
Dialysis (375)	x	x	x	x	x	x	x	x	x
Hypertn (380)	x		x	x			x	x	x
InfEndTy (840)	x	x	x	x	x	x	x	x	x
InfEndo (385)						x		x	

ChrLungD (405)	x	x	x	x	x		x	x	x
ImmSupp (490)	x	x			x	x	x	x	x
PVD (505)	x		x	x	x		x	x	x
CVD (525)	x	x	x	x			x	x	x
CVA (530)	x	x	x	x			x	x	x
CVAWhen (535)	x	x	x	x			x	x	x
CVDTIA (540)	x	x	x	x			x	x	x
CVDStenRt (550)		x		x					
CVDStenLft (555)		x		x					
CVDPCarSurg (560)	x		x				x		
IVDrugAb (470)	x	x		x		x		x	x
Alcohol (480)	x	x		x	x			x	x
Pneumonia (465)			x	x			x	x	x
MediastRad (495)	x		x	x			x	x	x
Cancer (500)									
TobaccoUse (400)		x		x	x	x	x		
FHCAD (355)									x
HmO2 (450)	x			x			x	x	x
SlpApn (460)									x
LiverDis (485)	x		x	x		x	x	x	x
UnrespStat (520)		x	x	x			x	x	
Syncope (515)		x							
E. Previous Interventions									
PrCAB (670)	x	x	x	x	x	x	x	x	x
PrValve (675)	x	x	x	x	x	x	x	x	x
PrValveProc1 (695)	x	x	x	x		x	x	x	x
PrValveProc2 (700)	x	x	x	x		x	x	x	x

Valve+CABG (AVRepl+CABG, MVRepl+CABG, MVRepr+CABG)	Operative Mortality	Stroke	Renal Failure	Prolonged Ventilation	Deep Stern Infx	Reop	Mortality/ Morbidity	Length of Stay>14	Length of Stay<6
B. Demographics									
Age (70)	x	x	x	x	x	x	x	x	x
Gender (75)	x	x	x	x	x	x	x	x	x
RaceBlack (160)	x		x	x	x	x	x	x	x
RaceAsian (165)	x		x				x		x
Ethnicity (185)	x		x	x	x	x	x		x
RaceNativeAm (170)	x		x						
RacNativePacific (175)	x								
C.Hospitalization									
SurgDt (310)	x		x	x	x	x	x	x	x
PayorPrim (291)	x	x		x	x	x	x	x	x
PayorSecond (293)	x	x		x	x	x	x	x	x
D. Risk Factors									
WeightKg (335)	x	x	x	x	x	x	x	x	x
HeightCm (330)	x	x	x	x	x	x	x	x	x
Diabetes (360)	x	x	x	x	x	x	x	x	x
DiabCtrl (365)	x	x	x	x	x	x	x	x	x
Hct (575)	x	x	x	x	x	x	x	x	x
WBC (565)	x		x	x	x		x	x	x
Platelets (580)	x	x	x	x	x	x	x	x	x
CreatLst (585)	x	x	x	x	x	x	x	x	x
Dialysis (375)	x	x	x	x	x	x	x	x	x
Hypertn (380)						x	x		
InfEndTy (840)	x	x	x	x	x		x	x	x
InfEndo (385)									
ChrLungD (405)	x	x	x	x	x	x	x	x	x
ImmSupp (490)	x			x	x			x	x
PVD (505)	x	x		x	x		x	x	x

CVD (525)	x	x		x			x	x	x
CVA (530)	x	x		x			x	x	x
CVAWhen (535)	x	x		x			x	x	x
CVDTIA (540)	x	x		x			x	x	x
CVDStenRt (550)		x	x	x		x	x		x
CVDStenLft (555)		x	x	x		x	x		x
CVDPCarSurg (560)			x	x		x	x		
IVDrugAb (470)									x
Alcohol (480)	x			x	x				x
Pneumonia (465)				x			x		
MediastRad (495)			x	x			x	x	x
Cancer (500)	x		x						
TobaccoUse (400)	x		x	x	x	x	x		x
FHCAD (355)									
HmO2 (450)	x			x			x	x	x
SlpApn (460)				x					
LiverDis (485)	x		x	x		x	x	x	x
UnrespStat (520)		x		x			x	x	
Syncope (515)	x								
E. Previous Interventions									
PrCAB (670)	x		x	x	x	x	x	x	x
PrValve (675)	x		x	x	x	x	x	x	x
PrValveProc1 (695)	x		x	x			x		x
PrValveProc2 (700)	x		x	x			x		x
PrValveProc3 (705)	x		x	x			x		x
PrValveProc4 (710)	x		x	x			x		x
PrValveProc5 (715)	x		x	x			x		x
POC (805)	x		x	x	x	x	x	x	x
POCInt1 (810)	x		x	x	x	x	x	x	x
POCInt2 (815)	x		x	x	x	x	x	x	x

POCInt3 (820)	x		x	x	x	x	x	x	x
POCInt4 (825)	x		x	x	x	x	x	x	x
POCInt5 (830)	x		x	x	x	x	x	x	x
POCInt6 (835)	x		x	x	x	x	x	x	x
POCInt7 (840)	x		x	x	x	x	x	x	x
pocpci (775)	x		x						x
pocpciwhen (780)	x		x						x
pocpciin (800)	x		x						x
PrCVInt (665)			x						
F. Preoperative Cardiac Status									
MIWhen (890)	x		x	x			x		
HeartFailTmg (912)	x	x	x	x	x	x	x	x	x
ClassNYH (915)	x	x	x	x	x		x	x	x
CardSympTimeOfAdm (895)		x	x			x	x	x	
CarShock (930)	x		x	x		x	x	x	x
ArrhythAtrFib (961)	x	x	x	x	x	x	x	x	x
ArrhythAFib (962)	x	x	x	x	x	x	x	x	x
ArrhythAFlutter (960)	x		x	x	x		x	x	x
ArrhythThird (970)	x		x	x	x		x	x	x
ArrhythSecond (965)	x		x	x	x		x	x	x
ArrhythSSS (955)	x		x	x	x		x	x	x
ArrhythVV (950)	x			x			x	x	x
G. Preoperative Medications									
MedInotr (1130)				x			x	x	x
MedADP5Days (1060)				x		x	x		
MedADPIDis (1065)				x		x	x		
MedSter (1143)						x	x	x	

MedGP (1073)									
Resusc (935)	x	x	x	x	x	x	x	x	x
medacei48 (1020)								x	
H. Hemodynamics and Cath									
NumDisV (1170)	x	x	x	x	x	x	x	x	x
PctStenLMain (1195)	x			x			x		x
HDEF (1545)	x			x		x	x	x	x
PctStenProxLAD (1215)							x	x	x
VDStenA (1600)			x					x	
VDStenM (1690)	x					x		x	x
VDInsufA (1590)		x				x	x	x	x
VDInsufM (1680)	x			x			x	x	x
VDInsufT (1775)	x	x	x	x			x	x	x
VDAoPrimEt (1646)	x		x	x			x		x
I. Operative									
Incidenc (1970)	x		x	x	x	x	x	x	x
Status (1975)	x	x	x	x	x	x	x	x	x
K. Valve Surgery									
VSTrRepair (3646)				x	x		x	x	x
L. Mechanical Cardiac Assist Devices									
IABPWhen (3730)	x		x	x	x		x	x	x
CathBasAssistWhen (3760)	x		x	x		x	x	x	x
ECMOWhen (3780)	x		x	x		x	x	x	x

Procedure Identification Charts

STS Website:

<https://www.sts.org/registries-research-center/sts-national-database/adult-cardiac-surgery-database/data-collection>

→ Version 2.9 → Additional Resources → Procedure Identification Charts

Procedure Type

Note, fields in green are new in v2.9x, fields in yellow are added or changed from the v2.81 definition

PART 1 (PROCID 1 through 4)				
Variable Short Name/Seq #	Isolated CAB (ProcID=1)	Isolated AVR (ProcID=2)	Isolated MVR** (ProcID=3)	AVR + CAB (ProcID=4)
OpCAB/2120	<ul style="list-style-type: none">• Yes, planned• Yes, unplanned due to unsuspected disease or anatomy	<ul style="list-style-type: none">• No• Yes, unplanned due to surgical complication• Missing	<ul style="list-style-type: none">• No• Yes, unplanned due to surgical complication• Missing	<ul style="list-style-type: none">• Yes, planned• Yes, unplanned due to unsuspected disease or anatomy•
OpCAB	OpCAB in(3,5)	OpCab in (NULL, 2,4)	OpCab in (NULL, 2,4)	OpCAB in(3,5)
OpValve/2125	<Not used in this calculation>	• Yes	• Yes	• Yes
OpValve		Opvalve eq 1	Opvalve eq 1	Opvalve eq 1
VSAV/3390	<ul style="list-style-type: none">• No• Yes, unplanned due to surgical complication• Missing	<ul style="list-style-type: none">• Yes, planned• Yes, unplanned due to unsuspected disease or anatomy	<ul style="list-style-type: none">• No• Yes, unplanned due to surgical complication• Missing	<ul style="list-style-type: none">• Yes, planned• Yes, unplanned due to unsuspected disease or anatomy
VSAV	VSAV in (NULL, 2,4)	VSAV in (3,5)	VSAV in (NULL, 2,4)	VSAV in (3,5)
VSAVPr/3395	<Not used in this calculation>	• Replacement	<Not used in this calculation>	• Replacement
VSAVPr		VSAVPr eq 1		VSAVPr eq 1
VSMV/3495	<ul style="list-style-type: none">• No• Yes, unplanned due to surgical complication• Missing	<ul style="list-style-type: none">• No• Yes, unplanned due to surgical complication• Missing	<ul style="list-style-type: none">• Yes, planned• Yes, unplanned due to unsuspected disease or anatomy	<ul style="list-style-type: none">• No• Yes, unplanned due to surgical complication• Missing
VSMV	VSMV in (NULL, 2,4)	VSMV in (NULL, 2,4)	VSMV in (3,5)	VSMV in (NULL, 2,4)
VSMVPr/3500	<Not used in this calculation>	<Not used in this calculation>	• Replacement	<Not used in this calculation>
VSMVPr			VSMVPr eq 2	
OCarCongProc1/6515	<ul style="list-style-type: none">• Missing• PFO, Primary closure• Anomalous origin of coronary artery from pulmonary artery repair• Anomalous aortic origin of coronary artery from aorta (AAOCA) repair	<ul style="list-style-type: none">• Missing• PFO, Primary closure	<ul style="list-style-type: none">• Missing• PFO, Primary closure• ASD repair, Primary closure• ASD repair, Patch	<ul style="list-style-type: none">• Missing• PFO, Primary closure• Anomalous origin of coronary artery from pulmonary artery repair• Anomalous aortic origin of coronary artery from aorta (AAOCA) repair

Responses required to remain within the specified procedure identification

ShortName and Version 2.9
Sequence Number Used in
the Data Collection Form

OCarCongProc1	Ocarconproc1 in (NULL,10,1291,1305)	Ocarconproc1 in (NULL,10)	Ocarconproc1 in (NULL,10,20,30)	Ocarconproc1 in (NULL,10,1291,1305)
OCarCongProc2/6520	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • Anomalous origin of coronary artery from pulmonary artery repair • Anomalous aortic origin of coronary artery from aorta (AAOCA) repair 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • ASD repair, Primary closure • ASD repair, Patch 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • Anomalous origin of coronary artery from pulmonary artery repair • Anomalous aortic origin of coronary artery from aorta (AAOCA) repair
OCarCongProc2	Ocarconproc2 in (NULL,10,1291,1305)	Ocarconproc2 in (NULL,10)	Ocarconproc2 in (NULL,10,20,30)	Ocarconproc2 in (NULL,10,1291,1305)
OCarCongProc3/6525	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • Anomalous origin of coronary artery from pulmonary artery repair • Anomalous aortic origin of coronary artery from aorta (AAOCA) repair 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • ASD repair, Primary closure • ASD repair, Patch 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • Anomalous origin of coronary artery from pulmonary artery repair • Anomalous aortic origin of coronary artery from aorta (AAOCA) repair
OCarCongProc3	Ocarconproc3 in (NULL,10,1291,1305)	Ocarconproc3 in (NULL,10)	Ocarconproc3 in (NULL,10,20,30)	Ocarconproc3 in (NULL,10,1291,1305)
Tricuspid Procedures, VSTV VSTrReplace VSTrValvec 3640, 3650, 3653	Unplanned Surgical Complications ONLY VSTV is one of : <ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 	Unplanned Surgical Complications ONLY VSTV is one of : <ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 	All tricuspid repairs are allowed. Tricuspid replacements and valvecotomies are only allowed if the tricuspid procedure was unplanned due to surgical complications. Must satisfy at least one of (1) or (2): 1. VSTrReplace: <ul style="list-style-type: none"> • No • Missing AND VSTrValvec: <ul style="list-style-type: none"> • No • Missing 2. VSTV	Unplanned Surgical Complications ONLY VSTV is one of : <ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing

			<ul style="list-style-type: none"> • Yes, unplanned due to surgical complication”] 	
Tricuspid Procedures VSTV VSTrReplace VSTrValvec	VSTV in (NULL, 2,4)	VSTV in (NULL, 2,4)	[VSTrReplace in (NULL, 2) and VSTrValvec in (NULL,2)] OR VSTV eq 4	VSTV in (NULL, 2,4)
VSPV/3685	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 			
VSPV	VSPV in (NULL, 2,4)			
Prev VADExp/ 3825	<ul style="list-style-type: none"> • Yes, not during this procedure • No • Missing 			
Prev VADExp	PrevVADExp in (NULL, 1,3)			
VADImpTmg/ 3845	<ul style="list-style-type: none"> • Pre-Operative (during same hospitalization but not same OR trip as CV surgical procedure) <ul style="list-style-type: none"> • In conjunction with CV surgical procedure (same trip to the OR)- unplanned • Post-Operative (after surgical procedure during reoperation) • Missing 			
VADImpTmg	VADImpTmg in (NULL, 1, 4, 5)			
VADImpTmg2/ 3900	<ul style="list-style-type: none"> • Pre-Operative (during same hospitalization but not same OR trip as CV surgical procedure) <ul style="list-style-type: none"> • In conjunction with CV surgical procedure (same trip to the OR)- unplanned • Post-Operative (after surgical procedure during reoperation) • Missing 			
VADImpTmg2	VADImpTmg2 in (NULL, 1, 4, 5)			
VADImpTmg3/ 3955	<ul style="list-style-type: none"> • Pre-Operative (during same hospitalization but not same OR trip as CV surgical procedure) <ul style="list-style-type: none"> • In conjunction with CV surgical procedure (same trip to the OR)- unplanned • Post-Operative (after surgical procedure during reoperation) • Missing 			
VADImpTmg3	VADImpTmg3 in (NULL, 1, 4, 5)			
VExp/3875	<ul style="list-style-type: none"> • Yes, not during this procedure • No • Missing 			
VExp	VExp in (NULL, 3, 2)			
VExp2/3930	<ul style="list-style-type: none"> • Yes, not during this procedure • No • Missing 			
VExp2	VExp2 in (NULL, 3, 2)			

VExp3/3985	<ul style="list-style-type: none"> • Yes, not during this procedure • No • Missing 			
VExp3	VExp3 in (NULL, 3, 2)			
OCarLVA/4075	<ul style="list-style-type: none"> • No • Missing 			
OCarLVA	OCarLVA in (NULL, 2)			
OCarVSD/4130	<ul style="list-style-type: none"> • No • Missing 			
OCarVSD	OCarVSD in (NULL, 2)			
AortProc/2125	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 			
AortProc	Aortproc in (NULL, 2,4)			
EndovasProc/5066	<ul style="list-style-type: none"> • No • Missing 			
EndovasProc	EndovasProc in (NULL, 2)			
OCarAFibIntraLes/4040	<ul style="list-style-type: none"> • No • Missing 	<ul style="list-style-type: none"> • No • Missing 	<Not used in this calculation>	<ul style="list-style-type: none"> • No • Missing
OCarAFibIntraLes	OcarAFibIntraLes in (NULL, 2)	OcarAFibIntraLes in (NULL, 2)		OcarAFibIntraLes in (NULL, 2)
OCarAFibLesLoc/4191	<ul style="list-style-type: none"> • Primarily epicardial • Missing 	<ul style="list-style-type: none"> • Primarily epicardial • Missing 	<Not used in this calculation>	<ul style="list-style-type: none"> • Primarily epicardial • Missing
OCarAFibLesLoc	OcarAFibLesLoc ne 2	OcarAFibLesLoc ne 2		OcarAFibLesLoc ne 2
OCarASDSec/4035	<ul style="list-style-type: none"> • No • Missing 	<ul style="list-style-type: none"> • No • Missing 	<Not used in this calculation>	<ul style="list-style-type: none"> • No Missing
OCarASDSec	OcarASDSec in (NULL, 2)	OcarASDSec in (NULL, 2)		OcarASDSec in (NULL, 2)
OCarACD/4055	<Not used in this calculation>	<Not used in this calculation>	<ul style="list-style-type: none"> • No • Missing • Permanent Pacemaker 	<Not used in this calculation>
OCarACD			OcarACD in (NULL, 1, 2)	
OCarACDLE/4065	<ul style="list-style-type: none"> • Yes, unplanned due to surgical complication • No • Missing 			

OCarACDLE	OCarACDLE in (NULL, 2,4)			
OCarLasr/4110	<Not used in this calculation>	<Not used in this calculation>	<ul style="list-style-type: none"> • No • Missing 	<Not used in this calculation>
OCarLasr			OCarLasr in (NULL, 2)	
OCPulThromDis/4085	<ul style="list-style-type: none"> • No • Missing 			
OCPulThromDis	OCPulThromDis in (NULL, 1)			
OCarSubaStenRes/4090	<ul style="list-style-type: none"> • No • Missing 			
OCarSubaStenRes	OCarSubaStenRes in (NULL, 2)			
OCarSVR/4105	<ul style="list-style-type: none"> • No • Missing 			
OCarSVR	OCarSVR in (NULL, 2)			
OCarCrTx/4120	<ul style="list-style-type: none"> • No • Missing 			
OCarCrTx	OCarCrTx in (NULL, 2)			
OCarTrma/4125	<ul style="list-style-type: none"> • No • Missing 			
OCarTrma	OCarTrma in (NULL, 2)			
OCTumor/4115	<ul style="list-style-type: none"> • No • Missing 			
OCTumor	OCTumor in (NULL, 1)			
OCarOthr/4135	<ul style="list-style-type: none"> • No • Missing 			
OCarOthr	OCarOthr in (NULL, 2)			
VSTCV/3400	<ul style="list-style-type: none"> • No • Missing 			
VSTCV	VSTCV in (NULL, 2)			
VSTCVMit/3610	<ul style="list-style-type: none"> • No • Missing 			
VSTCVMit	VSTCVMit in (NULL, 2)			
VSTCVTri/3652	<ul style="list-style-type: none"> • No • Missing 			
VSTCVTri	VSTCVTri in (NULL, 2)			
VSTCVPu/3695	<ul style="list-style-type: none"> • No • Missing 			
VSTCVPu	VSTCVPu in (NULL, 2)			

CCancCase/2050	<ul style="list-style-type: none"> • No • Missing
CCancCase	CCancCase in (NULL, 2)
ONCCarEn/6530	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing
ONCCarEn	ONCCarEn in (NULL, 2, 4)
ONCOVasc/6535	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing
ONCOVasc	ONCOVasc in (NULL, 2, 4)
ONCOTHor/6540	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing
ONCOTHor	ONCOTHor in (NULL, 2, 4)
ONCOther/6545	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing
ONCOther	ONCOther in (NULL, 2, 4)

PART 2 (PROCID 5 through 8)

Variable Short Name	MVR + CAB** (ProcID=5)	AVR + MVR** (ProcID=6)	MV Repair** (ProcID=7)	MV Repair + CAB** (ProcID=8)
OpCAB/2120	<ul style="list-style-type: none"> • Yes, planned • Yes, unplanned due to unsuspected disease or anatomy 	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 	<ul style="list-style-type: none"> • Yes, planned • Yes, unplanned due to unsuspected disease or anatomy
OpCAB	OpCAB in(3,5)	OpCab in (NULL, 2,4)	OpCab in (NULL, 2,4)	OpCAB in(3,5)
OpValve/2125	• Yes	• Yes	• Yes	• Yes
OpValve	Opvalve eq 1	Opvalve eq 1	Opvalve eq 1	Opvalve eq 1
VSAV/3390	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 	<ul style="list-style-type: none"> • Yes, planned • Yes, unplanned due to unsuspected disease or anatomy 	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing
VSAV	VSAV in (NULL, 2,4)	VSAV in (3,5)	VSAV in (NULL, 2,4)	VSAV in (NULL, 2,4)
VSAVPr/3395	<Not used in this calculation>	• Replacement	<Not used in this calculation>	<Not used in this calculation>
VSAVPr		VSAVPr eq 1		
VSMV/3495	<ul style="list-style-type: none"> • Yes, planned • Yes, unplanned due to unsuspected disease or anatomy 	<ul style="list-style-type: none"> • Yes, planned • Yes, unplanned due to unsuspected disease or anatomy 	<ul style="list-style-type: none"> • Yes, planned • Yes, unplanned due to unsuspected disease or anatomy 	<ul style="list-style-type: none"> • Yes, planned • Yes, unplanned due to unsuspected disease or anatomy
VSMV	VSMV in (3,5)	VSMV in (3,5)	VSMV in (3,5)	VSMV in (3,5)
VSMVPr/3500	• Replacement	• Replacement	• Repair	• Repair
VSMVPr	VSMVPr eq 2	VSMVPr eq 2	VSMVPr eq 1	VSMVPr eq 1
OCarCongProc1/6515	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • Anomalous origin of coronary artery from pulmonary artery repair • Anomalous aortic origin of coronary artery from aorta (AAOCA) repair • ASD repair, Primary closure • ASD repair, Patch 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • ASD repair, Primary closure • ASD repair, Patch 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • ASD repair, Primary closure • ASD repair, Patch 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • Anomalous origin of coronary artery from pulmonary artery repair • Anomalous aortic origin of coronary artery from aorta (AAOCA) repair • ASD repair, Primary closure • ASD repair, Patch
OCarCongProc1	Ocarconproc1 in (NULL,10,20,30,1291,1305)	Ocarconproc1 in (NULL,10,20,30)	Ocarconproc1 in (NULL,10,20,30)	Ocarconproc1 in (NULL,10,20,30,1291,1305)
OCarCongProc2/6520	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • Anomalous origin of coronary artery from pulmonary artery repair 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • ASD repair, Primary closure • ASD repair, Patch 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • ASD repair, Primary closure • ASD repair, Patch 	<ul style="list-style-type: none"> • Missing • PFO, Primary closure • Anomalous origin of coronary artery from pulmonary artery repair

PART 2 (PROCID 5 through 8)				
Variable Short Name	MVR + CAB** (ProcID=5)	AVR + MVR** (ProcID=6)	MV Repair** (ProcID=7)	MV Repair + CAB** (ProcID=8)
	<ul style="list-style-type: none"> Anomalous aortic origin of coronary artery from aorta (AAOCA) repair ASD repair, Primary closure ASD repair, Patch 			<ul style="list-style-type: none"> Anomalous aortic origin of coronary artery from aorta (AAOCA) repair ASD repair, Primary closure ASD repair, Patch
OCarCongProc2	Ocarconproc2 in (NULL,10, 20, 30,1291,1305)	Ocarconproc2 in (NULL,10,20,30)	Ocarconproc2 in (NULL,10,20,30)	Ocarconproc2 in (NULL,10, 20, 30,1291,1305)
OCarCongProc3/6525	<ul style="list-style-type: none"> Missing PFO, Primary closure Anomalous origin of coronary artery from pulmonary artery repair Anomalous aortic origin of coronary artery from aorta (AAOCA) repair ASD repair, Primary closure ASD repair, Patch 	<ul style="list-style-type: none"> Missing PFO, Primary closure ASD repair, Primary closure ASD repair, Patch 	<ul style="list-style-type: none"> Missing PFO, Primary closure ASD repair, Primary closure ASD repair, Patch 	<ul style="list-style-type: none"> Missing PFO, Primary closure Anomalous origin of coronary artery from pulmonary artery repair Anomalous aortic origin of coronary artery from aorta (AAOCA) repair ASD repair, Primary closure ASD repair, Patch
OCarCongProc3	Ocarconproc3 in (NULL,10, 20, 30,1291,1305)	Ocarconproc3 in (NULL,10,20,30)	Ocarconproc3 in (NULL,10,20,30)	Ocarconproc3 in (NULL,10, 20, 30,1291,1305)
Tricuspid Procedures; VSTV VSTrReplace VSTrValvec; 3640, 3650, 3653	<p>All tricuspid repairs are allowed. Tricuspid replacements and valvecotomies are only allowed if the tricuspid procedure was unplanned due to surgical complications. Must satisfy at least one of (1) or (2):</p> <p>1. VSTrReplace:</p> <ul style="list-style-type: none"> No Missing <p>AND VSTrValvec:</p> <ul style="list-style-type: none"> No Missing <p>2. VSTV</p>	<p>All tricuspid repairs are allowed. Tricuspid replacements and valvecotomies are only allowed if the tricuspid procedure was unplanned due to surgical complications. Must satisfy at least one of (1) or (2):</p> <p>1. VSTrReplace:</p> <ul style="list-style-type: none"> No Missing <p>AND VSTrValvec:</p> <ul style="list-style-type: none"> No Missing <p>2. VSTV</p>	<p>All tricuspid repairs are allowed. Tricuspid replacements and valvecotomies are only allowed if the tricuspid procedure was unplanned due to surgical complications. Must satisfy at least one of (1) or (2):</p> <p>1. VSTrReplace:</p> <ul style="list-style-type: none"> No Missing <p>AND VSTrValvec:</p> <ul style="list-style-type: none"> No Missing <p>2. VSTV</p>	<p>All tricuspid repairs are allowed. Tricuspid replacements and valvecotomies are only allowed if the tricuspid procedure was unplanned due to surgical complications. Must satisfy at least one of (1) or (2):</p> <p>1. VSTrReplace:</p> <ul style="list-style-type: none"> No Missing <p>AND VSTrValvec:</p> <ul style="list-style-type: none"> No Missing <p>2. VSTV</p>

PART 2 (PROCID 5 through 8)				
Variable Short Name	MVR + CAB** (ProcID=5)	AVR + MVR** (ProcID=6)	MV Repair** (ProcID=7)	MV Repair + CAB** (ProcID=8)
	• Yes, unplanned due to surgical complication"]	• Yes, unplanned due to surgical complication"]	• Yes, unplanned due to surgical complication"]	• Yes, unplanned due to surgical complication"]
Tricuspid Procedures VSTV VSTrReplace VSTrValvec	[VSTrReplace in (NULL, 2) and VSTrValvec in (NULL,2)] OR VSTV eq 4	[VSTrReplace in (NULL, 2) and VSTrValvec in (NULL,2)] OR VSTV eq 4	[VSTrReplace in (NULL, 2) and VSTrValvec in (NULL,2)] OR VSTV eq 4	[VSTrReplace in (NULL, 2) and VSTrValvec in (NULL,2)] OR VSTV eq 4
VSPV/3685	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 			
VSPV	VSPV in (NULL, 2,4)			
PrevVADExp/ 3825	<ul style="list-style-type: none"> • Yes, not during this procedure • No • Missing 			
PrevVADExp	PrevVADExp in (NULL, 1,3)			
VADImpTmg/ 3845	<ul style="list-style-type: none"> • Pre-Operative (during same hospitalization but not same OR trip as CV surgical procedure) <ul style="list-style-type: none"> • In conjunction with CV surgical procedure (same trip to the OR)- unplanned • Post-Operative (after surgical procedure during reoperation) • Missing 			
VADImpTmg	VADImpTmg in (NULL, 1, 4, 5)			
VADImpTmg2/ 3900	<ul style="list-style-type: none"> • Pre-Operative (during same hospitalization but not same OR trip as CV surgical procedure) <ul style="list-style-type: none"> • In conjunction with CV surgical procedure (same trip to the OR)- unplanned • Post-Operative (after surgical procedure during reoperation) • Missing 			
VADImpTmg2	VADImpTmg2 in (NULL, 1, 4, 5)			
VADImpTmg3/ 3955	<ul style="list-style-type: none"> • Pre-Operative (during same hospitalization but not same OR trip as CV surgical procedure) <ul style="list-style-type: none"> • In conjunction with CV surgical procedure (same trip to the OR)- unplanned • Post-Operative (after surgical procedure during reoperation) • Missing 			
VADImpTmg3	VADImpTmg3 in (NULL, 1, 4, 5)			
VExp/3875	<ul style="list-style-type: none"> • Yes, not during this procedure • No • Missing 			
VExp	VExp in (NULL, 3, 2)			
VExp2/3930	• Yes, not during this procedure			

PART 2 (PROCID 5 through 8)				
Variable Short Name	MVR + CAB** (ProcID=5)	AVR + MVR** (ProcID=6)	MV Repair** (ProcID=7)	MV Repair + CAB** (ProcID=8)
	<ul style="list-style-type: none"> • No • Missing 			
VExp2	VExp2 in (NULL, 3, 2)			
VExp3/3985	<ul style="list-style-type: none"> • Yes, not during this procedure • No • Missing 			
VExp3	VExp3 in (NULL, 3, 2)			
OCarLVA/4075	<ul style="list-style-type: none"> • No • Missing 			
OCarLVA	OCarLVA in (NULL, 2)			
OCarVSD/4130	<ul style="list-style-type: none"> • No • Missing 			
OCarVSD	OCarVSD in (NULL, 2)			
AortProc/2125	<ul style="list-style-type: none"> • No • Yes, unplanned due to surgical complication • Missing 			
AortProc	Aortproc in (NULL, 2,4)			
EndovasProc/5066	<ul style="list-style-type: none"> • No • Missing 			
EndovasProc	EndovasProc in (NULL, 2)			
OCarAFibIntraLes 4040	<Not used in this calculation>	<Not used in this calculation>	<Not used in this calculation>	<Not used in this calculation>
OCarAFibIntraLes				
OCarAFibLesLoc 4191	<Not used in this calculation>	<Not used in this calculation>	<Not used in this calculation>	<Not used in this calculation>
OCarAFibLesLoc				
OCarASDSec 4035	<Not used in this calculation>	<Not used in this calculation>	<Not used in this calculation>	<Not used in this calculation>
OCarASDSec				
OCarACD 4055	<ul style="list-style-type: none"> • No • Missing • Permanent Pacemaker 	<ul style="list-style-type: none"> • No • Missing • Permanent Pacemaker 	<ul style="list-style-type: none"> • No • Missing • Permanent Pacemaker 	<ul style="list-style-type: none"> • No • Missing • Permanent Pacemaker
OCarACD	OCarACD in (NULL, 1, 2)	OCarACD in (NULL, 1, 2)	OCarACD in (NULL, 1, 2)	OCarACD in (NULL, 1, 2)
OCarACDLE/4065	<ul style="list-style-type: none"> • Yes, unplanned due to surgical complication • No 			

PART 2 (PROCID 5 through 8)				
Variable Short Name	MVR + CAB** (ProcID=5)	AVR + MVR** (ProcID=6)	MV Repair** (ProcID=7)	MV Repair + CAB** (ProcID=8)
	<ul style="list-style-type: none"> Missing 			
OCarACDLE	OCarACDLE in (NULL, 2,4)			
OCarLasr/4110	<ul style="list-style-type: none"> No Missing 	<ul style="list-style-type: none"> No Missing 	<ul style="list-style-type: none"> No Missing 	<ul style="list-style-type: none"> No Missing
OCarLasr	OCarLasr in (NULL, 2)	OCarLasr in (NULL, 2)	OCarLasr in (NULL, 2)	OCarLasr in (NULL, 2)
OCPulThromDis/4085	<ul style="list-style-type: none"> No Missing 			
OCPulThromDis	OCPulThromDis in (NULL, 1)			
OCarSubaStenRes/4090	<ul style="list-style-type: none"> No Missing 			
OCarSubaStenRes	OCarSubaStenRes in (NULL, 2)			
OCarSVR/4105	<ul style="list-style-type: none"> No Missing 			
OCarSVR	OCarSVR in (NULL, 2)			
OCarCrTx/4120	<ul style="list-style-type: none"> No Missing 			
OCarCrTx	OCarCrTx in (NULL, 2)			
OCarTrma/4125	<ul style="list-style-type: none"> No Missing 			
OCarTrma	OCarTrma in (NULL, 2)			
OCTumor/4115	<ul style="list-style-type: none"> No Missing 			
OCTumor	OCTumor in (NULL, 1)			
OCarOthr/4135	<ul style="list-style-type: none"> No Missing 			
OCarOthr	OCarOthr in (NULL, 2)			
VSTCV/3400	<ul style="list-style-type: none"> No Missing 			
VSTCV	VSTCV in (NULL, 2)			
VSTCVMit/3610	<ul style="list-style-type: none"> No Missing 			
VSTCVMit	VSTCVMit in (NULL, 2)			
VSTCVTri/3652	<ul style="list-style-type: none"> No Missing 			

PART 2 (PROCID 5 through 8)				
Variable Short Name	MVR + CAB** (ProcID=5)	AVR + MVR** (ProcID=6)	MV Repair** (ProcID=7)	MV Repair + CAB** (ProcID=8)
VSTCVTri		• VSTCVTri in (NULL, 2)		
VSTCVPu/3695		• No • Missing		
VSTCVPu		• VSTCVPu in (NULL, 2)		
CCancCase/2050		• No • Missing		
CCancCase		• CCancCase in (NULL, 2)		
ONCCarEn/6530		• No • Yes, unplanned due to surgical complication • Missing		
ONCCarEn		• ONCCarEn in (NULL, 2, 4)		
ONCOVasc/6535		• No • Yes, unplanned due to surgical complication • Missing		
ONCOVasc		• ONCOVasc in (NULL, 2, 4)		
ONCOThor/6540		• No • Yes, unplanned due to surgical complication • Missing		
ONCOThor		• ONCOThor in (NULL, 2, 4)		
ONCOther/6545		• No • Yes, unplanned due to surgical complication • Missing		
ONCOther		• ONCOther in (NULL, 2, 4)		

****For Version 2.9 - Please note that the ProcID algorithms for all Mitral Valve Procedures now also include intracardiac lesions and tricuspid repairs. Since it is common practice to do a full Maze procedure and/or an occasional tricuspid repair STS Leadership wanted to keep these cases in the MV Risk Algorithms.**

The following fields are no longer collected:

AortProcTEVAR – replaced by EndovascProc

OpTricus – replaced by VSTrRepair, VSTrReplace, and VSTrValvec