



# Standardized Data File - Appendix 1

## Phenotype Specifications

**Version 2021**

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# Admission Type

## Description

Type of admission for each operative case

## Limitation

This phenotype is reliant upon proper variable mapping to specific MPOG admission type concepts. Also, admission status may change postoperatively. Some electronic health record extracts default to include the admission type when the case was initially added to the surgery schedule. For this reason, some cases may result in inaccurate admission types.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Unknown Concept	0	not mapped to admission type, there is no admission data for the case
Inpatient	500	Surgical Admission Type - inpatient
Outpatient	501	Surgical Admission Type - outpatient
Admit	502	Surgical Admission Type - admission
Other Admission Type	503	Surgical Admission Type - admission type that is not otherwise categorized
Unknown Admission Type	504	Surgical Admission Type - unknown
23 hour observation	505	Surgical Admission Type - 23 hour observation
Emergency	515	Surgical Admission Type - emergency

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar

Value_Code	numeric
------------	---------

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## Granularity

**One value per case**

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## Logic

This collation takes text from the concept description from the intraoperative case info and returns a raw string value corresponding to the above listed values along with the associated MPOG concept ID.

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## Dependencies

No dependency available.

## Age (Years)

### Description

Patient age in years for each procedure, returned as a continuous variable. Ages less than 2 yo are returned including one decimal place to reflect fractions of year when appropriate.

### Limitation

Maximum returned age is 90 as defined by PHI regulations.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	float

### Granularity

**One value per case**

### Logic

This phenotype returns the patient's age from the dedicated column in the cases file. The phenotype makes the following adjustments before returning a value:

1. If the patient age was documented in anything other than years:
  1. If the patient's age is in weeks: Divides the age by 52 to get the age in years
  2. If the age was documented in months: Divides the age by 12 to get age in years
2. The maximum age returned in years is 90 as defined by PHI regulations
3. For patients <2 years, the age will be returned as a decimal number (eg 16 months = 1.33 years old)
4. For patients >2 years, the age will return as a whole number
5. If age in years <0, then NULL is returned

### Dependencies

No dependency available.

# AHRQ Complication - Pulmonary - All

## Description

This is an ICD-9/10 code based phenotype. It is used to determine if cases had a pulmonary complication ICD 9/10 code documented from day of surgery through 90 days after surgery. Both Professional fee and Hospital discharge diagnosis codes are considered.

## Limitation

IMPORTANT: The pulmonary complication identified by this phenotype may have been present preoperatively and continued postoperatively. The pulmonary complication phenotype does not necessarily indicate a postoperative complication was identified. The complication may or may not be related to the procedure performed. Reasons why include: 1) ICD 9/10 'present on admission' documentation is not consistent across MPOG sites and therefore is not considered by this phenotype. 2) ICD-9/10 codes from professional fee and hospital/facility billing diagnoses data are considered. 3) The patient may have had more than one procedure during the 90 day timeframe for this phenotype. The complication code will trigger for both procedures if the start date for the ICD-9/10 code falls within the 90-day window for both cases. 4) The crosswalk between ICD-9 and ICD-10 codes was done manually using <https://www.icd10data.com/>

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any discharge ICD-9/10 codes
No	0	Patient does have discharge ICD-9/10 codes, but does not have any pulmonary complications
Yes - AHRQ only	1	Patient has AHRQ CCS "respiratory complication" ICD-9/10 codes only
Yes - Additional only	2	Patient only has non-AHRQ pulmonary complication ICD-9/10 codes
Yes - Both	3	Patient has both AHRQ CCS and non-AHRQ pulmonary complication ICD-9/10 codes

## Return Columns

Column Name	Data Type
-------------	-----------

MPOG_Case_ID	uniqueidentifier
Triggering_AHRQ_Diagnoses	varchar
Triggering_MPOG_Diagnoses	varchar
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

### AHRQ (16.10.2.2)

ICD-9	ICD-10	Description
518.7	J95.84	Transfusion-related acute lung injury (TRALI)
997.3	-----	Respiratory complications not elsewhere classified
997.31	J95.851	Ventilator associated pneumonia
997.32	J95.89	Post-procedural aspiration pneumonia
		Other complication of ventilator
	J95.859	Other intraoperative complications of respiratory system, not
997.39	J95.88	elsewhere classified
	J95.89	Other postprocedural complications and disorders of respiratory
		system, not elsewhere classified

### Additional Pulmonary Complication Codes

ICD-9	ICD-10	Description
	J96.00	Acute respiratory failure, unspecified whether with hypoxia or hypercapnia
518.81	J96.90	Respiratory failure, unspecified, unspecified whether with hypoxia or hypercapnia
	J96.91	Respiratory failure, unspecified with hypoxia
	J96.92	Respiratory failure, unspecified with hypercapnia
	J96.20	Acute and chronic respiratory failure, unspecified whether with
518.84	J96.21	hypoxia or hypercapnia
	J96.22	Acute and chronic respiratory failure with hypoxia
		Acute and chronic respiratory failure with hypercapnia
517.3	J99	Respiratory disorders in diseases classified elsewhere
518.5	-----	Pulmonary insufficiency following trauma and surgery
	J95.821	Acute postprocedural respiratory failure
518.51	J96.01	Acute respiratory failure with hypoxia
	J96.02	Acute respiratory failure with hypercapnia
	J95.1	Acute pulmonary insufficiency following thoracic surgery
518.52	J95.2	Acute pulmonary insufficiency following nonthoracic surgery
	J95.3	Chronic pulmonary insufficiency following surgery
518.53	J95.822	Acute and chronic postprocedural respiratory failure
518.82	J80	Acute respiratory distress syndrome
518.83	J96.10	Chronic respiratory failure, unspecified whether with hypoxia or hypercapnia
	J96.11	Chronic respiratory failure with hypoxia

	J96.12	Chronic respiratory failure with hypercapnia
799.1	R09.2	Respiratory arrest
481	J13	Pneumonia due to streptococcus pneumonia
482	-----	Other bacterial pneumonia
482.1	J15.1	Pneumonia due to Pseudomonas
482.3	-----	Pneumonia due to streptococcus
482.4	-----	Pneumonia due to staphylococcus
482.41	J15.211	Pneumonia due to Methicillin susceptible Staphylococcus
482.42	J15.212	Pneumonia due to Methicillin susceptible Staphylococcus aureus
482.82	J15.5	Pneumonia due to Escherichia coli
482.83	J15.6	Pneumonia due to other Gram-negative bacteria
482.89	J15.8	Pneumonia due to other specified bacteria
482.9	J15.9	Unspecified bacterial pneumonia
483.8	J16.8	Pneumonia due to other specified infectious organisms
484.6	B44.0	Invasive pulmonary aspergillus
485	J18.0	Bronchopneumonia, unspecified organism
486	J18.9	Pneumonia, unspecified organism
	----- J15.0	Pneumonia due to Klebsiella pneumonia
	----- J15.4	Pneumonia due to other streptococci
507	-----	Pneumonitis due to solids and liquids
514	J18.2	Hypostatic pneumonia, unspecified organism
799	-----	Other ill-defined and unknown causes of morbidity and mortality
506	-----	Respiratory conditions due to chemical fumes and vapors
	----- J69	Pneumonitis due to solids and liquids
507	J69.0	Pneumonitis due to inhalation of food and vomit
512.1	J95.811	Postprocedural pneumothorax
415.11	I26.90	Septic pulmonary embolism without acute cor pulmonale
	I26.99	Other pulmonary embolism without acute cor pulmonale
999.1	T80.0XXA	Air embolism following infusion, transfusion and therapeutic injection, initial encounter
997.2	T81.718A	Complication of other artery following a procedure, not elsewhere classified, initial encounter
997.79	T81.72XA	Complication of vein following a procedure, not elsewhere classified, initial encounter
996.71 996.72	T82.817A	Embolism due to cardiac prosthetic devices, implants and grafts, initial encounter
996.73 996.74	T82.818A	Embolism due to vascular prosthetic devices, implants and grafts, initial encounter

## Dependencies

Anesthesia Start

MPOG Patient ID



# Airway: Arrived Intubated

## Description

This phenotype determines if a patient had an existing airway in place prior to anesthesia start time. Existing airways include intubation with ETT or existing tracheostomy prior to anesthesia start time.

## Limitation

May include cancelled cases.

Cases where the patient was intubated in the days prior to the procedure but did not have any documented airway notes or included infusion medications in the time frames listed below may not be included.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	Patient did not arrive with an existing airway in place
Yes	1	Patient arrived to procedure room with an existing airway in place

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

This phenotype determines if a patient had an existing airway in place prior to arrival to the procedure room. This phenotype uses Observed Time. If Observed Time is not available, it will use Entered Time.

**Step 1:** Was case ASA 6? If No, proceed to step 2. If Yes, assign **Yes and stop**.

**Step 2:** Was Anesthesia Technique: General? If Yes, proceed to step 3. If No, assign **No and stop**

**Step 3:** If case has 'Tracheostomy' collation mappings **and** 1 of the following Surgical CPT codes (same date of surgery) then result **Yes and stop**. If no, proceed to step 4.

Surgical CPT code	CPT Description
31600	Tracheostomy, planned (separate procedure)
31601	Tracheostomy, planned (separate procedure); younger than 2 years
31603	Tracheostomy, emergency procedure; transtracheal
31605	Tracheostomy, emergency procedure; cricothyroid membrane
31610	Tracheostomy, fenestration procedure with skin flaps

**Step 4:** Did case have sedative medication administered (as an infusion) within 2 hours prior to anesthesia start? If Yes, proceed to step 4a. If No proceed to step 5.

**Sedation Medication Concepts:**

- 10020 ALFENTANIL
- 10149 DEXMEDETOMIDINE
- 10154 DIAZEPAM
- 10183 ETOMIDATE
- 10186 FENTANYL
- 10187 FENTANYL/MIDAZOLAM 40 MCG/ML / 200MCG/ML
- 10238 KETAMINE
- 10272 LORAZEPAM
- 10290 METHADONE
- 10292 METHOHEXITAL
- 10301 MIDAZOLAM
- 10377 PROPOFOL
- 10390 REMIFENTANIL
- 10414 SUFENTANIL
- 10427 THIOPENTAL
- 10453 PROPOFOL W/ KETAMINE 10 MG/ML + 1 MG/ML
- 10700 CLONAZEPAM

**Step 4a:** Was 50117, 50209, or 50074 (without the keywords listed in step 5) documented after anesthesia start? If Yes, assign **No**. If No, assign **Yes and stop**.

**Step 5:** Did case have existing airway concept documented within 4hrs of procedure start? If Yes, proceed to step 5a. If No, assign **No and stop**

MPOG Concept ID	MPOG Concept	Text
50208	Intubation view note	"in situ"
50628	Preinduction - Patient transported to OR by anesthesia team	"vent" "ICU"
50380	ETT in place, patient manually ventilated	
50671	Intubation - endotracheal tube in situ	
50105	Rhythm/Pattern (Respiratory)	"vent"
50074	Airway Type	"trach" "in situ"

		"existing"
50624	Airway - Supplemental oxygen delivered	"vent"

**Step 5a:** Was the existing airway concept 50117, 50209, or 50074 (without the keywords listed in step 5)? If No, assign **Yes and stop**. If Yes, assign **No and stop**.

---

## Dependencies

Airway Type Notes

Anesthesia End

Anesthesia Start

Anesthesia Technique: General

ASA Class

ASA Notes

GeneralNotes

Institution

Paralytics Used (All)

Surgery Start Date/Time

# Anesthesia CPT (All)

## Description

This phenotype returns Anesthesia CPT codes assigned to a case. If no actual codes are present, predicted CPT codes are returned.

## Limitation

If no CPT is available for a case, CPT prediction is used.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Actual CPT	0	Anesthesia CPT code was not predicted
Predicted CPT	1	Anesthesia CPT code was predicted with high confidence

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Was_Predicted	bit

## Granularity

**Many values per case**

## Logic

This phenotype returns Anesthesia CPT codes assigned to a case. If no actual codes are present, predicted CPT codes are returned.

1. Use actual CPT code first (not predicted). If no CPT codes present for case then,
2. Use predicted CPT code with high confidence (prediction rank = 2). If no CPTs have high confidence, then
3. Return all three predicted CPT codes

## Dependencies

No dependency available.



## Anesthesia CPT - Base Unit Value

### Description

This phenotype returns the base unit value associated with the primary anesthesia CPT code for the case. This version of the phenotype is built using the 2018 base units by CPT code values (for reference: <https://www.cms.gov/Center/Provider-Type/Anesthesiologists-Center>). The anesthesia base units remained unchanged for 2019 and 2020. This phenotype will be updated when a new version becomes available.

### Limitation

to be added

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

### Granularity

**One value per case**

### Logic

Assigns the corresponding numeric base unit value based on the primary anesthesia CPT code phenotype associated with the case.

### Dependencies

Anesthesia Start

Anesthesia CPT (Primary)

# Anesthesia CPT (Primary)

## Description

This phenotype is used to determine the single primary anesthesia Current Procedural Terminology (CPT) billing code for each case. This phenotype also returns the MPOG anesthesia CPT class and the MPOG base unit.

## Limitation

Any combined cases are returned as a single CPT code. An example is in OB, an epidural case that emergently goes to the OR for a C/S, if not listed as a separate case will return only a single anesthesia CPT code. Uploaded unit values are freely entered by presenting site and are unbounded. Thus, they may contain errors in documentation that fall outside acceptable base unit value ranges.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Anesthesia CPT Code	0	5-digit numeric value specific to anesthesia CPT billings codes

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
MPOGAnesCPTClass	varchar
MPOGbaseUnits	int
uploadedUnits	numeric
value	varchar

## Granularity

**One value per case**

## Logic

Step 1: Determine Primary Anesthesia CPT Code

1. Search for any anesthesia procedure codes linked to the case. Consider all codes marked as anesthesia codes, as well as any codes starting with 00 or 01 that are marked as surgical codes
  1. If a single code is found, that one is returned as the primary anesthesia code
  2. If multiple codes are found, they are ranked using the following criteria and the highest ranked code is returned as the primary code:
    1. The procedure code priority (if available)
    2. Total anesthesia time units (if unavailable, use the base time units from the CPT catalog)
    3. Codes defined as secondary are ranked below other codes
    4. As a final tiebreaker, the CPT codes are ranked alphabetically
3. If a case has no documented anesthesia procedure codes, search for surgical procedure codes linked to the case. Those surgical codes are then matched to the typical anesthesia code for that procedure, as listed in the ASA CPT crosswalk
  1. If a single code is found, that one is returned as the primary anesthesia code
  2. If multiple anesthesia codes arise from the cross-walking, they are ranked using the following criteria. The highest ranked code is returned as the primary code:
    1. The original surgical code's procedure priority (if available)
    2. Radiology procedures are ranked below non-radiology procedures (given they have atypically high base time unit)
    3. The anesthesia codes' base time units from the CPT catalog
    4. Codes defined as secondary are ranked below other codes
    5. As a final tiebreaker, the CPT codes are ranked alphabetically
2. If there is not a CPT uploaded, then the case is omitted from the collation, return NULL

Step 2: Specify the CPT into a class that is assigned by CPT groupings below

Anesthesia CPT Classes (as of 2/13/18)

Area of the Body	CPT Code Range
Head	00100-00222
Neck	00300-00352
Thorax (chest wall and shoulder girdle)	00400-00474
Intrathoracic	00500-00580
Spine and Spinal Cord	00600-00670
Upper Abdomen	00700-00797
Lower Abdomen	00800-00882
Perineum	00902-00952
Pelvis (except hip)	0112-01190
Upper Leg (except knee)	01200-1274
Knee and Popliteal Area	01320-01444
Lower Leg (below knee, including ankle and foot)	01462-01522
Shoulder and Axilla	01610-01682
Upper Arm and Elbow	01710-01782
Forearm, Wrist and Hand	01810-01860
Radiological Procedure	01916-01936
Burn Excisions or Debridement	01951-01953
Obstetric	01958-01969
Other Procedure	01990-01999

## Dependencies

Anesthesia Start



# Anesthesia Duration

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## Description

Duration of anesthesia care provided for an operative procedure

---

## Limitation

We omit the cases whose Duration is > 36hrs or < 0

---

## Value Type

**Numeric**

---

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

---

## Granularity

**One value per case**

---

## Logic

This collation will calculate the difference in minutes between the Anesthesia Start and Anesthesia End Collations. If the value returned is >36 hrs (>2160 minutes) or <0 (negative) the value returned is NULL.

---

## Dependencies

Anesthesia End

Anesthesia Start





# Anesthesia End

---

## Description

Anesthesia end time/date for a procedure/case

---

## Limitation

This phenotype uses note concept ID 50009 (AACD Anesthesia End Date/Time) to define the anesthesia stop time for the case. Those defined outside this concept will not be captured.

---

## Value Type

**Datetime**

---

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

---

## Granularity

**One value per case**

---

## Logic

This phenotype uses note concept ID 50009 (AACD Anesthesia End Date/Time) and returns the date/time of the last anesthesia end on a case,

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## Dependencies

No dependency available.

---



# Anesthesia Start

## Description

Anesthesia start time/date for a procedure/case

## Limitation

This phenotype uses note concept ID 50002 (AACD Anesthesia Start Date/Time) to define the anesthesia start time. Those defined outside this concept will not be captured.

## Value Type

**Datetime**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

## Granularity

**One value per case**

## Logic

This phenotype uses note concept ID 50002 (AACD Anesthesia Start Date/Time) and returns the associated time observed for the variable mapped to the AACD Anesthesia Start Date/Time concept. If there are more than one anesthesia start times for the case, this phenotype will result the earliest time.

## Dependencies

No dependency available.

# Anesthesia Technique: General

## Description

This phenotype attempts to classify each case in terms of general anesthesia technique. This returns type of anesthetic used within the possibilities listed in the value types.

## Limitation

This phenotype has several limitations. Tracheostomy is not considered. ETT and LMA single notes will return as general - unknown if there is only a single ETT or single LMA note in the case., meaning if there are no accompanying general, ETT, or LMA note. This phenotype also does not differentiate type of intubation (ex. fiberoptic or glidescope). Also, there is no differentiation of success, only if the type was documented as attempted. A negative return ("no") means there was either no general anesthetic attempted in the case (ex. a MAC / sedation case) or not enough documentation to determine a general anesthetic. Neuromuscular Blocker Only and Inhaled Anesthetic Only were used as distinct categories as they may convey meaning if isolated such as in pediatric mask induction cases or ECT cases in which succinylcholine was used. Only airway notes from 24 hours before anesthesia start through anesthesia end are considered.

## Value Type

### Categorical

## Enumeration

Value	Value Code	Definition
Invalid Value	-998	The case is missing either Anesthesia Start or Anesthesia End
No	0	No general, ETT, or LMA note and no sedative medications or inhaled anesthetics or paralytics associated with the case.
General - both ETT and LMA	1	There were ETT and LMA notes associated with this case.
General - ETT	2	There was at least one ETT note, with another general or ETT note associated with this case. There were no LMA notes.
General - LMA	3	There was at least one LMA note, There were no ETT notes.
General - Inhaled Anesthetic Only	4	There were inhaled anesthetics associated with this case. There were no ETT or LMA notes.
General - Neuromuscular Blocker Only	5	There were neuromuscular blockers associated with this case. There were no ETT or LMA notes.

General - Unknown	6	There were both neuromuscular blockers and inhaled anesthetics associated with this case along with ambiguous general airway notes
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## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

This phenotype relies on four internal phenotypes: Airway Type Notes, General Anesthesia Notes Present (*GeneralNotes*), Volatile Gases (*VolatileGasesUsed*), and Paralytcs (*ParalytcsUsed*).

- **Airway Type Notes** = four generic airway concepts that are mapped in a separate collation to ETT, LMA, or both ETT and LMA
- **General Anesthesia Notes Present** = includes General - unknown, LMA, ETT and both ETT and LMA notes
- **Halogenated Gases Used** = includes General - inhaled anesthetic only
  - Volatile Gases documented between 'Anesthesia Start' and 'Anesthesia End' only will be considered by this phenotype
- **Paralytcs Used All** = includes General - neuromuscular blockers only
  - Paralytcs administered from 60 minutes before 'Anesthesia Start' through 'Anesthesia End' only will be considered by this phenotype

Airway notes documented between 24 hours before 'Anesthesia Start' through 'Anesthesia End' are considered. Observed time take priority over entered time. If no observed time is available, entered time is considered

### CASE RESULT

IMPORTANT: 'ETT' result takes precedence over all other results except 'ETT and LMA'

Here is the hierarchical order of return for this phenotype:

**General - Both ETT and LMA:** ETT and LMA notes both exist

**General - ETT:** ETT note with any other inhaled anesthetic, neuromuscular blocker or general unknown note

**General - LMA:** LMA note exists, without any ETT notes

**General - inhaled anesthetic only:** inhaled anesthetic documented without any ETT notes, LMA notes, general-unknown concepts, or paralytic notes

**General - neuromuscular blocker only:** Paralytic administered without inhaled anesthetic, ETT notes, LMA note, general unknown concepts, or inhaled anesthetic notes

**General - unknown:** There were both neuromuscular blockers and inhaled anesthetics associated with this case along with ambiguous general airway notes \*(General-Unknown concept subset)

**No :** No general notes, sedative medications, inhaled anesthetics or paralytcs associated with the case.

**Invalid Value:** Cases missing either 'Anesthesia Start' or 'Anesthesia End'

## **\*General - Unknown Concept Subset:**

- 50099 Intubation - Nasal approach note
- 50100 Intubation - Videolaryngoscopy View
- 50115 Intubation Laryngoscopy Blade Type and Size
- 50116 Intubation Laryngoscopy Cricoid Pressure or BURP Applied
- 50119 Intubation Direct Laryngoscopy View
- 50120 Intubation Bougie Introducer Used
- 50127 Intubation Extubated Awake or Deep
- 50129 Intubation Fiberoptic Asleep or Awake
- 50130 Intubation Fiberoptic Nasal or Oral
- 50131 Intubation Fiberoptic Topicalization Type
- 50132 Intubation Fiberoptic Transtracheal block
- 50133 Intubation Fiberoptic Number of Attempts
- 50134 Intubation Fiberoptic Existing Airway Device
- 50197 Intubation - atraumatic
- 50202 Emergence - patient extubated
- 50207 Intubation device and adjunct note
- 50311 Induction - GA Induction type (mask, iv, rapid)
- 50334 Intubation - cricoid pressure applied
- 50653 Intubation - Retrograde technique
- 50669 Airway - Cuff inflation volume
- 50670 Intubation - performed awake
- 50688 Intubation - comment
- 50695 Categorized note - Intubation

## **\*\*Airway Type Notes:**

- 50004 Airway Type
- 50117 Intubation – ETT placed
- 50208 Intubation view note
- 50118 Intubation number of attempts

---

## **Dependencies**

Airway Type Notes

Anesthesia End

Anesthesia Start

GeneralNotes

Institution

Paralytics Used (All)

# Anesthesia Technique: Neuraxial

## Description

This phenotype is used to determine whether or not a case included neuraxial anesthesia and if that neuraxial anesthesia was spinal, epidural, caudal, multiple types, combined spinal-epidural, or unknown. This phenotype is applicable to all cases. This phenotype is used in exclusion/inclusion criteria for measures.

## Limitation

Variance in electronic health record documentation or incorrect variable mapping may cause an incorrect result for a case. This phenotype is limited to documentation within notes that are associated with neuraxial anesthesia.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
None	0	Case did not use any Neuraxial anesthesia techniques
Combined Spinal Epidural (CSE)	1	Case used Combined Spinal Epidural anesthesia technique
Epidural	2	Case used Epidural anesthesia technique
Spinal	3	Case used Spinal anesthesia technique
Caudal	4	Case used Caudal anesthesia technique
Neuraxial - Unknown Type	5	Case used a Neuraxial anesthesia technique, but the algorithm was unable to determine the type based on the documentation
Neuraxial - Multiple Types Listed	6	Case used multiple neuraxial anesthesia techniques

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

# Granularity

## One value per case

### <sup>2.1</sup> Logic

Start with all cases.

**First, compile list of all neuraxial types that a case may qualify for using steps 1-6.**

Step 1: Determine if case has 'Epidural' flags

1. Evaluate if case has any of the notes
  1. 50051 Obstetrics- Labor epidural end
  2. 50614 Neuraxial technique- combined spinal/epidural technique note
  3. 50050 Obstetrics- labor epidural start
  4. 50154 Epidural anesthesia catheter placement note
  5. 50643 Neuraxial - Epidural placed for postoperative pain control
2. If any of the above notes present, evaluate if that note has text 'Epidural' AND that note does **not** have text 'Combined Spinal'
  1. If yes, add '**Epidural**' to list of neuraxial types that case qualifies for and move to step 2.
3. OR if case has meds with 2005 (epidural) route concept OR if case has 10513 (other-epidural medication) medication concept
  1. If yes, add '**Epidural**' to list of neuraxial types that case qualifies for and move to step 2.
4. If no flags present, move to step 2

Step 2: Determine if case has 'Spinal' flags

1. Evaluate if case has any of the following notes
  1. 90320 High spinal
  2. 50614 Neuraxial technique - Combined Spinal / Epidural technique note
2. If any of the above notes present, evaluate if that note has text 'Spinal' or 'SAB' AND note does not contain 'Combined Spinal'
  1. If yes, add '**Spinal**' to list of neuraxial types that case qualifies for and move to Step 3
3. OR Evaluate if case has note concept 50680 and does not contain 'Combined Spinal'
  1. If yes, add '**Spinal**' to list of neuraxial types that case qualifies for and move to Step 3
4. OR case has a spinal access type concept 100313 (Spinal)
  1. If yes, add '**Spinal**' to list of neuraxial types that case qualifies for and move to Step 3
5. If no flags present, move to Step 3

Step 3: Determine if case has 'Combined Spinal Epidural (CSE)' flags

1. Evaluate if case has one of the note concepts
  1. 50614 Neuraxial technique - Combined Spinal / Epidural technique note
  2. 50154 Epidural anesthesia catheter placement note
2. If any of the above notes present, evaluate if the note has text 'CSE' or 'Combined Spinal'
  1. If yes, add '**Combined Spinal Epidural (CSE)**' to list of neuraxial types that case qualifies for and move to Step 4
3. If no flags present, move to Step 4

Step 4: Determine if case has 'Caudal' flags

1. Evaluate if case has note 50635 (Regional - Caudal block performed)
  1. If yes, add '**Caudal**' to list of neuraxial types that case qualifies for and move to final check.
  2. If no, move to Step 5

Step 5. Determine if the case has broad neuraxial notes

1. Evaluate if case has the following note concepts
  1. 50677 Regional - Block location
  2. 50665 Procedures - Other unlisted procedure
  3. 50691 Categorized note - Neuraxial anesthesia
  4. 50356 Regional - Block performed
  5. 50229 Induction procedure
  6. 50507 Procedures - Epidural Blood Patch
  7. 50764 Misc - Primary Anesthesia Technique Used
  8. 50165 Epidural dermatomal level achieved
  9. 50156 Epidural needle approach
  10. 90100 Actual procedure performed
2. If any of the above notes have text 'CSE' or 'Combined Spinal' OR has text 'Epidural' AND 'Spinal' in same note, then add '**Combined Spinal Epidural (CSE)**' to list of neuraxial types that case qualifies for and move to Step 6.
3. If any of the above notes have text 'Epidural' but does not have text 'Spinal', 'Combined Spinal', or 'CSE', then add '**Epidural**' to list of neuraxial types that case qualifies for and move to to Step 6.
4. If any of the above notes have text 'Spinal' but do not contain 'Epidural' or 'Combined Spinal' or 'CSE', then add '**Spinal**' to list of neuraxial types that case qualifies for and move to Step 6.
5. If any of the above notes have text 'Caudal' but do not have text 'Combined Spinal' or 'CSE', then add '**Caudal**' to list of neuraxial types that case qualifies for and move to Step 6.
6. If none of the above, move to Step 6.

Step 6. Then, check for additional neuraxial note concepts:

1. Evaluate if case has any of the following note concepts
  1. 50687 Neuraxial - comment
  2. 50679 Neuraxial - complications
  3. 50340 Neuraxial / Regional- Assessment of Neuraxial or regional technique
  4. 50341 Neuraxial / Regional - Assessment of neuraxial or regional technique - detail
  5. 50020 Neuraxial Approach
  6. 50338 Neuraxial insertion aspiration of blood or CSF- detail
  7. 50337 Neuraxial insertion aspiration of blood or CSF - note
  8. 50335 Neuraxial insertion paresthesia assessment- note
  9. 50336 Neuraxial insertion paresthesia yes / no detail
  10. 50165 Epidural dermatomal level achieved
  11. 50154 Epidural anesthesia catheter placement note
  12. 50371 Neuraxial technique - Bilateral Sensory Level Detail
  13. 50370 Neuraxial technique - Bilateral Sensory Level Tested Note
  14. 50372 Neuraxial technique - Bilateral Sensory Level Testing Device Detail
  15. 50364 Neuraxial technique - Sensory Level Left Detail
  16. 50365 Neuraxial technique - Sensory Level Left Testing Device Detail
  17. 50367 Neuraxial technique - Sensory Level Right Level Detail
  18. 50368 Neuraxial technique - Sensory Level Right Testing Device Detail
  19. 50363 Neuraxial technique - Sensory Level Tested Left Note
  20. 50366 Neuraxial technique - Sensory Level Tested Right Note
  21. 50146 Neuraxial technique patient position
  22. 50329 Neuraxial technique sterile prep and drape note
  23. 50330 Neuraxial technique sterile prep type detail



24. 50333 Neuraxial technique subcutaneous skin infiltrated with local anesthetic
  25. 50344 Epidural catheter secured
  26. 50163 Epidural catheter type or brand
  27. 50164 Epidural catheter withdrawn to depth (cm)
  28. 50339 Epidural catheter withdrawn to depth (cm) - detail
  29. 50161 Epidural loss of resistance (saline or air)
  30. 50162 Epidural loss of resistance depth (cm)
  31. 50347 Epidural meniscus fall assessment - note
  32. 50348 Epidural meniscus fall yes / no - detail
  33. 50159 Epidural needle length (cm)
  34. 50166 Epidural parasthesias during placement
  35. 50349 Epidural test dose administered - note
  36. 50350 Epidural test dose administered - number of ML detail
  37. 50155 Epidural vertebral interspace final
  38. 50153 Neuraxial- Spinal dermatomal level achieved
  39. 50148 Neuraxial- Spinal needle approach
  40. 50150 Neuraxial- Spinal needle diameter (gauge)
  41. 50151 Neuraxial- Spinal needle length (cm)
  42. 50353 Neuraxial - Spinal placement Blood observed in spinal needle note
  43. 50354 Neuraxial - Spinal placement Blood observed yes / no detail
  44. 50351 Neuraxial - Spinal placement CSF observed note
  45. 50352 Neuraxial - Spinal placement CSF observed yes / no detail
  46. 50147 Neuraxial- Spinal vertebral interspace final
  47. 50034 Neuraxial – Vertebral interspace final (unspecified)
  48. 50691 Categorized note - Neuraxial anesthesia
2. If case has any of the above note concepts, add '**Neuraxial - Unknown Type**' to list of neuraxial types that case qualifies for. Do not consider any terms in note text. Proceed to Final Check.

**Final Check: Compile complete list of Neuraxial Types that a case qualifies for based on above logic. One case can have zero assignments or many assignments. Consider complete list of Neuraxial Types assigned in the steps above:**

1. If list has 'Combined Spinal Epidural (CSE)', then assign final result '**Combined Spinal Epidural (CSE)**'
2. If case does not have 'Combined Spinal Epidural (CSE)' assignment, then check for 'Caudal', 'Epidural' and 'Spinal' independently
  1. If case has 'Caudal' and no other neuraxial types on list OR has 'Caudal' and 'Epidural', then assign final result '**Caudal**'
  2. If case has 'Epidural' and no other neuraxial types on list, then assign final result '**Epidural**'
  3. If case has 'Spinal' and no other neuraxial types in list, then assign final result '**Spinal**'
  4. If case has 'Caudal' and 'Spinal', then assign final result '**Neuraxial- Mixed Types Listed**'
  5. If case has 'Epidural' and 'Spinal', then assign final result '**Neuraxial- Mixed Types Listed**'
6. If case does not have 'Epidural', 'Spinal', 'Caudal' or 'Combined Spinal Epidural (CSE)' and has 'Neuraxial- Unknown Type Assignment', then assign final result '**Neuraxial- Unknown Type**'
3. If case has no neuraxial types assigned to it, then assign final result '**None**'

## Dependencies

No dependency available.

# Anesthesia Technique: Peripheral Nerve Block

## Description

This phenotype is used to determine if a peripheral nerve block was attempted or placed for a given case.

## Limitation

Variance in electronic health record documentation or incorrect variable mapping may produce an incorrect result for a case. This phenotype is limited to variables mapped to regional block MPOG concepts and examines only the documentation within those notes for specific peripheral nerve block text. This phenotype will result if the block was attempted; it does not differentiate if the attempt was successful. All regional block notes documented in the perioperative period will be examined however, the results of this phenotype do not differentiate whether the block was attempted before, after, or during a procedure.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
none	0	There was no peripheral block attempted
Block, Unknown Type	1	The case used/attempted a peripheral block, specific type could not be identified
Block, Multiple Types Listed	2	The case used/attempted peripheral blocks, more than one specific type identified
Cervical Plexus	3	The case used/attempted a Cervical Plexus block
Adductor Canal	4	The case used/attempted an Adductor Canal block
Supraclavicular	5	The case used/attempted a Supraclavicular block
Interscalene	6	The case used/attempted an Interscalene block
Infraclavicular	7	The case used/attempted an Infraclavicular block
Axillary	8	The case used/attempted an Axillary block
Femoral Nerve	9	The case used/attempted a femoral nerve block
Popliteal	10	The case used/attempted a Popliteal block
Sciatic	11	The case used/attempted a Sciatic block

Ankle	12	The case used/attempted an Ankle block
Bier	13	The case used/attempted a Bier block
Lumbar Plexus	14	The case used/attempted a Lumbar Plexus block
Retrobulbar	15	The case used/attempted a Retrobulbar block
Superior Laryngeal	16	The case used/attempted a Superior Laryngeal block
Saphenous Nerve	17	The case used/attempted a Saphenous Nerve block
Inguinal	18	The case used/attempted an Inguinal block
Transversus Abdominis Plane (TAP)	19	The case used/attempted a Transversus Abdominis Plane (TAP) block
Perineural Block	20	The case used/attempted a Perineural block
Eye Block, unspecified	21	The case used/attempted an Eye block, exact type unspecified
Quadratus Lumborum	22	The case used/attempted a Quadratus Lumborum block
Fascia Iliaca	23	The case used/attempted a Fascia Iliaca Block

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

### One value per case

## Logic

Start with all cases.

First, compile a list of all peripheral nerve blocks that may be documented on the case using steps 1-3.

**Step 1:** Determine if the case has any notes associated with peripheral nerve blocks

1. Evaluate if the case has any of these MPOG note concepts documented with an observed time between 24 hours before anes start through 24 hours after anesthesia end; if observed time is not documented, will use entered time:

- 50065 Regional - Cervical Plexus Block
- 50081 Regional - Adductor Canal Block Performed
- 50383 Regional - Supraclavicular Block
- 50384 Regional - Interscalene Block
- 50385 Regional - Infraclavicular Block
- 50386 Regional - Axillary Block
- 50387 Regional - Femoral Nerve Block
- 50388 Regional - Popliteal Block
- 50389 Regional - Sciatic Block

- 50390 Regional - Ankle Block
- 50391 Regional - Bier Block
- 50398 Regional - Lumbar Plexus Block
- 50629 Regional - Retrobulbar Block by surgeon
- 50724 Regional - Superior Laryngeal Block
- 50765 Regional - Saphenous Nerve Block
- 50798 Regional - Inguinal Field Block
- 50808 Regional - Transversus Abdominis Plane (TAP) Block
- 50243 Regional - Quadratus Lumborum Block
- 50624 Regional - Infiltration between Popliteal Artery and Capsule of Knee (IPACK) Block

2. If only one of the above note concepts is present, **assign the block type as listed in the concept** to the case and move to step 2.

3. If more than one of the above note concepts is present, add **Block, Multiple Types** and move to step 2.

4. If none of the above note concepts are present, move to step 2.

**Step 2.** Determine if the case has any regional note concepts with text indicating a peripheral nerve block was attempted/used.

1. Evaluate if the case has any of the following MPOG note concepts documented with an observed time between 24 hours before anes start through 24 hours after anesthesia end; if observed time is not documented, will use entered time:

- 50021 Regional- Peripheral Nerve Catheter Placed
- 50356 Regional- Block Performed
- 50690 Categorized Note- Regional Anesthesia
- 50665 Procedures - Other unlisted procedure
- 50254 Categorized note: Regional or neuraxial note
  - Exclusion Text: Spinal, Epidural, Cuadal

2. If any of the above note concepts (50021, 50356, 50690, 50665) are present, evaluate if any of the notes have the following text and then proceed to the next step:

- If text 'femoral' is present, add '**Femoral Nerve**'
- If text 'bier' is present, add '**Bier**'
- If text 'retrobul' is present, add '**Retrobulbar**'
- If text 'eye block' is present, add '**Eye Block**'
- If text 'cervical plex' OR 'cervical paraver' is present, add '**Cervical Plexus**'
- If text 'interscal' is present, add '**Interscalene**'
- If text 'axillary' is present, add '**Axillary**'
- If text 'transversus abdom' OR 'TAP' is present, add '**Transversus Abdominis Plane (TAP)**'
- If text 'lumbar plexus' is present, add '**Lumbar Plexus**'
- If text 'inguinal' is present, add '**Inguinal**'
- If text 'sciatic' is present, add '**Sciatic**'
- If 'saphenous' is present, add '**Saphenous Nerve**'
- If text 'supraclav' is present, add '**Supraclavicular**'
- If text 'popliteal' OR 'peroneal' OR 'IPACK' is present, add '**Popliteal**'
- If text 'superior laryngeal' is present, add '**Superior Laryngeal**'
- If text 'adductor can' is present, add '**Adductor Canal**'
- If text 'infraclav' is present, add '**Infraclavicular**'
- If text 'ankle' is present, add '**Ankle**'

- If text 'quadratus lum' or 'QL b' is present, add '**Quadratus Lumborum**'
- If text 'fascia ili' is present, add '**Fascia Iliaca**'

3. If peripheral nerve block text listed in the prior step are not identified within the note concepts 50021, assign '**Block, Unknown Type**' and continue to step 3.

4. If peripheral nerve block text is not identified within the note concept 50356 or 50665 or 50690, continue to step 3.

5. If none of the regional block concepts are present (50021, 50356, 50690, 50665), continue to step 3.

**Step 3:** Compile complete list of peripheral nerve block types that a case qualifies for based on steps 1-2. One case can have zero, one, or many assigned block types at this point.

1. If multiple specific block types result from steps 1-2, then the final result will be '**Block, Multiple Types Listed**'
2. If no blocks result from steps 1-2, move to step 4.
3. If case has only 'Block, Unknown Type' from step 1 & 2 and no other blocks from step 1, then the final result will be '**Block, Unknown Type**'
4. If case has a specific block type from step 1 and a 'Block, Unknown Type' from step 2, then final result will be **specific block type identified in step 1**.
5. If case has only 'Cervical Plexus' from steps 1-2, then the final result will be '**Cervical Plexus**'
6. If case has only 'Adductor Canal' from steps 1-2, then the final result will be '**Adductor Canal**'
7. If case has only 'Supraclavicular' from steps 1-2, then the final result will be '**Supraclavicular**'
8. If case has only 'Interscalene' from steps 1-2, then the final result will be '**Interscalene**'
9. If case has only 'Infraclavicular' from steps 1-2, then the final result will be '**Infraclavicular**'
10. If case has only 'Axillary' from steps 1-2, then the final result will be '**Axillary**'
11. If case has only 'Femoral Nerve' from steps 1-2, then the final result will be '**Femoral Nerve**'
12. If case has only 'Popliteal' from steps 1-2, then the final result will be '**Popliteal**'
13. If case has only 'Sciatic' from steps 1-2, then the final result will be '**Sciatic**'
14. If case has only 'Ankle' from steps 1-2, then the final result will be '**Ankle**'
15. If case has only 'Bier' from steps 1-2, then the final result will be '**Bier**'
16. If case has only 'Lumbar Plexus' from steps 1-2, then the final result will be '**Lumbar Plexus**'
17. If case has only 'Retrolumbar' from steps 1-2, then the final result will be '**Retrolumbar**'
18. If case has only 'Superior Laryngeal' from steps 1-2, then the final result will be '**Superior Laryngeal**'
19. If case has only 'Saphenous Nerve' from steps 1-2, then the final result will be '**Saphenous Nerve**'
20. If case has only 'Inguinal' from steps 1-2, then the final result will be '**Inguinal**'
21. If case has only 'Transversus Abdominis Plane (TAP)' from steps 1-2, then the final result will be '**Transversus Abdominis Plane (TAP)**'
22. If case has only 'Eye Block' from steps 1-2, then the final result will be '**Eye Block**'
23. If case has only 'Quadratus Lumborum' from steps 1-2, then the final result will be '**Quadratus Lumborum**'

**Step 4:** (Only assessed if steps 1-3 do not identify any block concepts.)

Determine if the case has any route of administration associated with peripheral nerve blocks:

1. Evaluate if the case has one of these route of administration MPOG concepts:

- 2019 Perineural (Route of Administration)
- 2020 Bier Block (Route of Administration)

2. If the Perineural route of administration concept is present, then the final result will be '**Perineural Block**'

3. If the Bier Block route of administration concept is present, then the final result will be '**Bier Block**'

4. If both routes of administration concepts are present, then the final result will be '**Block, Multiple Types Listed**'

5. If none of the above route of administration concepts are present, then the final result will be '**None**'

## Dependencies

No dependency available.

# Anesthesia Technique: Sedation

## Description

This phenotype is used to determine if monitored anesthesia care was used during a case with or without sedation medications

## Limitation

to be added

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	General, ETT, LMA notes or inhaled volatile anesthetics or paralytics were associated with the case.
Yes	1	There was documentation of at least one sedative medication without documentation of General, ETT, LMA notes or inhaled volatile anesthetics or paralytics associated with the case.

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

This phenotype relies on the internal phenotype *AnesthesiaTechniqueGeneral* Includes General - unknown, LMA, ETT, ETT+LMA, Neuromuscular Blocker Only and Inhaled anesthetic only.

If case returns value\_code 'o' for **AnesthesiaTechniqueGeneral** and there is documentation of at least one sedative medication between **PreopStart** and **AnesthesiaEnd**, then the case is assigned 'Anesthesia Technique Sedation: Yes'

**Sedation Medication Concepts:**

- 10020 ALFENTANIL
- 10149 DEXMEDETOMIDINE
- 10154 DIAZEPAM
- 10183 ETOMIDATE
- 10186 FENTANYL
- 10187 FENTANYL/MIDAZOLAM 40 MCG/ML / 200MCG/ML
- 10238 KETAMINE
- 10272 LORAZEPAM
- 10290 METHADONE
- 10292 METHOHEXITAL
- 10301 MIDAZOLAM
- 10377 PROPOFOL
- 10390 REMIFENTANIL
- 10414 SUFENTANIL
- 10427 THIOPENTAL
- 10453 PROPOFOL W/ KETAMINE 10 MG/ML + 1 MG/ML
- 10700 CLONAZEPAM

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**Dependencies**

- Airway Type Notes
- Anesthesia End
- Anesthesia Start
- Anesthesia Technique: General
- GeneralNotes
- Institution
- Paralytics Used (All)
- Preop Start Time

# Antiemetics Given

## Description

This phenotype determines whether or not an antiemetic was given for a case before Anesthesia End date/time.

## Limitation

Antiemetics returned could have been given prior to Anesthesia Start date/time. No left bound currently set. Data limited to antiemetics listed in logic section.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	No antiemetic medication given
Yes	1	At least one antiemetic medication given

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

This phenotype determines whether or not an antiemetic was administered per case, prior to Anesthesia End.

Antiemetic Concept Subset:

- 10035 APREPITANT
- 10147 DEXAMETHASONE
- 10160 DIPHENHYDRAMINE



- 10164 DOLASETRON
- 10169 DROPERIDOL
- 10208 GRANISETRON
- 10210 HALOPERIDOL
- 10257 DIMENHYDRINATE
- 10296 METHYLPREDNISOLONE
- 10297 METOCLOPRAMIDE
- 10335 ONDANSETRON
- 10373 PROCHLORPERAZINE
- 10374 PROMETHAZINE
- 10399 SCOPOLAMINE
- 10400 SCOPOLAMINE PATCH
- 10711 PALONOSETRON
- 10719 FOSAPREPITANT
- 11040 BUTYLSCOPOLAMINE

---

## Dependencies

Anesthesia End

# Arterial Line Used

## Description

To identify cases that have at least 20 valid blood pressure values taken from an invasive arterial line.

## Limitation

to be added

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	An Arterial Line was not used
Yes	1	An Arterial Line was used.
Inconclusive (< 20 observations)	2	There are more than 0 Arterial Line values but less than 20 total values.
Inconclusive (arterial line concept used with >= 20 NIBP readings)	3	The case has 20 <= 1 minute-to-minute NIBP reading values

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

This collation checks for the following invasive blood pressure physiologic concepts:

Systolic

3011 - Invasive Unspecified Site 1

3041 - Invasive Unspecified Site 2  
3046 - Invasive Unspecified Site 3  
3026 - Invasive Unspecified Site 4  
3475 - Invasive Unspecified Site 5  
3030 - Arterial Line (Invasive, Peripheral)

#### Diastolic

3012 - Invasive Unspecified Site 1  
3042 - Invasive Unspecified Site 2  
3047 - Invasive Unspecified Site 3  
3027 - Invasive Unspecified Site 4  
3476 - Invasive Unspecified Site 5  
3035 - Arterial Line (Invasive, Peripheral)

#### MAP

3013 - Invasive Unspecified Site 1  
3043 - Invasive Unspecified Site 2  
3048 - Invasive Unspecified Site 3  
3028 - Invasive Unspecified Site 4  
3477 - Invasive Unspecified Site 5  
3040 - Arterial Line (Invasive, Peripheral)

The phenotype will only consider blood pressure values up to 2 hours before anesthesia start (MPOG Concept ID: 50002) and up to anesthesia end (MPOG Concept ID:50009).

If there are  $\geq 20$  total valid blood pressure values for one of the invasive blood pressure concepts, then return a 1 for "yes."

Else, if there are more than 0 values but less than 20 total values, return 2 for "Inconclusive (< 20 observations)."

If either concept, Monitoring - Arterial Line Placed (MPOG Concept ID: 50222) or Procedures - Arterial Line Placed (MPOG Concept ID: 50662) and the case has 20  $\leq$  1 minute-to-minute blood pressure 'Non-invasive concepts' (MPOG Concept ID: 3015; 3020; 3025) used, return 3 for "Inconclusive (arterial line concept used with  $\geq 20$  NIBP readings)."

The timeframe for the Artline placed concepts will be considered up to 2 hours before anesthesia start until anesthesia end. If the observed time is not present for blood pressure concepts or the arterial line placed notes, the phenotype will consider entered times.

Else, return a 0 for "no."

---

## Dependencies

No dependency available.

# ASA Class

## Description

This phenotype returns the ASA classification assigned to a case based on collation mapping of raw text and numeric values documented within the electronic medical record. These data include AIMS variables mapped to 'Assessment and Plan - ASA Physical Status' (ID 70233). Collation mapping is completed at the MPOG Coordinating Center.

## Limitation

Data quality is limited to proper documentation. Conflicting data returns the highest ASA value documented for the case.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing or Unknown	-999	Missing or Unknown
Invalid Value	-998	Invalid Value
Unmapped	-1	Unmapped
ASA Class 1	1	ASA Class 1
ASA Class 2	2	ASA Class 2
ASA Class 3	3	ASA Class 3
ASA Class 4	4	ASA Class 4
ASA Class 5	5	ASA Class 5
ASA Class 6	6	ASA Class 6

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar

Value_Code	int
------------	-----

## Granularity

One value per case

## Logic

The AsaStatusClassification phenotype returns a single ASA Class per case based on the collation mapping of raw text/numeric values documented in the preoperative MPOG Concept 'Assessment and Plan - ASA Physical Status' (ID 70233). If more than ASA class is documented per case, the highest ASA class is resulted.

Mapping ID	Mapping Name	Mapping Description
-999	Missing or Unknown	When a case has no documentation for ASA class.
-998	Invalid Value	When the ASA class documentation does not contain a valid ASA class.
1	ASA Class 1	
2	ASA Class 2	
3	ASA Class 3	
4	ASA Class 4	
5	ASA Class 5	
6	ASA Class 6	

## Dependencies

ASA Notes

Institution

# Blood Product Total - Cryoprecipitate

## Description

This phenotype returns the total amount of cryoprecipitate administered per case in both milliliters and units.

## Limitation

Blood products can be charted in units or milliliters in any given case. All cryoprecipitate products are totaled and reported in units and milliliters. Concepts of 'units' of blood product are ambiguous in pediatric populations and may refer to split units. For this reason, no conversions are performed when age is less than 8 years. Data which appears to be documented in units below this should be handled on a project specific basis.

- Source data must be charted in units, units/hr, ml or ml/hr.
- Administration start time must be between anesthesia start and anesthesia end.
- Only looks in specified MPOG Concept IDs.
- Conversion from Units to ml is based on a fixed conversion factor - 100ml

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
PrimaryDocumentationCode	int
PrimaryDocumentationDescription	varchar
VolumInMLs	numeric
VolumInUnits	numeric

## Granularity

**One value per case**

## Logic

**Input MPOG Concept IDs:**

10495 CRYOPRECIPITATE

**Each case will return four results for this phenotype:**

- Volume in Units
- Volume in Milliliters
- Source documentation type (numeric code to indicate how the original values were reported to MPOG as units, milliliters or both)
- Source documentation description (actual description of how the original values were reported to MPOG, i.e. units, milliliters, or both)

**Step 1: Determine if the case has the cryoprecipitate concept listed above and with administration start time(s) between anesthesia start and anesthesia end.**

a) If none, return:

- 1) Volume in units: 0
- 2) Volume in milliliters: 0
- 3) Source documentation type: 0
- 4) Source documentation Description: "No Cryo Documented in Case"

b) If the cryoprecipitate concept is identified, continue to step 2.

**Step 2: Convert any me based units (units/hr or ml/hr) to full non-me based units (units or ml) + round**

**Step 3: Address any 5 or 10 pack charting ambiguity. For values charted in units:**

- 5 = 1 Unit
- 10 = 1 Unit
- 15 = 3 Units
- 20 = 2 Units
- 25 = 5 Units
- 30 = 3 Units

**Step 4: Generate case totals + indicator flags:**

**Step 4a: If charting is exclusively in ml's:**

- Sum all volumes to generate a ml value – return "Volume in ml"
- Return "Primary Documentation Type" = 1
- Return "Documentation Descriptor" = "Cryo Documented in mls"

If patient age >= 8 yrs:

- Divide ml value by 100, round to whole number – return "Volume in Units"

Else age < 8 yrs

- Set volume in units to Null.

**Step 4b: If charting is exclusively in Units:**

If patient age >= 8 yrs:

- Sum all volumes to generate a unit value – return "Volume in unit"
- Multiply unit value by 100 – return "Volume in ml"
- Return "Primary Documentation Type" = 2
- Return "Documentation Descriptor" = "Cryo Documented in Units"

Else age < 8 yrs:

- Set Volume in ml + Volume in Units to Null
- Return "Primary Documentation Type" = 9
- Return "Documentation Descriptor" = "Unable to Derive Data – Patient Age"

#### Step 4c: If charting is both in Units + mls

If patient age  $\geq$  8 yrs:

- Sum all volumes in units to generate a raw unit value
- Sum all volumes in ml to generate raw ml value
- Divide volume in ml's by 100, round, add to raw unit value.
- Return calculated unit value in "Value in Units"
- Multiply volume in units's by 100, round, add to raw ml value.
- Return calculated unit value in "Value in ml"
- Return "Primary Documentation Type" = 3
- Return "Documentation Descriptor" = "Cryo Documented in Both Units and mls"

Else Age < 8 yrs

- Set Volume in ml + Volume in Units to Null
- Return "Primary Documentation Type" = 9
- Return "Documentation Descriptor" = "Unable to Derive Data – Patient Age"

#### Step 5: If unit value > 30

- Set Volume in ml + Volume in Units to Null
- Return "Primary Documentation Type" = 8
- Return "Documentation Descriptor" = "Unable to Derive Data – Extremely High Charted Values"

---

## Dependencies

Age (Years)

Anesthesia End

Anesthesia Start



## Blood Product Total - FFP

### Description

This phenotype returns the total amount of fresh frozen plasma administered per case in both milliliters and units.

### Limitation

Blood products can be charted in units or milliliters in any given case. All fresh frozen plasma products are totaled and reported in units and milliliters. This phenotype attempts to standardize how blood products are reported and does not report total FFP amounts by individual concept ID. Concepts of 'units' of blood are ambiguous in pediatric populations and may refer to split units. For this reason, no conversions are performed when age is less than 8 years. Data which appears to be documented in units below this should be handled on a project specific basis.

- Source data must be charted in units, units/hr, ml or ml/hr.
- Conversion from Units to ml is based on a fixed conversion factor - 250ml
- Administration start time must be between anesthesia start and anesthesia end.
- Only considers specified MPOG Concept IDs (see logic section).

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
PrimaryDocumentationCode	int
PrimaryDocumentationDescription	varchar
VolumInMLs	numeric
VolumInUnits	numeric

### Granularity

**One value per case**

### Logic

Input MPOG Concepts:

10493 - FRESH FROZEN PLASMA

10661 - Perfusion - Fresh Frozen Plasma

**Each case will return four results for this phenotype:**

- Volume in Units
- Volume in Milliliters
- Source documentation type (numeric code to indicate how the original values were reported to MPOG as units, milliliters or both)
- Source documentation description (actual description of how the original values were reported to MPOG, i.e. units, milliliters, or both)

**Step 1: Determine if the case has any of the FFP concepts listed above with an administration start time between anesthesia start and anesthesia end.**

a) If none, return:

- 1) Volume in units: 0
- 2) Volume in milliliters: 0
- 3) Source documentation type: 0
- 4) Source documentation Description: "No FFPs Documented in Case"

b) If 1 or more FFP concepts are identified, continue to step 2.

**Step 2: Convert any time based units (units/hr or ml/hr) to full non-time based units (units or ml) + round to whole number, move to step 3. If no end time documented will use anesthesia end time as the end time for the transfusion.**

**Step 3: Generate case totals + indicator flags:**

**Step 3a: If charting is exclusively in ml's:**

- Sum all volumes to generate a ml value – return "Volume in ml"
- Return "Primary Documentation Type" = 1
- Return "Documentation Descriptor" = "FFPs Documented in mls"

If patient age  $\geq$  8 yrs:

- Divide ml value by 250, round to whole number – return "Volume in Units"

If patient age  $<$  8 yrs:

- Set volume in units to Null.

**Step 3b: If charting is exclusively in Units:**

If patient age  $\geq$  8 yrs:

- Sum all volumes to generate a unit value – return "Volume in unit"
- Multiply unit value by 250 – return "Volume in ml"
- Return "Primary Documentation Type" = 2
- Return "Documentation Descriptor" = "FFPs Documented in Units"

Else age  $<$  8:

- Set Volume in ml + Volume in Units to Null
- Return "Primary Documentation Type" = 9

- Return “Documentation Descriptor” = “Unable to Derive Data – Patient Age”

### Step 3c: If charting is both in Units + mls:

If patient age  $\geq 8$  yrs:

- Sum all volumes in units to generate a raw unit value
- Sum all volumes in ml to generate raw ml value
- Divide volume in ml's by 250, round, add to raw unit value.
- Return calculated unit value in “Value in Units”
- Multiply volume in units's by 250, round, add to raw ml value.
- Return calculated unit value in “Value in ml”
- Return “Primary Documentation Type” = 3
- Return “Documentation Descriptor” = “FFPs Documented in Both Units and mls”

Else age  $< 8$ :

- Set Volume in ml + Volume in Units to Null
- Return “Primary Documentation Type” = 9
- Return “Documentation Descriptor” = “Unable to Derive Data – Patient Age”

### Step 4: If unit value $> 100$

- Set Volume in ml + Volume in Units to Null
- Return “Primary Documentation Type” = 8
- Return “Documentation Descriptor” = “Unable to Derive Data – Extremely High Charted Values”

---

## Dependencies

Age (Years)

Anesthesia End

Anesthesia Start

## Blood Product Total - Platelets

### Description

This phenotype returns the total number of platelets administered per case in both milliliters and units.

### Limitation

Blood products can be charted in units or milliliters in any given case. All platelet blood products are totaled and reported in units and milliliters. Concepts of 'units' of blood product are ambiguous in pediatric populations and may refer to split units. For this reason, no conversions are performed when age is less than 8 years. Data which appears to be documented in units below this should be handled on a project specific basis.

- Source data must be charted in units, units/hr, ml or ml/hr.
- Administration start time must be between anesthesia start and anesthesia end.
- Only looks in specified MPOG Concept IDs.
- Conversion from Units to ml is based on a fixed conversion factor - 250ml

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
PrimaryDocumentationCode	int
PrimaryDocumentationDescription	varchar
VolumInMLs	numeric
VolumInUnits	numeric

### Granularity

**One value per case**

### Logic

**Inputs MPOG Concept IDs:**

10494 - PLATELETS

**Each case will return four results for this phenotype:**

- Volume in Units
- Volume in Milliliters
- Source documentation type (numeric code to indicate how the original values were reported to MPOG as units, milliliters or both)
- Source documentation description (actual description of how the original values were reported to MPOG, i.e. units, milliliters, or both)

**Step 1: Determine if the case has any values mapped to concept 10494 Platelets with an administration start time between anesthesia start and anesthesia end.**

a) If none, return:

- 1) Volume in Units: 0
- 2) Volume in milliliters: 0
- 3) Primary Documentation Type: 0
- 4) Primary Documentation description: "No Platelets Documented in Case"

b) If the platelet concept is identified, proceed to step 2.

**Step 2: Convert any time based units (units/hr or ml/hr) to full non-time based units (units or ml) + round to nearest whole number. If no end time is documented, will use anesthesia end time as the end time for the transfusion.**

**Step 3: Address any 5 pack charting ambiguity.**

For values charted in units in a single charting increment, we will treat:

- 5 = 1 Unit
- 10 = 2 Unit
- 15 = 3 Units
- 20 = 4 Units
- 25 = 5 Units
- 30 = 6 Units

**Step 4: Generate case totals + indicator ags:**

**Step 4a: If charting is exclusively in ml's:**

- Sum all volumes to generate a ml value – return "Volume in ml"
- Return "Primary Documentation Type" = 1
- Return "Documentation Descriptor" = "Platelets Documented in mls"

If patient age >= 8 yrs:

- Divide ml value by 250, round to whole number – return "Volume in Units"

Else age < 8 yrs:

- Set volume in units to Null.

**Step 4b If charting is exclusively in Units:**

If patient age >= 8 yrs:

- Sum all volumes to generate a unit value – return "Volume in unit"
- Multiply unit value by 250 – return "Volume in ml"
- Return "Primary Documentation Type" = 2
- Return "Documentation Descriptor" = "Platelets Documented in Units"

If patient age < 8 years:

- Set Volume in ml + Volume in Units to Null
- Return "Primary Documentation Type" = 9
- Return "Documentation Descriptor" = "Unable to Derive Data – Patient Age"

#### **Step 4c: If charting is both in Units + mls**

If patient age >= 8 yrs:

- Sum all volumes in units to generate a raw unit value
- Sum all volumes in ml to generate raw ml value
- Divide volume in ml's by 250, round, add to raw unit value.
- Return calculated unit value in "Value in Units"
- Multiply volume in units's by 250, round, add to raw ml value.
- Return calculated unit value in "Value in ml"
- Return "Primary Documentation Type" = 3
- Return "Documentation Descriptor" = "Platelets Documented in Both Units and mls"

If patient age < 8 years:

- Set Volume in ml + Volume in Units to Null
- Return "Primary Documentation Type" = 9
- Return "Documentation Descriptor" = "Unable to Derive Data – Patient Age"

#### **Step 5: If unit value > 30**

- Set Volume in ml + Volume in Units to Null
- Return "Primary Documentation Type" = 8
- Return "Documentation Descriptor" = "Unable to Derive Data – Extremely High Charted Values"

---

## **Dependencies**

Age (Years)

Anesthesia End

Anesthesia Start

## Blood Product Total - PRBCs

### Description

This phenotype returns the total number of packed red blood cells administered per case in both milliliters and units.

### Limitation

Blood products can be charted in units or milliliters in any given case. All packed red blood cell products (autologous and homologous combined) are totaled and reported in units and milliliters. This phenotype attempts to standardize how blood products are reported and does not report total PRBC amounts by individual concept ID. Concepts of 'units' of blood are ambiguous in pediatric populations and may refer to split units. For this reason, no conversions are performed when age is less than 8 years. Data which appears to be documented in units below this should be handled on a project specific basis.

- Uses a fixed conversion value to approximate units to ml - 350ml.
- Source data must be charted in units, units/hr, ml or ml/hr.
- Administration start time must be between anesthesia start and anesthesia end.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
PrimaryDocumentationCode	int
PrimaryDocumentationDescription	varchar
VolumInMLs	numeric
VolumInUnits	numeric

### Granularity

**One value per case**

### Logic

Input MPOG Concept IDs:

10489 PACKED RED BLOOD CELLS - AUTOLOGOUS  
 10490 PACKED RED BLOOD CELLS - HOMOLOGOUS  
 10616 PACKED RED BLOOD CELLS - UNKNOWN TYPE  
 10660 PERFUSION - PACKED RED BLOOD CELLS - AUTOLOGOUS  
 10658 PERFUSION - PACKED RED BLOOD CELLS - HOMOLOGOUS

**Each case will return four results for this phenotype:**

- Volume in Units
- Volume in Milliliters
- Source documentation type (numeric code to indicate how the original values were reported to MPOG as units, milliliters or both)
- Source documentation description (actual description of how the original values were reported to MPOG, i.e. units, milliliters, or both)

**Step 1: Determine if the case has any of the PRBC concepts listed above and with administration start time(s) between anesthesia start and anesthesia end.**

a) If none, return:

- 1) Volume in units: 0
- 2) Volume in milliliters: 0
- 3) Source documentation type: 0
- 4) Source documentation Description: "No PRBCs Documented in Case"

b) If 1 or more PRBC concepts are identified, continue to step 2.

**Step 2: Convert any time based units (units/hr or ml/hr) to full non-time based units (units or ml) + round to whole number, move to step 3. If no end time documented, will use anesthesia end time as the end time for the transfusion.**

**Step 3: Generate case totals + indicator flags:**

**Step 3a) If charting is exclusively in ml's, continue with step 3a, part i. Else, skip to step 3b.**

- i) Sum all volumes to generate a milliliter value and proceed to step 3, part ii.
- ii) If patient age is >8 years, divide total milliliter value by 350 and round to the nearest whole number. Evaluate if value is greater than 150 units. (If patient age <8, move to step 3a, part iii.)

1) If no, return:

- a) Volume in units: Calculated value from step 3a, part ii
- b) Volume in milliliters: Calculated value from step 3a, part i
- c) Source documentation type: 1
- d) Source documentation description: 'PRBCs Documented in milliliters'

2) If yes, return:

- a) Volume in units: 'null'
- b) Volume in milliliters: 'null'
- c) Source documentation type: 8
- d) Source documentation description: 'Unable to derive data - extremely high charted values'

iii) If patient age < 8 years, return:

- a) Volume in units: 'null'



b) Volume in milliliters: calculated value from step 3a, part i.

c) Source documentation type: 1

d) Source documentation description: 'PRBCs documented in milliliters'

**Step 3b: If charting is exclusively in Units, continue with step 3b, part i. Else, skip to step 3c.**

- i) If patient age < 8 years, return the following:
  - a) Volume in units: 'null'
  - b) Volume in milliliters: 'null'
  - c) Source Documentation type: 9
  - d) Source Documentation description: 'Unable to retrieve data - patient age'
- ii) If patient age =8 years, sum all volumes to generate a unit value. Evaluate if value is greater than 150 units.
  - a) If yes, return:
    - 1) Volume in units: 'null'
    - 2) Volume in milliliters: 'null'
    - 3) Source documentation type: 8
    - 4) Source documentation description: 'Unable to derive data - Extremely High Charted Values'
  - b) If no, return calculated value of 'volume in units' and proceed to step 3b, part iii.
- iii) Multiply unit value from step 3b, part i by 350, return calculated value for 'volume in ml.' Proceed to step 3b part iv.
- iv) Return Source Documentation Type: 2
- v) Return Source Documentation Description: 'PRBCs documented in units'

**Step 3c. If charting is documented in both units and milliliters and patient age = 8 years, proceed to step 3c, part i. If patient age is < 8 years, skip to step 3d.**

- i) Sum all volumes reported in units, move to ii.
- ii) Sum all volumes reported in milliliters, move to iii.
- iii) Divide volumes in milliliters (from step ii) by 350, round, add to raw unit value from step i. Evaluate if value is greater than 150 units.
  - 1) If yes, return:
    - a) Volume in units: 'null'
    - b) Volume in milliliters: 'null'
    - c) Source documentation type: 8
    - d) Source documentation description: 'Unable to derive data - extremely high charted values'
  - 2) If no, return the calculated unit value for 'Volume in units.' Proceed to step 3c, part iv.
- iv) Multiply volume in units (from step i) by 350, round, add to raw ml value from step ii. Return calculated milliliter value in 'Volume in milliliter' Proceed to step 3c, part v.
- v) Return Source Documentation Type: 3
- vi) Return Source Documentation Description: 'PRBCs documented in both units and milliliters'

**Step 3d. If charting is both in units and milliliters and patient age is < 8 years, proceed to step 3d, part i.**

- i) Return Volume in Units: 'null'
- ii) Return Volume in Milliliters: 'null'
- iii) Return Source Documentation Type: 9
- iv) Return Source Documentation Description: 'Unable to derive data - patient age'

---

## Dependencies

Age (Years)

Anesthesia End

Anesthesia Start

# BMI

## Description

### Body Mass Index (BMI)

Returns a continuous variable, with the limits of 10-80 as valid ranges of BMI. Anything outside these bounds are returned as the respective bound.

## Limitation

BMI calculation is reliant upon accurate patient height and weight data. Inaccurate height or weight patient data can cause an error in the reported BMI. Missing height or weight data will not return a value for BMI.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	float

## Granularity

**One value per case**

## Logic

Height and Weight collations have specific valid ranges which are defined in their respective collation documentation. See these collation documents for more information.

1. This collation determines if either/both Weight(kg) or Height(cm) is a NULL value, BMI returns NULL
2. Then, calculates  $BMI = Weight(kg) / (Height(cm)^2 \times 100)$
3. After the BMI calculation is made only include values [10-80]. If outside this range, BMI returns as NULL.

[ ] = inclusive (meaning including the values of BMI=10 and BMI=80)

## Dependencies

Anesthesia End

Height (cm)

Weight (kg)

## BMI Classification (Pediatric)

### Description

This collation is used to determine the body mass index (BMI) percentile based on the Centers for Disease Control and Prevention (CDC) classification for patients ages 2 - 19 years old.

### Limitation

Only available when both height and weight are non-missing and valid (from the BMI collation)

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
Missing	-999	BMI is <10 or >80, or BMI is NULL
Underweight	1	Less than 5th percentile
Healthy Weight	2	5th to less than 85th percentile
Overweight	3	85th to less than 95th percentile
Obese	4	95th percentile or greater

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

This collation returns the CDC Classification for BMI percentile. It takes the result of the BMI percentile (pediatric) collation rounded to the nearest whole number and categorizes it into weight status categories:

Weight Status Category	Percentile Range
Underweight	Less than the 5 <sup>th</sup> percentile
Healthy Weight	5 <sup>th</sup> percentile to less than the 85 <sup>th</sup> percentile
Overweight	85 <sup>th</sup> to less than the 95 <sup>th</sup> percentile
Obesity	Equal to or greater than the 95 <sup>th</sup> percentile

BMI-for-age - Boys Growth Chart

BMI-for-age - Girls Growth Chart

---

## Dependencies

Age (Years)

Anesthesia End

BMI

BMI Percentile (Pediatric)

Height (cm)

Sex

Weight (kg)

## BMI Percentile (Pediatric)

### Description

This phenotype determines the BMI-for-age percentile and associated z-score for patients 2 - 19 years old.

For children and teens, BMI is age- and sex-specific and is often referred to as BMI-for-age. A child's weight status is determined using an age- and sex-specific percentile for BMI rather than the BMI categories used for adults. Overweight is defined as a BMI ranging from the 85<sup>th</sup> to 95<sup>th</sup> percentile and obese is defined as a BMI greater than the 95th percentile for children and teens of the same age and sex.

### Limitation

BMI calculation is reliant upon accurate patient height and weight data. Inaccurate height or weight patient data can cause an error in the reported BMI. Missing height or weight data will not return a value for BMI.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
BMI	float
MPOG_Case_ID	uniqueidentifier
Value	numeric
Z_Score	float

### Granularity

**One value per case**

### Logic

This phenotype returns the BMI percentile and z-score per case based on the patient's age, sex, height (cm) and weight (kg) at time of surgery.

#### Step I: Obtain BMI value from its respective collation.

Height and Weight collations have specific valid ranges which are defined in their respective collation documentation. See these collation documents for more information.

- Calculated BMI =  $\text{Weight(kg)} / (\text{Height(cm)} / 100)^2$

- If either/both Weight(kg) or Height(cm) is a NULL value then,
- Use value documented under MPOG Concept 70253 'Physical Exam - Body Mass Index'. If not available, return NULL

## Step II: Determine BMI percentile based on CDC reference tables

*\*\*The CDC reference tables list age at the half month point for the entire month; for example, 1.5 months represents 1.0-1.99 months or 1.0 month up to but not including 2.0 months of age*

1. Calculate Age in months, based on mid point for age in years:= (Age in Years \* 12) + 6.5
2. Return BMI percentile for Age

## Step III: Calculate the corresponding z-score based on LMS parameters listed in CDC reference table

$$Z = \frac{((X/M)^L) - 1}{LS}, L \neq 0$$

$$Z = \ln \frac{(X/M)}{S}, L = 0$$

- **X:** BMI Value
- **L:** Power in the Box-Cox transformation
- **M:** Median
- **S:** Generalized coefficient of variation

---

## Dependencies

Age (Years)

Anesthesia End

BMI

Height (cm)

Sex

Weight (kg)

# Body Region

## Description

This phenotype categorizes procedures into 18 body regions based upon the primary anesthesia CPT. If there is no primary anesthesia CPT code attached to the case, then this phenotype will return a -999 (unknown) value.

## Limitation

to be added

## Value Type

**Categorical**

## Enumeration

**No enumeration available right now.**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_CD	int

## Granularity

**One value per case**

## Logic

For the body region groupings:

Value (Body Region)	Value Code	Included CPT codes
Head	1	00160, 00162, 00164, 00100, 00102, 00170, 00172, 00174, 00176, 00120, 00124, 00126, 00103, 00140, 00142, 00144, 00145, 00147, 00148, 00190, 00192, 00210, 00211, 00212, 00214, 00215, 00216, 00218, 00220, 00222, 00104
Neck	2	00300, 00320, 00322, 00326, 00350, 00352
Thorax - Extrathoracic	3	00400, 00410, 00402, 00404, 00406, 00450, 00452, 00454, 00470, 00472, 00474
Thorax - Intrathoracic	4	00500, 00520, 00522, 00524, 00528, 00529, 00539, 00540, 00541, 00546, 00548, 00542, 00530, 00532, 00534, 00537
Cardiac	5	00550, 00560, 00561, 00562, 00563, 00566, 00567, 00580
Spine and Spinal cord	6	00640, 00600, 00604, 00620, 00622, 00625, 00626, 00630, 00632, 00634, 00635, 00670
Upper Abdomen	7	00700, 00702, 00730, 00731, 00732, 00740, 00750, 00752, 00754, 00756, 00790, 00792, 00794, 00796, 00797, 00770
Lower Abdomen	8	00800, 00802, 00820, 00810, 00811, 00812, 00813, 00830, 00832, 00834, 00836, 00840, 00844, 00848, 00866, 00902, 00904, 00880, 00882
Urologic	9	00862, 00868, 00864, 00870, 00872, 00873, 00865, 00908, 00910, 00912, 00914, 00916, 00918, 00860
Gynecologic	10	00842, 00948, 00950, 00952, 00846, 00851, 00942, 00944, 00906, 00940
Male Reproductive System	11	00921, 00922, 00924, 00926, 00928, 00930, 00932, 00934, 00936, 00938, 00920
Pelvis	12	01112, 01130, 01160, 01120, 01140, 01150, 01170, 01173, 01180, 01190
Hip/Leg/Foot	13	01200, 01220, 01340, 01380, 01390, 01420, 01462, 01490, 01202, 01210, 01212, 01214, 01215, 01230, 01232, 01234, 01250, 01320, 01360, 01382, 01392, 01400, 01402, 01404, 01464, 01470, 01472, 01474, 01480, 01482, 01484, 01486, 01260, 01270, 01272, 01274, 01430, 01432, 01440, 01442, 01444, 01500, 01502, 01520, 01522
Shoulder/Arm/Hand	14	01620, 01680, 01682, 01730, 01820, 01860, 01610, 01622, 01630, 01634, 01636, 01638, 01710, 01712, 01714, 01716, 01732, 01740, 01742, 01744, 01756, 01758, 01760, 01810, 01829, 01830, 01832, 01650, 01652, 01654, 01656, 01670, 01770, 01772, 01780, 01782, 01840, 01842, 01844, 01850, 01852
Radiologic	15	01916, 01920, 01922, 01924, 01925, 01926, 01930, 01931, 01932, 01933, 01935, 01936
Burn	16	01951, 01952, 01953
Obstetrics	17	01958, 01960, 01961, 01968, 01967, 01962, 01963, 01969, 01964, 01965, 01966
Other Procedures	18	01990, 01991, 01992, 01995, 01996, 01999
Unknown	-999	

## Dependencies

Anesthesia Start

Anesthesia CPT (Primary)



# Cardiopulmonary Bypass Duration

## Description

This phenotype is used to determine the duration (in minutes) of cardiopulmonary bypass per case.

## Limitation

- Does NOT capture undocumented partial/left heart cardiopulmonary bypass (if NOT documented in notes, otherwise DOES capture)
- Does NOT capture VA/VV bypass (these are separate concepts) à e.g. for ECMO, liver transplant, or IVC thrombectomy Only gets first start, and last end
- Only captures first start and last end, thus multiple CPB runs will return as one consecutive run.
- This group returns the time of the first instance and last instance, regardless of the type of the specific cardiopulmonary bypass (CPB) trigger. Thus, if a case has documented 50426 (Ice off head) twice, and only these CPB concepts, this phenotype will return the first and last instance of documentation and the duration in between for the documentation.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

This phenotype calculates the difference between Cardiopulmonary Bypass End and Cardiopulmonary Bypass Start collations. Duration is returned in minutes.

## Dependencies

Anesthesia End

Cardiopulmonary Bypass End

Anesthesia Start

Cardiopulmonary Bypass Start

# Cardiopulmonary Bypass End

## Description

This phenotype returns the latest date/time of cardiopulmonary bypass specific concepts for each case.

## Limitation

- Does NOT capture undocumented partial/left heart cardiopulmonary bypass (if NOT documented in notes, otherwise DOES capture)
- Does NOT capture VA/VV bypass (these are separate concepts) à e.g. for ECMO, liver transplant, or IVC thrombectomy Only gets first start, and last end
- Only captures first start and last end, thus multiple CPB runs will return as one consecutive run.
- This group returns the time of the first instance and last instance, regardless of the type of the specific cardiopulmonary bypass (CPB) trigger. Thus, if a case has documented 50426 (Ice off head) twice, and only these CPB concepts, this phenotype will return the first and last instance of documentation and the duration in between for the documentation.

## Value Type

**Datetime**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

## Granularity

**One value per case**

## Logic

This phenotype returns the latest date/time of the concepts listed below per case. Only considers notes documented between Anesthesia Start and Anesthesia End

**For intraoperative notes, the following concepts are used:**

- 50418 Cardiopulmonary bypass -- Access cannula removed location detail
- 50423 Cardiopulmonary bypass -- Arterial cannula insertion flow detail

- 50647 Cardiopulmonary bypass - Aprotinin test dose performed
- 50766 Cardiopulmonary bypass -- Circulatory arrest start
- 50427 Cardiopulmonary bypass -- Ice on head
- 50412 Cardiopulmonary bypass -- perfusion start
- 50425 Cardiopulmonary bypass -- Blood pressure lowered therapy detail
- 50406 Cardiopulmonary bypass rewarm temperature - detail
- 50428 Cardiopulmonary bypass - cardioplegia start
- 50408 Cardiopulmonary bypass systemic cooling temperature - detail
- 50420 Cardiopulmonary bypass -- Isoflurane vaporizer turned on
- 50413 Cardiopulmonary bypass -- perfusion end
- 50407 Cardiopulmonary bypass systemic cooling initiated
- 50403 Cardiopulmonary bypass vent on detail
- 50404 Cardiopulmonary bypass vent off detail
- 50429 Cardiopulmonary bypass - cardioplegia stop
- 50401 Cardiopulmonary bypass vent on - note
- 50405 Cardiopulmonary bypass rewarm - note
- 50402 Cardiopulmonary bypass vent off - note
- 50411 Cardiopulmonary bypass -- ventilator turned off
- 50399 Cardiopulmonary bypass -- aortic clamp on/off note
- 50419 Cardiopulmonary bypass -- Aortic crossclamp removal requiring therapy
- 50416 Cardiopulmonary bypass -- crossclamp and circulatory arrest time totals
- 50424 Cardiopulmonary bypass -- Blood pressure lowered note
- 50417 Cardiopulmonary bypass -- Access cannula removed note
- 50409 Cardiopulmonary bypass terminated
- 50767 Cardiopulmonary bypass -- Circulatory arrest stop
- 50422 Cardiopulmonary bypass -- Arterial cannula insertion site detail
- 50410 Cardiopulmonary bypass initiated (full)
- 50415 Cardiopulmonary bypass -- aortic crossclamp off
- 50714 Cardiopulmonary bypass - Bypass start / stop event
- 50421 Cardiopulmonary bypass -- Arterial cannula inserted note
- 50426 Cardiopulmonary bypass -- Ice off head
- 50047 Perfusion - Retrograde Arterial Prime/Venous Antegrade Prime Performed (Yes/No)
- 50346 Vascular - Aortic cross clamp on\*\*

\*\*This concept is used for vascular cases, but often to mark cardiac bypass start as well.

If none of the concepts are in the case, then the case will not be included in the results of the collation.

## Dependencies

Anesthesia End

Anesthesia Start

# Cardiopulmonary Bypass Start

## Description

This phenotype determines the earliest date/time of cardiopulmonary bypass specific concepts for each case.

## Limitation

- Does NOT capture undocumented partial/left heart cardiopulmonary bypass (if NOT documented in notes, otherwise DOES capture)
- Does NOT capture VA/VV bypass (these are separate concepts) à e.g. for ECMO, liver transplant, or IVC thrombectomy Only gets first start, and last end
- Only captures first start and last end, thus multiple CPB runs will return as one consecutive run.
- This group returns the time of the first instance and last instance, regardless of the type of the specific cardiopulmonary bypass (CPB) trigger. Thus, if a case has documented 50426 (Ice off head) twice, and only these CPB concepts, this phenotype will return the first and last instance of documentation and the duration in between for the documentation.

## Value Type

**Datetime**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

## Granularity

**One value per case**

## Logic

This phenotype returns the earliest date/time of the concepts listed below per case. Only considers notes documented between Anesthesia Start and Anesthesia End

**For intraoperative notes, the following concepts are used:**

- 50418 Cardiopulmonary bypass -- Access cannula removed location detail
- 50423 Cardiopulmonary bypass -- Arterial cannula insertion flow detail

- 50647 Cardiopulmonary bypass - Aprotinin test dose performed
- 50766 Cardiopulmonary bypass -- Circulatory arrest start
- 50427 Cardiopulmonary bypass -- Ice on head
- 50412 Cardiopulmonary bypass -- perfusion start
- 50425 Cardiopulmonary bypass -- Blood pressure lowered therapy detail
- 50406 Cardiopulmonary bypass rewarm temperature - detail
- 50428 Cardiopulmonary bypass - cardioplegia start
- 50408 Cardiopulmonary bypass systemic cooling temperature - detail
- 50420 Cardiopulmonary bypass -- Isoflurane vaporizer turned on
- 50413 Cardiopulmonary bypass -- perfusion end
- 50407 Cardiopulmonary bypass systemic cooling initiated
- 50403 Cardiopulmonary bypass vent on detail
- 50404 Cardiopulmonary bypass vent off detail
- 50429 Cardiopulmonary bypass - cardioplegia stop
- 50401 Cardiopulmonary bypass vent on - note
- 50405 Cardiopulmonary bypass rewarm - note
- 50402 Cardiopulmonary bypass vent off - note
- 50411 Cardiopulmonary bypass -- ventilator turned off
- 50399 Cardiopulmonary bypass -- aortic clamp on/off note
- 50419 Cardiopulmonary bypass -- Aortic crossclamp removal requiring therapy
- 50416 Cardiopulmonary bypass -- crossclamp and circulatory arrest time totals
- 50424 Cardiopulmonary bypass -- Blood pressure lowered note
- 50417 Cardiopulmonary bypass -- Access cannula removed note
- 50409 Cardiopulmonary bypass terminated
- 50767 Cardiopulmonary bypass -- Circulatory arrest stop
- 50422 Cardiopulmonary bypass -- Arterial cannula insertion site detail
- 50410 Cardiopulmonary bypass initiated (full)
- 50415 Cardiopulmonary bypass -- aortic crossclamp off
- 50714 Cardiopulmonary bypass - Bypass start / stop event
- 50421 Cardiopulmonary bypass -- Arterial cannula inserted note
- 50426 Cardiopulmonary bypass -- Ice off head
- 50047 Perfusion - Retrograde Arterial Prime/Venous Antegrade Prime Performed (Yes/No)
- 50346 Vascular - Aortic cross clamp on\*\*

\*\*This concept is used for vascular cases, but often to mark cardiac bypass start as well.

If none of the concepts are in the case, then the case will not be included in the results of the collation.

## Dependencies

Dependencies	Data Capture Start	Obstetric Anesthesia Type
Anesthesia End	GeneralNotes	Paralytics Used (All)
Anesthesia Start	Induction End	Patient Out Of Room Date/Time
Anesthesia End	Induction Start	Patient In Room Date/Time
Anesthesia Start	Institution	Procedure Text
Anesthesia Technique: General	Intubation Time	Surgery End
xRetiredx Arrived Intubated to the OR	MPOG Patient ID	Surgery Start Date/Time

# Case End

## Description

This phenotype is used to determine the 'Case End' date/time for a given case based on provided date/time documentation available on the case. See 'logic' section for concepts considered.

## Limitation

This phenotype only results "observed" dates and times. "Observed" dates and times are those that are explicitly entered or documented in the record and must be documented as part of the note. MPOG will not default to the "time entered" to determine case start. "Time entered" reflects the time that the documentation was written, and not necessarily the time that care was provided.

## Value Type

**Datetime**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

## Granularity

**One value per case**

## Logic

1. Patient Extubated (as determined by the Extubation Times phenotype). If not available, then
2. 50007 Procedure End. If not available, then
3. 50008 AACD Patient out of Room Date/Time. If not available, then
4. 50009 AACD Anesthesia End Date/Time

## Dependencies

Anesthesia End

Anesthesia Start

Extubation Times

Patient Out Of Room Date/Time

Surgery End

## Case Start

### Description

This phenotype returns the documented date/time of case start for each case. One value per case.

### Limitation

This phenotype only results "observed" dates and times. "Observed" dates and times are those that are explicitly entered or documented in the record and must be documented as part of the note. MPOG will not default to the "time entered" to determine case start. "Time entered" reflects the time that the documentation was written, and not necessarily the time that care was provided.

### Value Type

**Datetime**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

### Granularity

**One value per case**

### Logic

The case start will be equal to the following logic:

Case Start

1. Anesthesia Induction End. If not available, then
2. Anesthesia Induction Begin. If not available, then
3. Procedure Start. If not available, then
4. Patient in Room. If not available, then
5. Anesthesia Start

### Dependencies

Airway Type Notes	GeneralNotes	Paralytics Used (All)
Anesthesia CPT (All)	Induction End	Patient Out Of Room Date/Time
Anesthesia End	Induction Start	Patient In Room Date/Time
Anesthesia Start	Institution	Procedure Text
Anesthesia Technique: General	Intubation Time	Surgery End
xRetiredx Arrived Intubated to the OR	MPOG Patient ID	Surgery Start Date/Time
Data Capture Start	Obstetric Anesthesia Type	

# Duration of Anesthesiology Attending Sign-in

## Description

Duration of time (minutes) that anesthesiology attending(s) are signed into the case between anesthesia start and anesthesia end.

## Limitation

Will only count sign-in time between anesthesia start and end.

If a provider has signed in as both a resident and attending in the same month, the phenotype may assign minutes to the resident role rather than the updated role of the 'attending.'

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

This phenotype relies on the StaffRoles phenotype to determine provider roles. If the role of anesthesiology 'attending' is identified by the StaffRoles phenotype, the duration phenotype will determine how many minutes an attending was signed into the case between anesthesia start (MPOG Concept ID: 50002) and anesthesia end (MPOG Concept ID:50009).

If multiple anesthesiology attendings are signed in during the case, the phenotype will add the total time of all providers together. If the providers' signed-in time overlaps, the overlapping time will only be counted once. If a provider is signed in before anesthesia start, the duration start time will be adjusted to begin at anesthesia start. If a provider is signed out after anesthesia end, the duration end time will be adjusted to anesthesia end. If multiple anesthesia start times are documented, the first one will be used. If multiple anesthesia end times are documented, the last one will be used.

For this phenotype, seconds will be ignored for the signed-in duration and anesthesia start/end calculations. The duration values returned will be minutes only.

## Dependencies

Anesthesia End	Institution
Anesthesia Start	StaffRoles



# Duration of Anesthesiology Resident Sign-in

## Description

Duration of time (minutes) that anesthesiology resident(s) are signed into the case between anesthesia start and anesthesia end.

## Limitation

Will only count sign-in time between anesthesia start and end.

If a provider has signed in as both a resident and attending in the same month, the phenotype may assign minutes to the resident role rather than the updated role of 'attending.'

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

This phenotype relies on the StaffRoles phenotype to determine provider roles. If the role of anesthesiology 'resident' is identified by the StaffRoles phenotype, the duration phenotype will determine how many minutes a resident was signed into the case between anesthesia start (MPOG Concept ID: 50002) and anesthesia end (MPOG Concept ID:50009).

If multiple anesthesiology residents are signed in during the case, the phenotype will add the total time of all providers together. If the providers' signed-in time overlaps, the overlapping time will only be counted once. If a provider is signed in before anesthesia start, the duration start time will be adjusted to begin at anesthesia start. If a provider is signed out after anesthesia end, the duration end time will be adjusted to anesthesia end. If multiple anesthesia start times are documented, the first one will be used. If multiple anesthesia end times are documented, the last one will be used.

For this phenotype, seconds will be ignored for the signed-in duration and anesthesia start/end calculations. The duration values returned will be minutes only.

## Dependencies

Anesthesia End

Institution

Anesthesia Start

StaffRoles

# Duration of CRNA and Anesthesia Assistant Sign-in

## Description

Duration of time (minutes) that Certified Registered Nurse Anesthetist(s) or Anesthesia Assistant(s) are signed into the case between anesthesia start and anesthesia end.

## Limitation

Will only count sign-in time between anesthesia start and end.

The phenotype does not separate out between CRNA and Anesthesiology Assistant.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

This phenotype relies on the StaffRoles phenotype to determine provider roles. If the role of 'CRNA' or 'Anesthesiology Assistant' is identified by the StaffRoles phenotype, the duration phenotype will determine how many minutes a CRNA or AA was signed into the case between anesthesia start (MPOG Concept ID: 50002) and anesthesia end (MPOG Concept ID:50009).

If multiple CRNAs or anesthesiology assistants are signed in during the case, the phenotype will add the total time of all providers together. If the providers' signed-in time overlaps, the overlapping time will only be counted once. If a provider is signed in before anesthesia start, the duration start time will be adjusted to begin at anesthesia start. If a provider is signed out after anesthesia end, the duration end time will be adjusted to anesthesia end. If multiple anesthesia start times are documented, the first one will be used. If multiple anesthesia end times are documented, the last one will be used.

For this phenotype, seconds will be ignored for the signed-in duration and anesthesia start/end calculations. The duration values returned will be minutes only.

## Dependencies

Anesthesia End

Institution

Anesthesia Start

StaffRoles

# Elixhauser Comorbidity - AIDS \ HIV

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes for AIDS \ HIV will be classied as a 1 for yes. If none of the codes from the table below are present, the patient will be classied as a 0 . If there are no ICD codes, then the data will be classied as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	04[2-4]	HUMAN IMMUNODEFICIENCY VIRUS (HIV) DISEASE	B2[0124]
	04[2-4].%		B2[0124].%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Alcohol Abuse

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion (derived, non-standardized)*
Components1	980 980.%	Toxic effect of (an alcohol)	T51 T51.%
	265.2	Pellagra (Niacin deficiency)	E52
	291.1-35-9].% 303. [09].% 305.0%	Alcohol abuse (withdrawal, mental changes), Acute alcohol intoxication, Non-dependent Alcohol abuse	F10.%
	357.5%	Alcoholic polyneuropathy	G62.1%
	425.5%	Alcoholic cardiomyopathy	I42.6%
	535.3%	Alcoholic Gastritis	K29.2%
	571.10-3].%	Alcoholic fatty liver, hepatitis, cirrhosis	K70.[039].%
	V11.3%	Problem w/ alcohol use	Z72.1%
		Alcohol Abuse Counseling / Rehab	Z50.2% Z71.4%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Blood Loss Anemia

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion ( <i>derived, non-standardized</i> )*
Components1	280.0%	IronDefi-ciency Anemia 2/2 Blood Loss (chronic)	D50.0%

Dependencies

No dependency available.



# Elixhauser Comorbidity - Cardiac Arrhythmias

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0. If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	996.0[14]	Mechanical Complication of Pacemaker/De brillator	T82.1%
	426.1[079]%	AV block and various dysrhythmias	I44[1-3].%
	426.1[023]		I45.[69]%
	427.1[0-46-9]%		I4[7-9]
			I4[7-9].%
	785.0%	Tachycardia, bradycardia Unspecified	R00.[018]%
	V45.0%	Defibrillator, pacemaker, cardiac device	Z45.0%
	V53.3%		Z95.0%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Chronic Pulmonary Disease

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion ( <i>derived, non-standardized</i> )*
Components1	49[0-9].%	Various chronic lung conditions (bronchiectasis, asthma, obs, etc.)	J6[0-7]%
	49[0-9]		J6[0-7]
	506.4%		J68.4%
	50[0-5]		J4[0-7].%
	50[0-5].%	asbestosis	J4[0-7]
	508.[18]%	Chronic pulmonary manifestation	J70.[13]%
	416.[89]%	Chronic Pulm Heart Disease	I27.[89]%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Coagulopathy

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion ( <i>derived, non-standardized</i> )*
Components1	286 286.%	Various coagulation defects and DIC	D6[5-8] D6[5-8].%
	287.[13-5] 5]%	Platelet defects, thrombocytopenia	D69[13-6].%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Congestive Heart Failure

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion ( <i>derived, non-standardized</i> )*
Components1	425.[4-9]%	Cardiomyopathy	I43 I43.% I42.[05-9] % I25.5%
	428 428.% 404.[019]3 40[24].[019]1	Heart Failure	I50 I50.% I11.0% I13.[02] %
	398.91	Rheumatic Heart Failure	I09.9%
		Neonatal Cardiac Failure	P29.0%

Dependencies

No dependency available.



# Elixhauser Comorbidity - Deficiency Anemia

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion ( <i>derived, non-standardized</i> )*
Components1	280.[1-9]%	Iron De ciency	D50.[89]%
	281	B12 and Folate de ciencies	D5[1-3]
	281.%		D5[1-3].%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Depression

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion ( <i>derived, non-standardized</i> )*
Components1	296.12351% 311 311.%	Depression, and Major Depressive Disorder	F31231 F31231.%
	300.4%	Dysthymic disorder	F34.1%
	309 309.%	Depressive states	F41131.2% F20.4% F31.13-51%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Diabetes (Complicated)

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion ( <i>derived, non-standardized</i> )*
Components1	250.[4-9]%	Various diabetic complications	E1[0-4].[2-8]%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Diabetes (Uncomplicated)

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes for diabetes uncomplicated will be classified as a 1 for yes. If none of the codes from the table below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD_9 Code	Description	ICD_10 Code conversion
Components 1	250.[0-3]%	Diabetes: not uncontrolled; uncomplicated	E1[0-4].[019]%

Dependencies

No dependency available.



# Elixhauser Comorbidity - Drug Abuse

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	305.[2-9]%, 292, 292.%, 304, 304.%	Various substance abuse	F1[1-689].%
	V65.42	Counseling on substance use and abuse	Z71.5%, Z72.2%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Fluid/Electrolyte Disorders

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Yes 1 Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

# Granularity

One value per case

## Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components(1)	253.6%	SIADH	E22.2%
	276 276.6%	Various electrolyte and Acid/Base disorders	E8[6-7].%

## Dependencies

No dependency available.

# Elixhauser Comorbidity - Hypertension (Complicated)

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	40[2-5] 40[2-5].%	Hypertensive end organ	1[1235].%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Hypertension (Uncomplicated)

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge administrative codes. Does not reference professional billing diagnoses, anesthesia history and physical diagnoses, or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Data source:

aims\_billingdiagnoses

Prior time frame – one year prior (before the operation date)

Post time frame – extends to date of service end

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type

MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	401.% 401	Essential HTN (primary)	I10 I10.%

## Dependencies

No dependency available.



# Elixhauser Comorbidity - Hypothyroidism

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	24[34]	Various hypothyroidism	E0[0-3]
	24[34].%		E0[0-3].%
	240.9%		E89.0%
	246.[18]%	Dysmorphogenic goiter	

Dependencies

No dependency available.

# Elixhauser Comorbidity - Liver Disease

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	456.[0-2]%, 572.[2-8]%, 573.[3489]%, 57[01], 57[01].%, 070.[23][23], 070.[45]4, 070.[69]%	Various hepatic vascular diseases, including viral hepatitis	K71.[13457]%, K76.[02-9]%, I98.2%, B18.%, I8[56].%, K70.%, K7[2-4].%
	V42.7%	Liver Transplant	Z94.4%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Lymphoma

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or professional administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	20[0-2] 20[0-2].%	Lymphoma, sarcoma, myeloma, mycosis fungoides, macroglobinemia	C8[123458] C8[123458].%
	203.0%	Multiple myeloma, plasmacytoma, and plasma cell leukemia	C90.[02]%
	238.6%	Histiocytosis, carcoma, Mast cell tumor	C96 C96.%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Metastatic Cancer

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components(1)	19[6-9].% 19[6-9]	Metastatic neoplasm	C7[7-9].% C80.%

Dependencies

No dependency available.



# Elixhauser Comorbidity - Obesity

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components(1)	278.0%	Obesity, overweight	E66.%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Other Neurological Disorders

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	33[45] 33[45].%	Ataxia, spastic paraplegia, spinocerebellar disease	G1[0-3].% G1[0-3]
	34[015] 34[015].%	MS, demyelinating diseases, epilepsy	G3[2567] G3[2567].% G4[01].%
	332.[01].% 333.92	Parkinson's Disease, Neuroleptic Malignant Syndrome	G2[0-2] G2[0-2].%
	78[04].3%	Seizures, convulsions, aphasia	R56.% R47.0%
	331.9% 336.2% 348.[13].%	Various cognitive and degenerative impairments	G31.[289].% G93.[14].%
	333.[45].%	Choreas (including Huntington's)	G25.[45].%

Dependencies

No dependency available.

# Elixhauser Comorbidity - Paralysis

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	34[23] 34[23].%	Hemiplasia, paraplesia, quadriplegia	G8[12].%
	334.1% 344.[0–6g]%	Various paralysis, including monoplegia and hereditary spastic paraplegia	G83.[0–49] % G80.[12] % G11.4 % G04.1 %

Dependencies

No dependency available.

# Elixhauser Comorbidity - Peptic Ulcer Disease, Excluding Bleeding

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

**Phenotype table not stored in database. No column returned.**

## Granularity

**One value per case**

# Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	53[1234].[79]%	Gastric, duodenal, peptic, gastrojejunal, etc. ulcerative disease	K2[5678].[79]%

## Dependencies

No dependency available.



# Elixhauser Comorbidity - Peripheral Vascular Disorders

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG.

This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

# Granularity

One value per case

## Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	093.0%	Syphilitic aortic aneurysm	
	437.3%	Nonruptured cerebral aneurysm	
	443.[1–9]%	Various aneurysms and dissections	
	447.1%	Artery Stricture	I77.1%
	V43.4%	Presence of implant or graft including cardiac, heart assist device, arti cial heart, or vascular	Z95.[89]%
	44[01]	Various peripheral vascular disease (including intestinal)	I73.[189]%
	44[01].%		I79.[02]%
	557.[19]%		K55.[189]%
			I7[01].%

## Dependencies

No dependency available.

# Elixhauser Comorbidity - Psychoses

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG.

This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

# Granularity

One value per case

## Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	29[578]	Schizophrenia, paranoid, psychosis, and delusional disorders	F2[02-589]
	29[578].%		F2[02-589].%
	296.[0145]4	Various disorders w/ psychotic symptoms	F3[01].2%
	293.8%		F31.5%

## Dependencies

No dependency available.

# Elixhauser Comorbidity - Pulmonary Circulation Disorders

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG.

This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity <sup>1</sup>

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

---

## Granularity

**One value per case**

---

## Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:

aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	417.[089]%	Pulmonary vessel disease	I28.[089]%
	416 416.% 415.[01]%	Pulmonary embolism, pulmonary hypertension, cor pulmonale	I267[.].%

---

## Dependencies

No dependency available.

# Elixhauser Comorbidity - Renal Failure

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	58[56] 58[56].% 403.[019]1 404.[019][23]	Chronic kidney disease, kidney failure	N1[89] N1[89].% I12.0% I13.1%
	V56 V56.% V45.1%	Dialysis and dialysis care	Z99.2% Z49.[0–2]%
	588.0%	Renal osteodystrophy	N25.0%
	V42.0%	Kidney transplant	Z94.0%

Dependencies

No dependency available.



# Elixhauser Comorbidity - Rheumatoid Arthritis Collagen Vascular Diseases

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

**Phenotype table not stored in database. No column returned.**

## Granularity

**One value per case**

# Logic

Patients with the following ICD codes will be classified as a 1 for yes. If the patient has ICD codes, but none listed on the table are present, the patient will be classified as a 0. If there are no ICD codes, the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	446 446.%	Various, including polyarteritis Nodosa, thrombotic microangiopathy, granuloma	M30.% M31.[0–3]%
	714 714.% 719.3%	Rheumatic disease	M0[568].% M12.[03]%
	701.0%	Scleroderma	L94.[013]%
	72[05] 72[05].%	Inflammatory spondylopathies	M45.% M46.[189]%
	710.[0–489]%. 711.2%. 728.5%	Various, including arthritis, lupus, systemic sclerosis, and hypermobility syndrome	M3[2–5].%
	728.89 729.30	Fasciitis including panniculitis	

## Dependencies

No dependency available.

# Elixhauser Comorbidity - Solid Tumor Without Metastasis

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

# Granularity

One value per case

## Logic

Patients with the following ICD codes will be classified as a 1 for yes. If the patient has ICD codes, but none listed on the table are present, the patient will be classified as a 0. If there are no ICD codes, the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1			C[01][0-9].%
			C2[0-6].%
			C3[0-47-9].%
			C4[0135-9].%
			C5[0-8].%
	1[4-6][0-9].%		C6[0-9].%
	17[0-24-9].%		C7[0-6].%
	19[0-5].%		C97.%
	1[4-6][0-9]		C[01][0-9]
	17[0-24-9]	Malignant neoplasms	C2[0-6]
	19[0-5]		C3[0-47-9]
			C4[0135-9]
			C97
			C7[0-6]
			C5[0-8]
			C6[0-9]

## Dependencies

No dependency available.

# Elixhauser Comorbidity - Valvular Disease

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Patients with the following ICD codes will be classified as a 1 for yes. If the patient has ICD codes, but none listed on the table are present, the patient will be classified as a 0. If there are no ICD codes, the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	39[4-7]	Valve diseases including rheumatic	I09.[18]%
	39[4-7].%		I0[5-8].%
	424		I3[4-9]
	424.%		I3[4-9].%
	093.2%	Syphilitic heart disease	A52.0%
	746.[3-6]%	Congenital	Q23.[0-3]%
	V42.2%	Prosthetic or xenogenic heart valve	Z95.[2-4]%
	V43.3%		

Dependencies

No dependency available.

# Elixhauser Comorbidity - Weight Loss

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses. Codes are based upon the Quan et al article (see below for full reference).

Reference:

(1) Quan, et. al. "Coding Algorithms for Defining Comorbidities in ICD-9- CM and ICD-10 Administrative Data", Medical Care, 43 (11), Nov 2005

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-9/10 codes during the specified timeframe
No	0	Patient does have ICD-9/10 codes, but does not have any for this specific Elixhauser comorbidity spec
Yes	1	Patient has ICD-10 or Enhanced ICD-9-CM codes for this specific Elixhauser comorbidity1

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

One value per case

Logic

Any patient that have the following ICD codes will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

	ICD-9 Codes	Description	ICD-10 Code conversion
Components1	26[0-3]	Kwashiorkor, marasmus, etc.	E4[0-6]
	26[0-3].%		E4[0-6].%
	799.4%	Cachexia	R64
	783.2%	Loss of weight and underweight	R63.4%

Dependencies

No dependency available.



## Emergency Status (ASA Class) Yes/No

### Description

This phenotype returns a yes/no answer for the Emergency Status in ASA Classification. When used with ASA status will return the ASA status and emergent status (example "2E" as opposed to just "2" or "E" if used independently).

References:

1. <https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system>

### Limitation

none

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
Missing	-999	Missing or unknown. When a case has no documentation for emergency status.
Invalid	-998	The emergency status documentation is invalid
Conflicting	-997	The case has multiple valid, but conflicting values
Emergency Status No	0	The case was labeled, but not as Emergent "E" case
Emergency Status Yes	1	The case was labeled as Emergent "E" case

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

---

## Granularity

**One value per case**

---

## Logic

As developed by the American Society of Anesthesiologists (ASA), the ASA Physical Status Classification is a six-category system for assessing health and fitness of patients prior to anesthesia/surgery<sup>1</sup>.

This collation uses the Emergency Status collation value and maps it to a "Yes" (1) or a "No" (0) response. Yes (1) indicates that the case was listed as Emergency Status, a No (0) indicates it was not. If the value is invalid (does not fit emergent documentation) it returns "Invalid" (-998). If there are multiple valid documented values a "Conflicting" (-997) is returned. Missing documentation is returned "Missing" (-999). A NULL may be returned if the note is available but has yet to be mapped.

This collation can accompany the ASA Class (cleaned) collation to return a numerical ASA Classification and the traditional alpha "E" notation in the form of this collation's Yes/No (1/0) response.

---

## Dependencies

Emergency Status (ASA Class)

Institution

# Halogenated Anesthetic Gases

## Description

This phenotype specifies if (and when) halogenated anesthetic gases were administered during a case.

## Limitation

Note these readings do not have to be consecutive or of the same type of halogenated agent.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	Halogenated Gas was not used during the case
Induction Only	1	Halogenated Gas was administered during induction only
Induction + Maintenance	2	Halogenated Gas was administered during induction and maintenance
Maintenance Only	3	Halogenated Gas was administered during maintenance only
Yes - Unspecified	4	Halogenated Gas was administered during the case but unable to determine induction or maintenance time

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

This phenotype determines if (and when) a halogenated anesthetic was administered between Anesthesia Start and Anesthesia End using the **InductionStart**, **Induction end** and **Maintenance end** phenotypes

A case must have = 5 halogenated gas physiologic values above threshold for = 5 minutes within the defined time bounds for induction vs. maintenance to return values 1-3; otherwise 'Yes - unspecified (4)' will be returned. If < 5 valid halogenated gas values between Anesthesia start - End then, (0) No, halogenated gas was not used during the case. If none of the timebounds have at least 5 values, but the case has a total >=5 values, 'Yes - unspecified' (4) will be returned. Missing minutes between valid values will have the last value carried forward if <= to 5 minutes.

**\*Note:**

- These readings do not have to be consecutive or of the same type of volatile gas.
- For institutions that only report anesthetic gases every 5 minutes, = 2 halogenated gas physiologic values must be present to return values 1-4.
- For this phenotype induction end date and time will be the same as maintenance start.

MPOG Concept ID	Concept Name	Threshold of Clinical Significance (%)	Threshold of Clinical Significance (reported as number)
3260	Isoflurane Exp %	0.3	0.003
3265	Isoflurane Insp %	0.3	0.003
3270	Sevoflurane Exp %	0.4	0.004
3275	Sevoflurane Insp %	0.4	0.004
3280	Desflurane Exp %	1.2	0.012
3285	Desflurane Insp %	1.2	0.012
3290	Halothane Exp %	0.5	0.005
3295	Halothane Insp %	0.5	0.005
3297	Enflurane Exp %	0.5	0.005
3298	Enflurane Insp %	0.5	0.005
3299	Miscellaneous Volatile Agent Insp%	0.3	0.003
3300	Miscellaneous Volatile Agent Exp%	0.3	0.003

If no values found between anesthesia start and anesthesia end  
Return 0

If values found between **Induction Start - Induction End** only  
Return 1 (Induction Only)

If values found between **Induction Start - Induction End AND Induction End -Maintenance End**

Return 2 (Induction + Maintenance)

If values found between **Induction End -Maintenance End** only

Return 3 (Maintenance Only)

If values found between anesthesia start and anesthesia end, but unable to determine their location within the **Induction Start, Induction End, and Maintenance End** date and times

Return 4 (Yes - Unspecified)

---

## Dependencies

Halogenated Anesthetic Gases (Yes / No)

Extubation Times

Induction End

Induction Start

Procedure Text

# Height (cm)

## Description

This phenotype returns the height for a patient in cm on a per case basis.

## Limitation

Dependent on height AIMS variables being correctly mapped to MPOG Concepts 70257 Physical exam- height (cm) and 70258 Physical exam-height (in)

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Takes values mapped to 70257 Physical exam- height (cm) and 70258 Physical exam-height (in)

Valid height range is 12.70 - 243.85 cm (5-96 inches)

1. If case reported height in inches, converts the value to cm (Height in cm = Height in inches \* 2.54cm).
2. Then this collation determines if the value is in a valid range of [12.70-243.85]. If outside the range returns as NULL

[ ] = inclusive (meaning including the values of 12.70 cm and 243.85 cm)

Note:

- Only one result is returned. If there are multiple results, the latest recorded result within 12 hours past anesthesia end is used. If multiple heights are recorded at the chosen time, then the height recorded in CM is chosen. If there are still multiple heights at the same time, the tallest measurement is used

- Heights recorded after 12 hours postop or missing a recorded time are not excluded, but they won't be chosen if there are heights recorded before 12 hours postop

## Dependencies

Anesthesia End

# Holiday

## Description

This returns an indication if the "anesthesia start" for a specific MPOG\_CASE\_ID occurred on a designated holiday. For the purpose of US Holidays, the following holidays are recognized:- New Year's Day

- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Friday After Thanksgiving Day
- Christmas Day

## Limitation

We do not validate if each site treats these actual dates as holidays/non-observed/observed on another day.

There may be additional site specific holidays which are unaccounted for.

Accounts only for weekday holidays. Weekend holidays are excluded.

For the purposes of Dutch holidays the following will be recognized (following a date specific approach) in a later version of this phenotype:

- New Year's Day
- Good Friday (Easter Sunday - 2)
- Eater Sunday
- Easter Monday (Easter Sunday + 1)
- King's Day
- Liberation Day (Every 5 years, start 2015)
- Ascension Day
- Pentecost Sunday (Easter Sunday + 49 Days)
- Pentecost Monday (Easter Sunday + 50 days)
- Christmas Day
- Boxing Day (Christmas Day + 1)

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition

non-Holiday	0	case DID NOT occur on recognized holiday (listed above)
Holiday	1	case occurred on recognized holiday (listed above)

## Return Columns

Column Name	Data Type
Holiday_Name	varchar
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

**Aim:** To identify days on which limited clinical activity occurs.

**Methods:**

- 1) Determine if the Anesthesia Start Falls on a Weekday
- 2) Determine if this date is a designated holiday. If it is, then return 1 else return 0.

## Dependencies

Anesthesia Start



# Hospital Bed Size

---

## Description

This phenotype returns a categorical value indicating the the bed-size for each hospital affiliated with an MPOG institution.

---

## Limitation

Bed-sizes are based on 2018 hospital data.

---

## Value Type

**Not Set**

---

## Return Columns

**Phenotype table not stored in database. No column returned.**

---

## Granularity

**One value per case**

---

## Logic

### ValueDescription

- |   |                  |
|---|------------------|
| 1 | 6-24 beds        |
| 2 | 25-49 beds       |
| 3 | 50-99 beds       |
| 4 | 100-199 beds     |
| 5 | 200-299 beds     |
| 6 | 300-399 beds     |
| 7 | 400-499 beds     |
| 8 | 500 or more beds |

## Dependencies

No dependency available.

# Ideal Body Weight

## Description

### Calculating the ideal body weight for a patient

References:

1. Phillips S, Edlbeck A, Kirby M, Goday P. Ideal Body Weight in Children. Nutrition in clinical Practice (2007) 22:240-245
2. ARDS Network. <http://www.ardsnet.org/tools.shtml>
3. CDC Children growth charts: [https://www.cdc.gov/growthcharts/percentile\\_data\\_files.htm](https://www.cdc.gov/growthcharts/percentile_data_files.htm)

## Limitation

There are 2 formulas used in this collation, one for patient's aged 1-17 years old and one for patient's aged >=18 years old.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

IF patients aged: 1-17 years AND height > 74cm

then IBW using the McLaren Method uses the CDC growth charts to determine IBW for children 2-17 years old and WHO growth charts for children < 2 years old by sex. This method plots the child's height for age and extends a line horizontally to the 50th percentile height-for-age line. You then extend a line vertically from the 50th percentile height-for-age line to the corresponding 50th percentile weight. This the child's IBW. 1

For patients aged >= 18 years2:

If collation.Sex = 0 then IBW =  $50 + 0.91 * (\text{collation.height} - 152.4\text{cm})$

If collation.Sex = 1 then IBW =  $45.5 + 0.91 * (\text{collation.height} - 152.4\text{cm})$

If patient height < 74cm or patient age <1, returns NULL

## Dependencies

Age (Years)

Height (cm)

Anesthesia End

Sex

# Induction End

## Description

This phenotype returns the associated date/time of Induction End for cases as applicable.

## Limitation

This phenotype uses specific MPOG concepts. Those defined outside of these concepts will not be captured. Labor epidurals are not considered in this phenotype.

## Value Type

**Datetime**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

## Granularity

**One value per case**

## Logic

This phenotype determines the **induction end** date and time using the defined process and concepts below. Labor epidurals as defined by Obstetric Anesthesia Type (value\_code 3 and 6) are excluded from this phenotype.

1. Induction End Date/Time (50005) If none, then
2. Earliest Intubation Time, if none, then
3. Anesthesia Ready Date/Time (50018). If none, then
4. Pre-Incision Timeout (50198). if none, then
5. The latest documented Date/Time of
  - Procedure Start (50006)
  - Surgical Incision (50235)

## Dependencies

Halogenated Anesthetic Gases (Yes / No)

Procedure Text

Induction Start

# Induction Start

## Description

This phenotype returns the associated date/time of Induction Start for cases as applicable.

## Limitation

This phenotype uses specific MPOG concepts. Those defined outside of these concepts will not be captured. Labor epidurals are not considered in this phenotype.

## Value Type

**Datetime**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

## Granularity

**One value per case**

## Logic

**This phenotype returns the date and time using the defined process and concepts below.**

**Step 1.** Is case determined a Labor Epidural by the Obstetric Anesthesia Type? (*value code 3 or 6*). If yes, exclude. If no proceed to step 2.

**Step 2.** Does case return Anesthesia Technique: General? (*value code > 0*) If yes, proceed to **Step 2A**. If no, Proceed to **Step 2B**.

### General Anesthesia Cases (A)

1. Induction Start (50004). If none, then
2. Earliest Documentation following Anesthesia Start. If none, then
  - Pre-induction verification (50301)
  - Propofol (10377)
  - ETCO2 > 10 (3235, 3256)
3. Data Capture Start. If none, then
4. Patient in Room. If none, then
5. Anesthesia Start

### Sedation Cases (B)

1. Induction Start (50004). If none, then
2. Earliest Documentation of Regional/Neuraxial block placement (*see concept subset below\**) . If none, then
  - Must follow Patient in Room (*if not then, Anesthesia Start*) and precede Procedure Start
3. Earliest documentation of Sedation medication following Patient In Room (*if not then, Anesthesia Start*) and before Procedure Start. If none, then

- ETCO2 > 10 (3235, 3256)
- 'MAC Sedation Medications'

4. Data Capture Start. If none, then

5. Patient in Room. If none, then

6. Anesthesia Start. If none, then

**\* Regional/Neuraxial Concept Subset**

- 50065 Regional - Cervical Plexus Block
- 50081 Regional - Adductor Canal Block Performed
- 50383 Regional - Supraclavicular Block
- 50384 Regional - Interscalene Block
- 50385 Regional - Infraclavicular Block
- 50386 Regional - Axillary Block
- 50387 Regional - Femoral Nerve Block
- 50388 Regional - Popliteal Block
- 50389 Regional - Sciatic Block
- 50390 Regional - Ankle Block
- 50391 Regional - Bier Block
- 50398 Regional - Lumbar Plexus Block
- 50629 Regional - Retrobulbar Block by surgeon
- 50724 Regional - Superior Laryngeal Block
- 50765 Regional - Saphenous Nerve Block
- 50798 Regional - Inguinal Field Block
- 50808 Regional - Transversus Abdominis Plane (TAP) Block
- 50243 Regional - Quadratus Lumborum Block
- 50624 Regional - Infiltration between Popliteal Artery and Capsule of Knee (IPACK) Block
- 50021 Regional- Peripheral Nerve Catheter Placed
- 50356 Regional- Block Performed
- 50690 Categorized Note- Regional Anesthesia
- 50665 Procedures - Other unlisted procedure
- 50254 Categorized note: Regional or neuraxial note
- 50614 Neuraxial technique- combined spinal/epidural technique note
- 50154 Epidural anesthesia catheter placement note
- 50643 Neuraxial - Epidural placed for postoperative pain control
- 50020 Neuraxial Approach
- 50635 Regional - Caudal block performed
- 50691 Categorized note - Neuraxial anesthesia
- 50148 Neuraxial- Spinal needle approach
- 50680 Neuraxial – spinal or epidural performed
- 50635 Regional - Caudal block performed
- 50691 Categorized note - Neuraxial anesthesia
- 50148 Neuraxial- Spinal needle approach
- 50680 Neuraxial – spinal or epidural performed

## Dependencies

Halogenated Anesthetic Gases (Yes / No)

Procedure Text



## Institution

---

### Description

This phenotype links cases to the institution from which they are processed.

---

### Limitation

Institutions may have different instances if the institution has multiple electronic medical record (EMR) systems, or has changed EMR while in MPOG. Of note, to protect patient privacy, there are instances where the MPOG Institution ID will be appropriately de-identified.

---

### Value Type

**Raw Text**

---

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
MPOG_Institution_ID	numeric
Value	varchar

---

### Granularity

**One value per case**

---

### Logic

Returns a text value of the institution assigned to the case, along with an MPOG\_Institution ID.

---

### Dependencies

No dependency available.

# Intraoperative MAP (Minutes Under 65) - THRIVE

## Description

Calculates the number of minutes during a case that the patient's Mean Arterial Pressure (MAP) was under 65mmHg.

## Limitation

Cases that do not have the MAP or MAP calculations done at the required frequency of 5 minutes or less, such as epidurals, will result in an -999 value.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

This phenotype measures the cumulative time in minutes of Mean Arterial Pressure (MAP) <65mmHg for a given case using the below non-invasive and invasive blood pressure concepts. MAP concepts can be counted alone. To use a calculated MAP the systolic and diastolic must be present for the same time and be listed as the same type and location. Example: To use BP Sys Invasive Unspecified Site 1 there must also be a value in the BP Dias Invasive Unspecified Site 1 for the same time.

Evaluate by each minute- If there are 2 or more blood pressure monitoring methods done during the same minute, the higher MAP will be used. Missing minutes between valid values will have the last value carried forward if <= to five minutes. If the case has more than >10 minutes between valid times with a non-0 value, flag the case as -998. If the case has >10 minutes between valid times with a 0 value, flag case as -999.

The phenotype will start evaluating BPs after the first BP reading after the derived start. It will stop evaluating BPs after the last BP before derived end.

Artifact readings will be identified and removed from final measurement calculation. Artifact processing: if systolic and diastolic blood pressures are present, the values must be at least 5 mmHg apart; otherwise the values will be excluded. MAP values less than 10 are excluded.

## **Time Bounds**

### **Derived Start Time:**

First Blood Pressure Reading after the latest of these 3 times:

1. First documented Anesthesia Start time.
2. First documented Patient in Room time.
3. First documented Data Capture Start time.

\* For labor epidurals which convert to cesarean deliveries where the procedures are combined under one case ID, 'Cesarean Delivery Start Time' is used as the 'Measure Start Time'

### **Derived End Time:**

1. Patient Out of Room. If not available,
2. Data Capture End. If not available,
3. Anesthesia End

\* For labor epidurals which convert to cesarean deliveries where the procedures are combined under one case ID, the latest 'data capture end' is used as the 'Measure End Time' when appropriate (all other cases use logic from 'Data Capture End' phenotype)

3011	BP Sys Invasive Unspecified Site 1	3040	BP Mean Arterial Line (Invasive, Peripheral)
3012	BP Dias Invasive Unspecified Site 1	3041	BP Sys Invasive Unspecified Site 2
3013	BP Mean Invasive Unspecified Site 1	3041	BP Sys Invasive Unspecified Site 2
3015	BP Sys Non-invasive	3042	BP Dias Invasive Unspecified Site 2
3020	BP Dias Non-invasive	3043	BP Mean Invasive Unspecified Site 2
3025	BP Mean Non-invasive	3046	BP Sys Invasive Unspecified Site 3
3026	BP Sys Invasive Unspecified Site 4	3047	BP Dias Invasive Unspecified Site 3
3027	BP Dias Invasive Unspecified Site 4	3048	BP Mean Invasive Unspecified Site 3
3028	BP Mean Invasive Unspecified Site 4	3475	BP Sys Invasive Unspecified Site 5
3030	BP Sys Arterial Line (Invasive, Peripheral)	3476	BP Dias Invasive Unspecified Site 5
3035	BP Dias Arterial Line (Invasive, Peripheral)	3477	BP Mean Invasive Unspecified Site 5

## **Dependencies**

Airway Type Notes

Anesthesia CPT (All)

Anesthesia End

Anesthesia Start

Anesthesia Technique: General

Blood Pressure Observations

Data Capture End

Data Capture Start

GeneralNotes

Institution

MPOG Patient ID

Obstetric Anesthesia Type

Cesarean Delivery Start Time for Conversions

Paralytics Used (All)

Patient Out Of Room Date/Time

Patient In Room Date/Time

Procedure Text

Surgery Start Date/Time



# Intraoperative MAP (Minutes Under 55) - THRIVE

## Description

Calculates the number of minutes during a case that the patient's Mean Arterial Pressure (MAP) was under 55mmHg.

## Limitation

Cases that do not have the MAP or MAP calculations done at the required frequency of 5 minutes or less, such as epidurals, will result in an -999 value.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

This phenotype measures the cumulative time in minutes of Mean Arterial Pressure (MAP) <55mmHg for a given case using the below non-invasive and invasive blood pressure concepts. MAP concepts can be counted alone. To use a calculated MAP the systolic and diastolic must be present for the same time and be listed as the same type and location. Example: To use BP Sys Invasive Unspecified Site 1 there must also be a value in the BP Dias Invasive Unspecified Site 1 for the same time.

Evaluate by each minute- If there are 2 or more blood pressure monitoring methods done during the same minute, the higher MAP will be used. Missing minutes between valid values will have the last value carried forward if <= to five minutes. If the case has more than >10 minutes between valid times with a non-0 value, flag the case as -998. If the case has >10 minutes between valid times with a 0 value, flag case as -999. The phenotype will start evaluating BPs after the first BP reading after the derived start. It will stop evaluating BPs after the last BP before derived end.

Artifact readings will be identified and removed from final measurement calculation. Artifact processing: if systolic and diastolic blood pressures are present, the values must be at least 5 mmHg apart; otherwise the values will be excluded. MAP values less than 10 are excluded.

## Time Bounds

### Derived Start Time:

First Blood Pressure Reading after the latest of these 3 times:

1. First documented Anesthesia Start time.
2. First documented Patient in Room time.
3. First documented Data Capture Start time.

\* For labor epidurals which convert to cesarean deliveries where the procedures are combined under one case ID, 'Cesarean Delivery Start Time' is used as the 'Measure Start Time'

### Derived End Time:

1. Patient Out of Room. If not available,
2. Data Capture End. If not available,
3. Anesthesia End

\* For labor epidurals which convert to cesarean deliveries where the procedures are combined under one case ID, the latest 'data capture end' is used as the 'Measure End Time' when appropriate (all other cases use logic from 'Data Capture End' phenotype)

MPOG Concept	Concept Name	MPOG Concept	Concept Name
3011	BP Sys Invasive Unspecified Site 1	3040	BP Mean Arterial Line (Invasive, Peripheral)
3012	BP Dias Invasive Unspecified Site 1	3041	BP Sys Invasive Unspecified Site 2
3013	BP Mean Invasive Unspecified Site 1	3041	BP Sys Invasive Unspecified Site 2
3015	BP Sys Non-invasive	3042	BP Dias Invasive Unspecified Site 2
3020	BP Dias Non-invasive	3043	BP Mean Invasive Unspecified Site 2
3025	BP Mean Non-invasive	3046	BP Sys Invasive Unspecified Site 3
3026	BP Sys Invasive Unspecified Site 4	3047	BP Dias Invasive Unspecified Site 3
3027	BP Dias Invasive Unspecified Site 4	3048	BP Mean Invasive Unspecified Site 3
3028	BP Mean Invasive Unspecified Site 4	3475	BP Sys Invasive Unspecified Site 5
3030	BP Sys Arterial Line (Invasive, Peripheral)	3476	BP Dias Invasive Unspecified Site 5
3035	BP Dias Arterial Line (Invasive, peripheral)	3477	BP Mean Invasive Unspecified Site 5

## Dependencies

Airway Type Notes

Anesthesia CPT (All)

Anesthesia End

Anesthesia Start

Anesthesia Technique: General

Blood Pressure Observations

Data Capture End

Data Capture Start

GeneralNotes

Institution

MPOG Patient ID

Obstetric Anesthesia Type

Cesarean Delivery Start Time for Conversions

Paralytics Used (All)

Patient Out Of Room Date/Time

Patient In Room Date/Time

Procedure Text

Surgery Start Date/Time

# Intraoperative Research Standard

## Description

Binary variable indicating whether a case meets the Intraoperative Research Standard as defined in the Logic section below.

## Limitation

This phenotype relies on several other phenotypes, which each have their own limitations.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	The case does not meet the Intraoperative Research Standard
Yes	1	The case meets the Intraoperative Research Standard

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

Each case must meet eight (8) criteria to be classified as a Yes for this phenotype:

1. **Has valid Anesthesia Start and End** – phenotypes for **Anesthesia Start** and **Anesthesia End** must both exist, must both not be null, and Anesthesia End must occur after Anesthesia Start.
2. **Patient in Room time should be valid if exists** – exclude only cases where **Patient in Room Date/Time** occurs more than 30 minutes before Anesthesia Start. All cases where **Patient in Room Date/Time** does not exist, occurs

after Anesthesia Start, or occurs 30 minutes or less before Anesthesia Start are included.

### 3. Anesthesia Duration

- a. For General Anesthesia Cases (where the **Anesthesia Technique: General** phenotype is 1-6, inclusive), include all cases where **Anesthesia Duration** is at least 10 minutes.
- b. For Non-General Anesthesia Cases (where the **Anesthesia Technique: General** phenotype = 0), include all cases where **Anesthesia Duration** is at least 5 minutes.

4. **Age must be present** – **Age (Years)** phenotype must not be Null.

5. **Sex must not be unknown** – **Sex** phenotype must not be Unknown.

6. **ASA Class must not be missing, invalid, or conflicting** – **ASA Class** phenotype must be 1-6, inclusive.

7. **At least one valid BP value must be present** – at least one non-artifact blood pressure measure exists within the **Blood Pressure Observations** phenotype.

8. **At least one intraoperative medication was administered** – At least one medication listed in the **AIMS\_IntraopMedications** table.

---

## Dependencies

Age (Years)

Airway Type Notes

Anesthesia Duration

Anesthesia End

Anesthesia Start

Anesthesia Technique: General

ASA Class

ASA Notes

Blood Pressure Observations

GeneralNotes

Institution

Paralytics Used (All)

Patient In Room Date/Time

Sex

# Last Known Alive

## Description

This phenotype returns the last known date that the patient was considered alive according to MPOG data. It is used to help determine the date of death and Mortality data

## Limitation

none

## Value Type

**Datetime**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

## Granularity

**One value per case**

## Logic

The latest date of the following criteria is returned as the 'Last Known Alive' date:

1. The latest 'Anesthesia Start' minus 1 day
2. The latest medication dose minus 1 day
3. The latest lab observation date minus 2 days

Other Details:

- Observation date is used as it reflects the date that the lab was drawn and may be different from the date that the lab was resulted
- This phenotype evaluates each patient ID at each institution
- This phenotype omits dates where the patient is recorded as an ASA 6 (A declared brain-dead patient whose organs are being removed for donor purposes).
- It will only return patients with a last known alive date. If there is no last known alive date by this logic (no reported anes start, medications, or labs for this patient), this collation will not return the patient.

References:

1. <https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system>

## Dependencies

ASA Notes

Anesthesia Start

Institution

ASA Class

MPOG Patient ID

# Medical School Affiliation

## Description

Indicates whether the case occurred at an institution affiliated with a medical school.

## Limitation

This phenotype is determined by MPOG. This is not associated with the American Hospital Association definition for teaching hospital. Please contact us if the affiliation for your institution should be updated.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Not Specified	-999	
No	0	Case occurred at an institution that is not affiliated with a medical school
Yes	1	Case occurred at an institution affiliated with a medical school

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

This phenotype will return a 1=Yes or 0=No flag for whether the institution where the case occurred has an associated medical school.

Please note that this phenotype does NOT return the institution name and will only return the medical school affiliation value. We include the institution name and medical school affiliation designation below for

informational purposes.

Ins tu on Name	Medical School Affilia on
Beaumont Dearborn	0
Beaumont Farmington Hills	0
Beaumont Grosse Pointe	0
Beaumont Royal Oak	1
Beaumont Taylor	0
Beaumont Trenton	0
Beaumont Troy	1
Beaumont Wayne	0
Brigham and Women's Hospital	1
Bronson Healthcare Group	0
Childrens Hospital of Orange County	1
Cleveland Clinic	1
Columbia University Medical Center	1
Dartmouth-Hitchcock Medical Center	1
Duke University	1
Henry Ford Health System – Allegiance	0
Henry Ford Health System - Detroit	1
Henry Ford Health System – Macomb	0
Henry Ford Health System - West Bloomfield	0
Henry Ford Health System – Wyandote	0
Holland Hospital	0
Massachusetts General Hospital	1
MD Anderson Cancer Center	1
Memorial Sloan Kettering Cancer Center	1
NYU Langone Medical Center	1
Oregon Health and Science University	1
Sparrow Health System	0
Stanford Hospitals and Clinics	1
Trinity - Mercy Health Muskegon	0
Trinity - St. Joseph Mercy Ann Arbor	0
Trinity - St. Joseph Oakland	0
Trinity - St. Mary Mercy Livonia	0
UChicago Medicine	1
UCLA Medical Center	1
University Medical Center - Utrecht	1
University of Amsterdam - Academic Medical Center	1
University of Arkansas for Medical Sciences	1
University of California San Francisco	1
University of Colorado Denver	1
University of Florida Health Jacksonville	1

University of Florida, Gainesville	1
University of Michigan Health System	1
University of Oklahoma Health Sciences Center	1
University of Pennsylvania Medical School	1
University of Tennessee Medical Center	1
University of Utah Health Care	1
University of Vermont - Fletcher Allen Health Care	1
University of Virginia Health System	1
University of Washington Medical Center	1
Vanderbilt University Medical Center	1
Wake Forest Baptist Medical Center	1
Washington University School of Medicine	1
Weill Cornell Medical College	1
Yale New Haven Hospital	1

## Dependencies

Institution



## Mortality (In Hospital 30-day)

### Description

30-day in-hospital mortality

### Limitation

This phenotype includes patients who passed away during the same encounter as the procedure within 30 days or if the patient's death was after discharge and reported to the hospital within 30 days of the procedure.

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
Missing	-999	There is no data on in-hospital or hospital reported mortality within the current month or the prior 3-months
ASA6	-2	The case has patient listed as an ASA 6
Conflicting	-1	Last known alive date >48 hrs after death date
No	0	No in-hospital or hospital reported death within 30 days of procedure and there is in-hospital data present from their institution
Yes	1	In-hospital or hospital reported death within 30 days of procedure and last known alive date <48 hrs after death date

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_CD	int

### Granularity

**One value per case**

---

## Logic

Looks to see if the institution has in-hospital mortality within the current month or +/- 1 month.

If none, -999 "Missing" is returned.

If patient is labeled as an ASA 6 for the case, return -2 "ASA6".

Next, looks at mortality date and checks last known alive date and if >48 hrs from recorded death, return -1 "conflicting".

If mortality is w/in the 30 days following anesthesia start, last known alive is <48hrs prior, and the case is not an ASA 6, return 1 ("Yes").

Given all the above, if there is no date of death within 30 days of anes start, return 0 ("No").

---

## Dependencies

Anesthesia Start

ASA Class

ASA Notes

Institution

Last Known Alive

MPOG Patient ID

# MPOG Comorbidity - Cerebrovascular Disease

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses.

## Limitation

This phenotype relies on ICD-9 & ICD-10 codes. These codes must be included in the hospital discharge or pro fee administrative billing data submitted to MPOG. This collation does not reference problem summary list diagnoses.

MPOG is unable to determine if diagnosis was present on admission.

## Value Type

### Categorical

## Enumeration

Value	Value Code	Definition
No Diagnosis Codes Available	-999	Patient does not have any ICD-9 or ICD-10 codes within the timeframe.
No	0	Patient does have ICD-9 or ICD-10 codes during the given timeframe, but does not have any indicating cerebrovascular disease as defined by the codes listed in the logic section below
Yes	1	Patient does have ICD-9 or ICD-10 codes indicating cerebrovascular disease during the given timeframe

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

---

## Granularity

### One value per case

---

## Logic

Any patient that have the following ICD codes for cerebrovascular disease will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0 . If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:  
aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

ICD-9-CM:  
433.X, 434.X, 435.X, 437.X, 438.X

ICD-10-CM:  
I63.X, I65.X, I66.X, I67.X, I68.X

X = any number of any digits

KEY:  
433 - Occlusion and stenosis of precerebral arteries  
434 - Occlusion of cerebral arteries  
435 - Transient cerebral ischemia  
437 - Other and ill-defined cerebrovascular disease  
438 - Late effects of cerebrovascular disease

I63 - Cerebral Infarction  
I65 - Occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction  
I66 - Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction  
I67 - Other cerebrovascular diseases  
I68 - Cerebrovascular disorders in diseases classified elsewhere

---

## Dependencies

No dependency available.

# MPOG Comorbidity - Coronary Artery Disease

## Description

ICD-9, ICD-10 based comorbidity measure derived from hospital discharge and professional billing diagnoses administrative codes. This phenotype does not reference anesthesia history and physical diagnoses or problem summary list diagnoses.

## Limitation

Patients with a history of pre-eclampsia will not be identified for cases without ICD-10 codes submitted to MPOG. In addition, it is not known whether each ICD-10 code was present on admission. Also, this phenotype does not determine if the patient is currently pregnant OR if the case performed was an obstetric case.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Patient does not have any ICD-10 codes within the timeframe.
No	0	Patient does have ICD-10 codes during the given timeframe, but does not have any indicating CAD as defined by the codes listed in the logic section below
Yes	1	Patient does have ICD-9 or ICD-10 codes indicating CAD during the given timeframe

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

Any patient that have the following ICD codes for pre-eclampsia will be classified as a 1 for yes. If none of the codes below are present, the patient will be classified as a 0. If there are no ICD codes, then the data will be classified as missing and reported as -999.

Data source:

aims\_billingdiagnoses

Using the DiagnosisCleaned phenotype, this collation looks as the following timeframe:

**Prior time frame** – 90 days (before the operation date)

**Post time frame** – extends 7 days after service end

ICD-9-CM:

410, 410.X, 411, 411.X, 412, 412.X 414.2, 414.8, 414.9, V45.81, V45.82

ICD-10-CM:

I21, I21.X, I25, I25.X, I25.10, I25.110, I25.111, I25.118, I25.119, I25.2, I25.5, I25.6, I25.700, I25.701, I25.708, I25.709, I25.710, I25.711, I25.718, I25.719, I25.720, I25.721, I25.728, I25.729, I25.730, I25.731, I25.738, I25.739, I25.750, I25.751, I25.758, I25.759, I25.760, I25.761, I25.768, I25.769, I25.790, I25.791, I25.798, I25.799, I25.810, I25.811, I25.812, I25.82, I25.83, I25.84, I25.89, I25.9, Z95.1, Z95.5, Z98.61

KEY:

I25 – Chronic Ischemic Heart Disease

Z95.1 - Presence of aortocoronary bypass graft

Z95.5 - Presence of coronary angioplasty implant and graft

Z98.61 – Coronary Angioplasty Status (primarily coded as presence of a stent, CAD)

412 – Old MI

414.2 – Chronic total occlusion of coronary artery

414.8 – Other specified forms of chronic ischemic heart disease

414.9 – Chronic ischemic heart disease, unspecified

V45.81, V45.82 - Coronary Angioplasty Status (primarily coded as presence of a stent, CAD)

---

## Dependencies

No dependency available.

# MPOG Complication - Acute Kidney Injury (AKI)

## Description

Lab-based postoperative outcome measure, defined by Kidney Disease – Improving Global Outcomes (KDIGO) definition.

Specifically, an increase in serum creatinine by  $\geq 0.3$  mg/dL within 48 hours of anesthesia end time, or a  $\geq 50\%$  increase within seven postoperative calendar days.

### References:

Kellum JA, Lameire N. Diagnosis, evaluation, and management of acute kidney injury: a KDIGO summary (Part 1). Crit Care. 2013;17(1):204.

\* CKD-EPI Formula: <https://www.niddk.nih.gov/health-information/health-communication-programs/nkdep/lab-evaluation/gfr/estimating/Pages/estimating.aspx>

\*\* Cockcroft-Gault Formula: <http://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation/>  
Body Surface Area (BSA) by Du Bois and Du Bois Formula: <http://www.ncbi.nlm.nih.gov/pubmed/2520314>

BSA-Indexed EGFR conversion reference: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2879308/>

\*\*\* Bedside Schwartz Formula: <https://www.kidney.org/content/creatinine-based-%E2%80%9Cbedside-schwartz%E2%80%9D-equation-2009>

## Limitation

This phenotype is for research purposes and not quality. The quality AKI metric returns different parameters and has different exclusion criteria.

- Returns negative values in enumeration (see below), for non-applicable cases

- Intended for use on adults  $>18$  yo only

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing or invalid	-999	No valid laboratory data (any date) available
No preoperative creatinine	-3	No pre-operative creatinine (within 60 days) available
Preoperative renal	-2	Preoperative creatinine available; patient in renal failure (KDIGO stage 5; CKD-

failure		EPI EGFR < 15 mL/min/1.73 m2)
No postoperative creatinine	-1	Preoperative creatinine available; no post-operative creatinine (within 7 days) available
No AKI	0	Postoperative creatinine available, no AKI
Stage 1 AKI	1	Stage 1 AKI (but not Stage 2)
Stage 2 AKI	2	Stage 2 AKI (but not Stage 3)
Stage 3 AKI	3	Stage 3 AKI

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

### One value per case

## Logic

### Step 1. Determine Baseline Creatinine

1. Check if case has any laboratory data. If no, then return **'Missing/Unknown'** (value\_code -999) and Stop. If yes, proceed to check 2.
2. Obtain most recent serum creatinine (Scr) value in mg/dL (MPOG concept ID 5002) within 24 hours before anesthesia start.
  - If Scr value is = 0 mg/dL, then return **'Missing/Unknown'**
  - If Scr value is > 0 mg/dL and documented > 60 days before Anesthesia start, then return **'No preoperative creatinine'** (value\_code -3)
  - Otherwise, use the most recent, valid, Scr value documented within 60 days of Anesthesia Start.

### Step 2. Calculate Body Surface Area (BSA)-Indexed EGFR

#### Adults > 18 years old:

- If race data available, then use CKD-EPI formula\*:  $CKD-EPI\ EGFR = 141 \times \min(Scr/?, 1)^a \times \max(Scr/k, 1)^{-1.209} \times (0.993)^{Age} \times (1.018 \text{ if female}) \times (1.159 \text{ if black})$ 
  - Scr indicates the baseline serum creatinine in mg/dL
  - k = 0.7 for females, 0.9 for males (*If no gender data available, assume female*)
  - a = -0.329 for females, -0.411 for males
  - Age = age in years (*mandatory*)
  - min indicates the minimum of Scr/k or 1
  - max indicates the maximum of Scr/k or 1



- If no race data available ? use Cockcroft-Gault formula\*\*:  $EGFR = ((140 - \text{age in years}) * (\text{weight in kg}) * (0.85 \text{ if female})) / (72 * \text{Baseline creatinine})$ 
  - $BSA = (\text{weight in kg})^{0.425} * (\text{height in cm})^{0.725} * 0.007184$ .
  - $BSA\text{-Indexed } EGFR = EGFR * 1.73 / BSA$
  - Age is mandatory
  - If no gender data available ? assume female
  - If no height data available ? assume  $BSA = 1.73$
  - If no weight data available ? use CKD-EPI formula instead, assume non-black

- If no race data (and no weight data for Cockcroft-Gault) available, then use CKD-EPI and assume non-black

**Pediatric Patients = 18 years old** use Bedside Schwartz  $EGFR = 0.413 * (\text{height in cm}) / (\text{baseline creatinine})$

### **Step 3. Determine if preoperative renal failure is present:**

If  $BSA\text{-Indexed } EGFR < 15 \text{ mL/min/1.73 m}^2$ , then return '**Preoperative Renal Failure**' (value\_code -2) and stop. Otherwise, proceed to Step 4.

**Step 4. Determine Postoperative Scr level** recorded within 7 days after anesthesia end, AND before anesthesia start date/time of subsequent surgery.

1. If Scr value is = 0 mg/dL, then value is ignored (non-valid)
2. If no postoperative creatinine within 7 days after anesthesia end, then return '**No Postoperative Creatinine**' (value\_code -1)
3. Otherwise, if this value is = 200% greater than baseline creatinine (i.e. = 3.0 times baseline), OR Scr > 4.0 mg/dl then return '**AKI Stage 3**' (value\_code 3)
4. Otherwise, if this value is = 100% greater than baseline creatinine (i.e. = 2.0 times baseline), then return '**AKI Stage 2**' (value\_code 2)
5. Otherwise, if this value is = 50% greater than baseline creatinine (i.e. = 1.5 times baseline), then return '**AKI Stage 1**' (value\_code 1)
6. Otherwise, obtain highest postoperative Scr level recorded within 48 hours after anesthesia end, AND before anesthesia start date/time of subsequent surgery.
  - a) If this value is = 0.3 mg/dL greater than baseline creatinine then return '**AKI Stage 1**' (value\_code 1)
  - b) Otherwise, return '**No AKI**' (value\_code 0). End Collation.

## **Dependencies**

Age (Years)

Anesthesia End

Anesthesia Start

Height (cm)

Preop Creatinine

Preop EGFR (Most Recent)

Race

Sex

Weight (kg)

# MPOG Patient ID

## Description

Identifies the MPOG Patient ID for case. MPOG Patient ID is a unique identifier for each patient. It is generated when the patient's ID is seen for the first time in Import Manager in the local MPOG database.

## Limitation

None

## Value Type

**Not Set**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
MPOG_Patient_ID	uniqueidentifier

## Granularity

**One value per case**

## Logic

This phenotype returns the MPOG\_Patient\_ID associated with the case.

## Dependencies

No dependency available.

# Nitrous Oxide Used

## Description

This phenotype specifies if (and when) nitrous oxide was administered during a case.

## Limitation

Note these readings do not have to be consecutive or of the same type of non-halogenated agent

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	Nitrous oxide was not used during the case
Induction only	1	Nitrous was administered during induction only
Induction + Maintenance	2	Nitrous was administered during induction and maintenance
Maintenance only	3	Nitrous was administered during maintenance only
Yes - Unspecified	4	Nitrous was administered during the case but unable to determine induction or maintenance time

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

This phenotype determines if (and when) nitrous oxide was administered between Anesthesia Start and Anesthesia End. Using the **Induction Start**, **Induction End**, and **Maintenance End** phenotypes.

A case must have  $\geq 5$  nitrous oxide physiologic values above threshold for  $\geq 5$  minutes within the defined time bounds for induction vs. maintenance to return values 1-3; otherwise 'Yes - unspecified' (4) will be returned. If  $< 5$  valid nitrous values between Anesthesia start - End then, (0) No, nitrous was not used during the case. If none of the timebounds have at least 5 values, but the case has a total  $\geq 5$  values, 'Yes - unspecified' (4) will be returned. Missing minutes between valid values will have the last value carried forward if  $\leq 5$  minutes.

\*Note:

- These readings do not have to be consecutive or of the same nitrous variable
- For this phenotype induction end date and time will be the same as maintenance start.
- For institutions that only report anesthetic gases every 5 minutes,  $\geq 2$  nitrous oxide physiologic values must be present to return values 1-4.

MPOG Concept ID	Concept Name	Artifact Threshold (%)	Artifact Values (reported as number)
3250	Nitrous Insp %	20	0.20
3255	Nitrous Exp %	20	0.20
3225	Flows Nitrous Oxide (L/min)	0.2	na

If no values found between anesthesia start and anesthesia end  
Return 0

If values found between **InductionStart** - **InductionEnd** only  
Return 1 (Induction Only)

If values found between **InductionStart** - **InductionEnd** AND **Induction End** - **MaintenanceEnd**  
Return 2 (Induction + Maintenance)

If values found between **Induction End** - **Maintenance End** only  
Return 3 (Maintenance Only)

If values found between anesthesia start and anesthesia end, but unable to determine their location within the **Induction Start**, **Induction End** and **Maintenance end** date and times  
Return 4 (Yes - Unspecified)

## Dependencies

Halogenated Anesthetic Gases (Yes / No)  
Extubation Times

Induction End  
Induction Start  
Procedure Text

# Non-Opioid Analgesics

## Description

This phenotype describes which non-opioid medications were given during a case. It returns a key code of all of the medications given from the non-opioid list as a yes/no for each. Please see logic below for more details.

## Limitation

Essentially returns a yes/no for each medication from the list irrespective of dosing characteristics. Routes included in this phenotype are listed in the Logic section and specific to each medication as shown.

## Value Type

**Categorical**

## Enumeration

**No enumeration available right now.**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar

## Granularity

**One value per case**

## Logic

If a medication from the list below is found to be used at any time during the case, the corresponding letter is returned. All letters are then concatenated (placed together) and returned as a single alpha return per case.

'A' --Acetaminophen

'B' --Aspirin

'C' --Celecoxib

'D' --Diclofenac

'E' --Dexamethasone

'F' --Dexmedetomidine

'G' --Gabapentin

'H' --Ibuprofen

'I' --Ketamine

'J' --Ketorolac

'K' --Indomethacin

'L' --Magnesium Sulfate

'M' --Lidocaine

'N' --Pregabalin

Med/Route combinations covered are listed below:

Routes: 2001 = IV, 2008 = ORAL, 2023 = ENTERIC TUBE

```
    WHEN meds.MPOG_Med_Concept_ID = 10007 AND meds.MPOG_Route_Concept_ID IN(2008,2023,2001)
THEN 'A' --Acetaminophen
    WHEN meds.MPOG_Med_Concept_ID = 10040 AND meds.MPOG_Route_Concept_ID IN(2008,2023)
THEN 'B' --Aspirin
    WHEN meds.MPOG_Med_Concept_ID = 10116 AND meds.MPOG_Route_Concept_ID IN(2008,2023)    THEN
'C' --Celecoxib
    WHEN meds.MPOG_Med_Concept_ID = 11000 AND meds.MPOG_Route_Concept_ID IN(2008,2023,2001)
THEN 'D' --Diclofenac
    WHEN meds.MPOG_Med_Concept_ID = 10147 AND meds.MPOG_Route_Concept_ID IN(2008,2023,2001)
THEN 'E' --Dexamethasone
    WHEN meds.MPOG_Med_Concept_ID = 10149 AND meds.MPOG_Route_Concept_ID IN(2001)    THEN 'F'
--Dexmedetomidine
    WHEN meds.MPOG_Med_Concept_ID = 10199 AND meds.MPOG_Route_Concept_ID IN(2008,2023)    THEN
'G' --Gabapentin
    WHEN meds.MPOG_Med_Concept_ID = 10222 AND meds.MPOG_Route_Concept_ID IN(2008,2023,2001)
THEN 'H' --Ibuprofen
    WHEN meds.MPOG_Med_Concept_ID = 10238 AND meds.MPOG_Route_Concept_ID IN(2001)    THEN 'I' -
-Ketamine
    WHEN meds.MPOG_Med_Concept_ID = 10239 AND meds.MPOG_Route_Concept_ID IN(2008,2023,2001)
THEN 'J' --Ketorolac
    WHEN meds.MPOG_Med_Concept_ID = 10323 AND meds.MPOG_Route_Concept_ID IN(2008,2023)    THEN
'K' --Indomethacin
    WHEN meds.MPOG_Med_Concept_ID = 10276 AND meds.MPOG_Route_Concept_ID IN(2001)    THEN 'L'
--Magnesium Sulfate
    WHEN meds.MPOG_Med_Concept_ID = 10477 AND meds.MPOG_Route_Concept_ID IN(2001)    THEN 'M'
--Lidocaine
    WHEN meds.MPOG_Med_Concept_ID = 10570 AND meds.MPOG_Route_Concept_ID IN(2008,2023)
THEN 'N' --Pregabalin
```

---

## Dependencies

No dependency available.

# Obstetric Anesthesia Type

## Description

This collation will be used to determine if cases with predicted or actual CPT codes for labor epidurals, cesarean deliveries, or cesarean hysterectomies (01961, 01967, 01968, 19969, or 01963) are one of eight case types: labor epidural, cesarean delivery, labor epidural converted to cesarean delivery, cesarean hysterectomy, conversion (labor epidural portion), conversion (cesarean delivery portion), conversion (cesarean hysterectomy portion) or unable to determine. High variability in use of CPT codes and frequent mismatches between CPT codes and procedures performed necessitate this phenotype. This phenotype will be used to include or exclude cases from obstetric specific measures and other general measures.

## Limitation

This phenotype is limited to cases with predicted or actual CPT codes 01961, 01967, 01968, 01969 or 01963. Errors in coding may prevent an obstetric case of interest to be missed by this phenotype. Further, this phenotype is unable to determine procedures outside of labor epidural, cesarean delivery, cesarean hysterectomy or labor epidural converted to cesarean delivery. Cases not designated at one of these obstetric case types will be labeled as 'unable to determine.' Cesarean hysterectomies done without specifying 'hysterectomy' (or related terms) in the procedure text will not be differentiated from cesarean deliveries or not picked up by this collation.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	Case did not have any Obstetric Anesthesia CPT codes (actual or predicted) - 01961, 01967 and/or 01968
Conversion (Labor epidural and cesarean delivery combined)	1	Case was a Labor Epidural that later converted to a Cesarean Delivery. Both the labor epidural and cesarean delivery portions are under one Case ID
Cesarean Delivery	2	Case was a standalone Cesarean Delivery without a preceding labor epidural case
Labor Epidural	3	Case was a Labor Epidural that completed without the occurrence of a Cesarean Delivery
Cesarean Hysterectomy	4	Case was a Cesarean with a Hysterectomy

Obstetric Case, Unable to Determine Type	5	Case had an Obstetric Anesthesia CPT code (actual or predicted) - 01961, 01967 and/or 01968, but the algorithm was not able to determine which type of obstetric case it is
Conversion (labor epidural portion)	6	Case is a labor epidural. The same patient has a cesarean delivery case within 24 hours after this case.
Conversion (cesarean delivery portion)	7	This case is a cesarean delivery. The same patient has a labor epidural case within 24 hours before.
Conversion (Cesarean Hysterectomy Portion)	8	Case is a cesarean hysterectomy. The same patient has a labor epidural case within 24 hours before.

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

Note: If there are multiple notes with different times documented, the phenotype uses the first documented time.

Step I: Examine CPT codes

1. If case has actual or predicted CPT codes 01961, 01967, 01968, 01969, or 01963 proceed to Step II. If not, return value "No" and stop.

Step II: Determine if case should be included in phenotype

1. Evaluate if procedure text contains "XRT IMRT TX DELIVERY COMPLEX-KV IGRT W ANES" or "PROTON"
  1. If yes, exclude case. Return value "No"
  2. If no, continue to number 2
2. Evaluate if the procedure text includes "tubal", "ligation", OR "btl" without including "cesarean" (or other versions of cesarean) AND has predicted or actual CPT codes 00851 AND concept 50596 is the only OB concept on the case (see list of included OB concepts)
  1. If yes, exclude case. Return value "No"
  2. If no, continue to number 3
3. Evaluate if case includes *Neonate Delivered (50358)* between *Anesthesia Start (50002)* and *Anesthesia End (50009)*
  1. If yes, include case and move to Step III
  2. If no, evaluate if case procedure text includes any of the following, and does not include "resection", "wound", "methotrexate", or "scar"



1. Included procedure texts

1. Active labor
2. Antepartum
3. Ante
4. Induction + n/a
5. Assisted Delivery
6. C sec
7. C/s
8. Cesarean
9. Ces section
10. Cesarean Delivery
11. C-hyst
12. CS
13. Deliver
14. Induction + no other words
15. Delivery
16. Induction + labor
17. Induction + OB
18. IOL
19. Labor
20. CLE
21. PPROM
22. TOLAC
23. Primary Section
24. OB + anesthesia

2. If yes, include case and move to Step III

3. If no, evaluate if procedure text includes any of the following procedure texts AND has any of the following OB concepts between *Anesthesia Start (50002)* and *Anesthesia End (50009)*

1. Conditional procedure text

1. Active labor
2. Evaluation
3. Consult
4. Salpingectomy
5. Version
6. Amnioreduction
7. Ligation
8. Btl
9. Tubal
10. Cerclage
11. ECV
12. Epidural
13. L&D
14. Blood patch
15. Anesthesia consult
16. Possible Cesarean Delivery
17. Cesarean (or derivatives) + Cephalic

18. Cesarean (or derivatives) + Scar
19. Cesarean (or derivatives) + Wound
20. Cesarean (or derivatives) + Methotrexate
21. Delivery + Placenta
22. Analgesia
23. D&C
24. Observation
25. Ovarian
26. Obs
27. Hyster
28. Placenta
29. D and C
30. Postpartum
31. Pregnancy
32. Regional Block
33. Retained Placenta
34. Alpingectomy
35. Loss
36. Anesthesia
37. OB
2. Obstetric Concepts Considered
  1. 50357 Obstetrics- Uterine Incision
  2. 50050 Obstetrics - Labor Epidural start
  3. 50051 Obstetrics - Labor epidural end
  4. 50189 Obstetrics- Delivery of Neonate 2
  5. 50359 Obstetrics- Apgar score checked at 1 minute note
  6. 50360 Obstetrics- Apgar score 1 minute detail
  7. 50358 Obstetrics- delivery of neonate
  8. 50049 Duration of contractions
  9. 50052 Frequency of contractions
  10. 50596 Obstetrics- labor continued as c-section
  11. 50361 Obstetrics - Vaginal delivery note
  12. 50362 Obstetrics - Vaginal Delivery in/out of OR detail
  13. 50369 Obstetrics- Vaginal Delivery in/out of OR detail
  14. 50373 Obstetrics - Apgar score checked at 5 minute note
  15. 50374 Obstetrics- Apgar score at 5 minute detail
  16. 3181 Frequency of Contractions
  17. 3188 Duration of Contractions
3. If yes, include case and move to step III
4. If no, exclude case from phenotype. Return value "No"

Step III: Determine if case is surgical

1. Evaluate if case includes CPT codes 01963 or 01969 AND has procedure texts including "cesarean" + "hysterectomy", "C-Hyst", or "C Section Hyst"
  1. If yes, then assign preliminary result 'Cesarean Hysterectomy'. Proceed to Step V
  2. If no, proceed to number 2

2. Evaluate if case meets any of the following criteria:

1. Meets General Anesthesia criteria as determined by the 'Anesthesia Technique: General' phenotype OR
2. Any of the following between *Anesthesia Start (50002)* and *Anesthesia End (50009)*
  1. Uterine Incision (50357)
  2. Surgical Incision Time (50235)
  3. AACD Procedure Start (50006)
  4. AACD Procedure Finish (50007)
3. If 'No' then assign preliminary result **'Labor Epidural'**. "Proceed to Step V
4. If 'Yes' then proceed to Step IV

Step IV: Refine Obstetric surgery type

1. Determine if *Neonate Delivered (50358)* is after or at the same time as *Procedure Start (50006)*, *Uterine Incision (50357)*, *Surgical Incision Time (50235)* or *Obstetrics- Labor Epidural Continued as C-Section (50596)*
  1. If no, then assign preliminary result **'Unable to Determine'**. Proceed to Step V
  2. If yes or n/a, move to number 2
2. Determine if procedure text includes "cesarean" + "hysterectomy", "C-Hyst" or "C Section Hyst" AND does not include text 'with or without hysterectomy'
  1. If yes, then assign preliminary result **'Cesarean Hysterectomy'**. Proceed to Step V
  2. If no, move to number 3
3. Determine if anesthesia duration is greater than 240 minutes
  1. If yes, move to number 6
  2. If no, move to number 4
4. Determine if *Obstetrics-Labor Continued as C-Section (50596)* is within 30 minutes of *Anesthesia Start (50002)*
  1. If yes, then assign preliminary result **'Cesarean Delivery'**. Proceed to Step V
  2. If no, then move to number 5
  3. If n/a, then move to number 6
5. Determine if *Obstetrics-Labor Continued as C-Section (50596)* is before the start of any of the surgical criteria listed in Step II
  1. If yes, then assign preliminary result **'Labor Epidural Converted to Cesarean Delivery'**. Proceed to Step V
  2. If no, then assign preliminary result **'Cesarean Delivery'**. Proceed to Step V
6. Determine if *Anesthesia Start (50002)* is >120 minutes before *Procedure Start (50006)* or *Obstetrics-Labor Continues as C-Section (50596)*, or if *Procedure Start* not available, if *Anesthesia Start* is >150 minutes before *Surgical Incision (50235)* or *Uterine Incision (50357)*
  1. If yes, then assign preliminary result **'Labor Epidural Converted to Cesarean Delivery'**. Proceed to Step V
  2. If no, then assign preliminary result **'Cesarean Delivery'**. Proceed to Step V

Step V: Assign Final Decision

1. If preliminary result 'Unable to Determine' then assign final result **'Unable to Determine'**
2. If preliminary result 'Cesarean Hysterectomy', then check for a 'Labor Epidural' or 'Conversion (Labor Epidural Portion)' case starting or ending within 24 hours after the current case for the same patient
  1. If yes, then assign final result **'Conversion (Cesarean Hysterectomy Portion)'**
  2. If no, then assign final result **'Cesarean Hysterectomy'**
3. If preliminary result 'Cesarean Hysterectomy' then assign final result **'Cesarean Hysterectomy'**
4. If preliminary result 'Labor Epidural Converted to Cesarean Delivery', then assign final result **'Conversion (Labor Epidural and Cesarean Delivery Combined)'**
5. If preliminary result 'Labor Epidural', then check for a 'Cesarean Delivery', 'Conversion (Cesarean Delivery Portion)', 'Conversion (Cesarean Hysterectomy Portion)', or 'Cesarean Hysterectomy' case starting or ending within 24

hours before the current case for the same patient

1. If yes, then assign final result '**Conversion (Labor Epidural Portion)**'

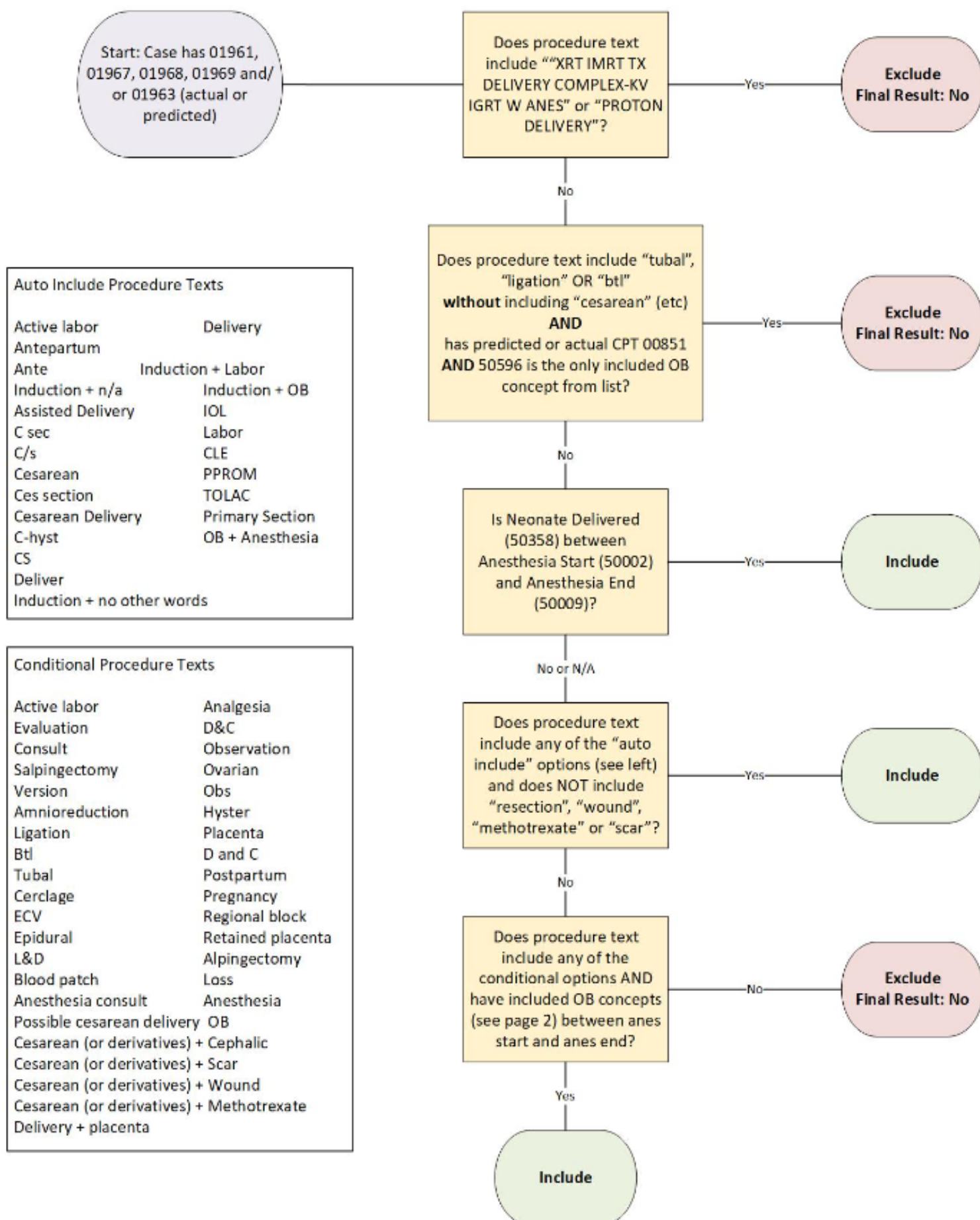
2. If no, then assign final result '**Labor Epidural**'

6. If preliminary result 'Cesarean Delivery', then check for a 'Labor Epidural' or 'Conversion (Labor Epidural Portion)' case starting or ending within 24 hours after the current case for the same patient

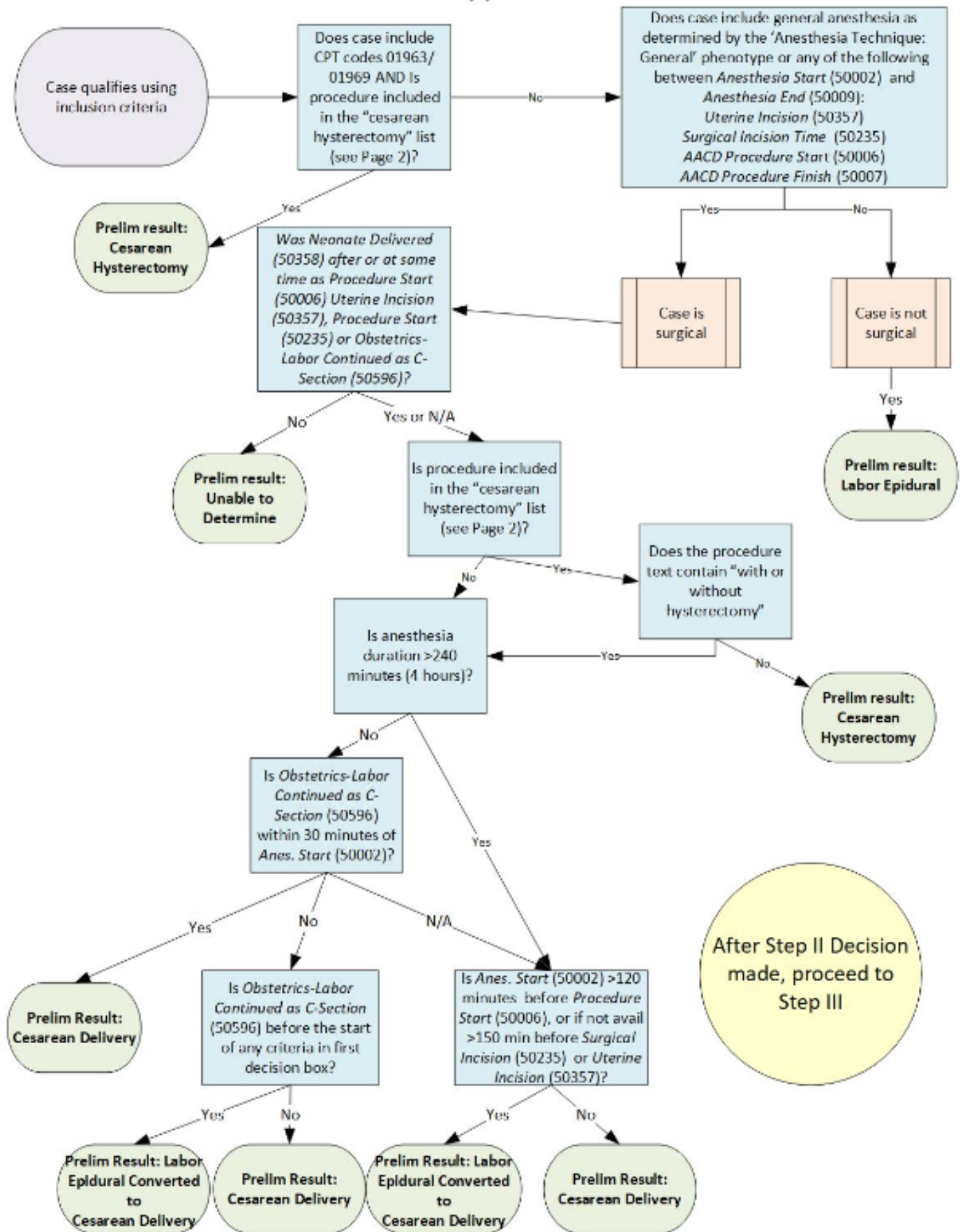
1. If yes, then assign final result '**Conversion (Cesarean Delivery Portion)**'

2. If no, then assign final result '**Cesarean Delivery**'

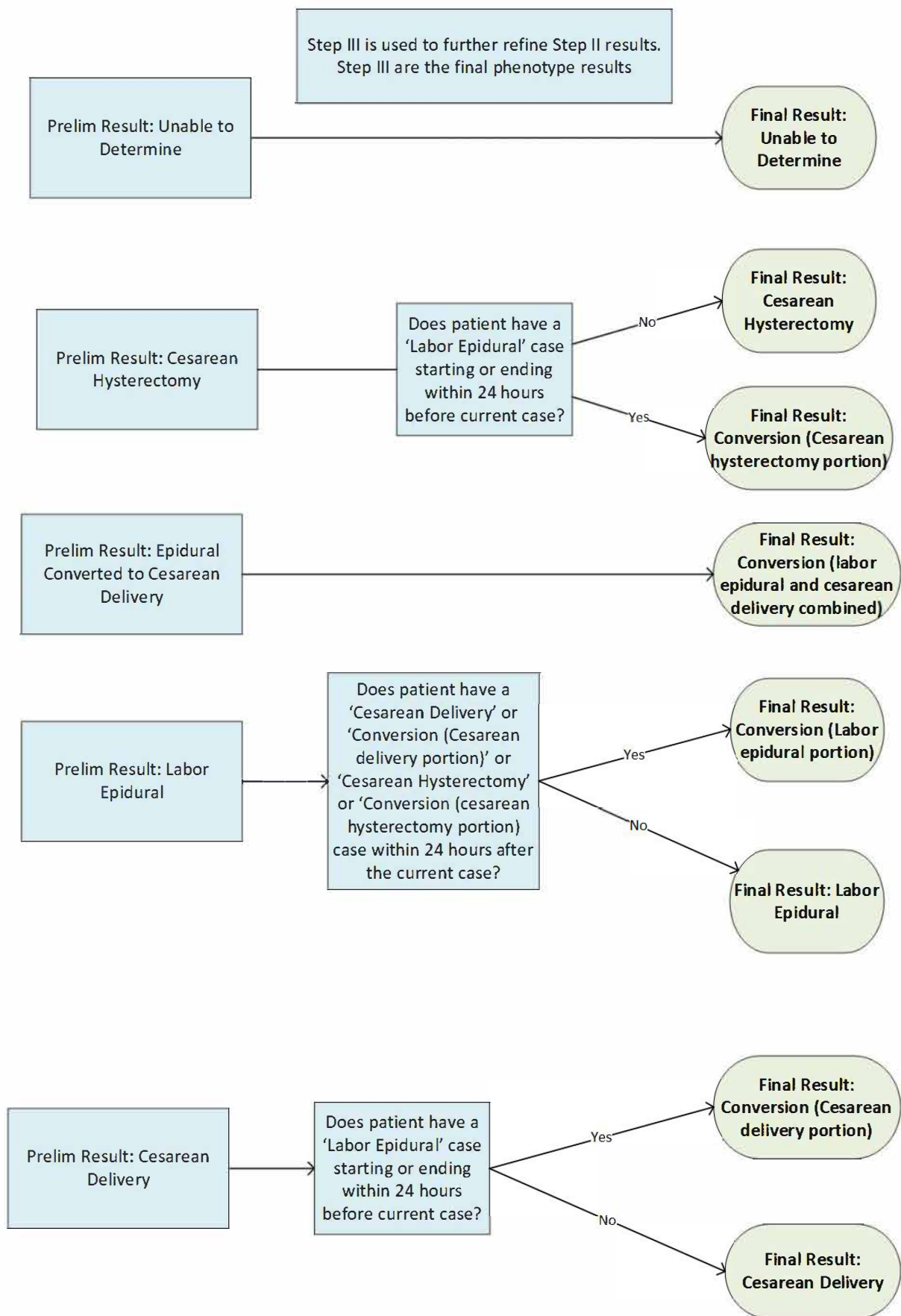
# Obstetric Anesthesia Type: Inclusion Criteria



# Obstetric Anesthesia Type: Case Determination



# Obstetric Anesthesia Type: Final Results





## OB Specific Concepts

50050	Obstetrics - Labor epidural start	50361	Obstetrics - Vaginal Delivery note
50051	Obstetrics - Labor epidural end	50362	Obstetrics - Vaginal Delivery in / out of OR detail
50189	Obstetrics - Delivery of Neonate 2	50369	Obstetrics - Delivery of Placenta
50359	Obstetrics - Apgar score checked at 1 minute note	50373	Obstetrics - Apgar score checked at 5 minute note
50360	Obstetrics - Apgar score 1 minute detail	50374	Obstetrics - Apgar score at 5 minute detail
50358	Obstetrics- delivery of neonate	50049	Duration of Contractions
50052	Frequency of Contractions	50596	Obstetrics- Labor continued as c-section
50357	Obstetrics- Uterine Incision		
3181	Frequency of Contractions		
3188	Duration of Contractions		

## Cesarean Hysterectomy Criteria

Cesarean + Hysterectomy  
C-Hyst  
C section hyst

---

## Dependencies

Airway Type Notes  
Anesthesia CPT (All)  
Anesthesia End  
Anesthesia Start  
Anesthesia Technique: General  
GeneralNotes  
Institution  
MPOG Patient ID  
Paralytics Used (All)  
Procedure Text



## Oral Morphine Equivalent

### Description

This phenotype takes the opioid medications given for a case and converts them into oral morphine equivalents, ex oral morphine. This phenotype also returns whether an opioid medication was documented as given but was not in the case due to lack of dosing information (labeled as "unknown"). For example, if 10mg IV morphine was recorded as IV fentanyl, the case would return the OME for the morphine and "unknown" as a 1, indicating another opioid medication not included in the OME calculation. Additionally, this phenotype returns whether Remifentanyl was included as the conversion used is 0.

### Limitation

For intraoperative medications documented without dosing parameters we note there was a medication given for conversion to OME, labeled as "unknown". Not all listed medications are found in the MPOG data, as some medications are not used in the perioperative setting. Additionally, this phenotype calculated intraoperative OME without considering home medications or the patient's preoperative opioid tolerance. Documentation errors for medications occur in our data. We found that OME values >600 typically contain a documentation error and should be considered in error for any given case.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
partialAgonist	bit
REMI	smallint
UnknownDose	bit
Value	numeric

### Granularity

**One value per case**

### Logic

This collation returns the following columns:

- a single value for OME per case

- unknown dose - yes (1) / no (0) - an indicator for opioids that were unable to calculate OME value as data was mis given

- REMI - yes (1) / no (0) - an indicator whether remifentanyl was used in the case

All medications for each case are gathered and converted to mg for their doses administered. Then these medications are converted to oral morphine (mg) using the following conversions:

Oral Morphine Equivalence Table					
Opioid	Route	Equivalence (mg)	Potency	Source	Comment
Morphine	Oral	30	1	APS/CDC	
MS Contin (controlled release Morphine)	Oral	30	1	<a href="https://www.healthcare.uiowa.edu/familymedicine/fpinfo/Docs/adultopioidrefguide.htm">https://www.healthcare.uiowa.edu/familymedicine/fpinfo/Docs/adultopioidrefguide.htm</a>	
Codeine	Oral	200	0.15	APS/CDC	
Hydromorphone (Dilaudid)	Oral	7.5	4	APS/CDC	
Hydrocodone	Oral	30	1	CDC	
Oxycodone	Oral	20	1.50	APS/CDC	
Oxymorphone	Oral	10	3	APS/CDC	
Meperidine	Oral	300	0.10	APS	
Tramadol	Oral	300	0.10	CDC	
Fentanyl	transdermal (mcg/hr)	25-300 ug/hr	2.40	CDC	*note this figure varies significantly based on resource. For consistency we stuck with CDC recommendations. ** Walker et al found 14.7 ratio in a study of 29 patients. Important that below numbers not be used for equianalgesic conversion
Methadone	Oral	1-20 mg/day	4	CDC	
Methadone	Oral	21-40 mg/d	8	CDC	
Methadone	Oral	41-60 mg/day	10	CDC	
Methadone	Oral	>61-80 mg/d	12	CDC	
Buprenorphine (Suboxone)	Sublingual	75	0.40	Other	Either exclude from inclusion or flag OME result with "includes buprenorphine". Demystifying Opioid Conversion Calculations - Mary Lynn McPherson

IV Morphine Equivalence Table					Comment (from Epic Review)
Opioid		Equivalence (mg)	Potency	Source	
Morphine	IV	10	1	APS	From UpToDate; Cancer pain management with opioids: Optimizing analgesia
Codeine	IV	100	0.10	APS	
Fentanyl	IV	0.10	100	APS	
Fentanyl	epidural	0.033	300	Open Anesthesia	
Fentanyl	IT	0.011	900	Open Anesthesia	
Hydromorphone (Dilaudid)	IV	1.50	6.67	APS	
Hydromorphone (Dilaudid)	epidural	0.30	33.33	Open Anesthesia	
Hydromorphone (Dilaudid)	IT	0.06	166.67	Open Anesthesia	
Oxymorphone	IV	1	10	APS	
Meperidine	IV	100	0.10	APS	
Meperidine	IT	0.10	100		Morphine: 10mg IV = 1mg Epidural = 0.1mg Intrathecal (1/10 ratio; very hydrophilic)  *not a consensus. Sufenta is 2.5x to 24x more potent than fent. Most likely 2.5-10x more potent
Tramadol	IV	100	0.30	APS	
Buprenorphine (Suboxone)	IV	0.40	25	APS	
Nalbuphine	IV	10	1	APS	
Butorphanol	IV	2	5	APS	
Morphine	IT	0.10	100	Krames / OpenAnesthesia	
Morphine	epidural	1	10	Krames	
Sufentanil	IV	0.02	500	Anderson	
Sufentanil	epidural	0.0067	1500	5x epidural fentanyl	
Sufentanil	IT	0.0025	3960	4.4x IT fentanyl	
Alfentanil	IV	0.50	60		convert to PO methadone then to OME
Remifentanil	IV	0	0		
Methadone	IV	IV:PO -->12	2	MLM	
Sources					
APS	APS Principles of Analgesic Use 7th ed. Table 2 p. 27-36				
CDC	CDC guidelines for prescribing opioids for chronic pain 2016				
MLM	Mary Lynn McPherson - Demystifying opioid conversion calculations, ch 6 p. 134, 2010.				
Krames	Intrathecal Infusional Therapies for intractable pain: patient management guidelines. J Pain Symptom Manage 1993;8:36-46.				
Anderson	Anderson R, Saiers JH, Abram S, et al. Accuracy in equianalgesic dosing, conversion dilemmas. J Pain Symptom Manage. 2001;21(5):397-406. PMID 11369161.				

## Dependencies

Anesthesia End

Anesthesia Start

Patient Out Of Room Date/Time

Weight (kg)

# Oral Morphine Equivalent (Normalized)

## Description

This phenotype uses the results of the "oral morphine equivalent" phenotype and normalizes (divides by) to patient weight (kg) and anesthesia duration (minutes).

As with the parent phenotype, this normalized phenotype also returns whether an opioid medication was documented as given but was not included in the OME for the case due to lack of dosing information (labeled as "unknown"). For example, if 10mg IV morphine was recorded and an unknown dose of IV fentanyl, the case would return the OME for the morphine and "unknown" as a 1, indicating another opioid medication was given and not included in the OME calculation. Additionally, this phenotype returns whether Remifentanyl was included as the current OME conversion used is 0. As this phenotype is dependent on patient weight and case duration, it returns a column for these values indicating if either is missing.

## Limitation

to be added

## Value Type

**Not Set**

## Return Columns

Column Name	Data Type
DurationMissing	bit
MPOG_Case_ID	uniqueidentifier
partialAgonist	bit
REMI	int
UnknownDose	int
Value	numeric
WeightMissing	bit

## Granularity

**One value per case**

## Logic

This collation returns the following columns:

- a single value for normalized OME per case, this value is the OME derived from the "Oral Morphine Equivalent" phenotype divided by the case duration (min) and patient weight (kg). If case duration is less than one hour, one hour is used for calculations
- unknown dose - yes (1) / no (0) - an indicator for opioids that were unable to calculate OME value as data was missing to calculate dose given
- REMI - yes (1) / no (0) - an indicator whether remifentanyl was used in the case
- WeightMissing - yes (1) / no (0) - an indicator whether patient weight was missing for the case (if missing we are unable to normalize the OME)
- DurationMissing - yes (1) / no (0) - an indicator whether case duration was missing for the case (if missing we are unable to normalize the OME)

---

## Dependencies

Anesthesia Duration

Anesthesia End

Anesthesia Start

Oral Morphine Equivalent

Patient Out Of Room Date/Time

Weight (kg)

## Paralytics Used (All)

### Description

Indicates if any neuromuscular blockers (paralytic medications) were used during the case, includes succinylcholine.

### Limitation

none

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	No paralytic medications were used during the case
Yes	1	Paralytic medications were used during the case

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

This phenotype uses the following MPOG medication concepts to determine if a paralytic was administered during the case:

- 10043 Atracurium
- 10046 Atropine-Edrophonium
- 10129 Cisatracurium
- 10167 Doxacurium

- 10170 Edrophonium
- 10305 Mivacurium
- 10344 Pancuronium
- 10363 Pipecuronium
- 10388 Rapacuronium
- 10393 Rocuronium
- 10446 Vecuronium
- 10413 Succinylcholine

There are no time bounds for this documentation. If any of these concepts are found on the case, regardless of the anesthesia start and end times, the case will be considered as **Yes, Paralytic medications were used during the case.**

---

## Dependencies

No dependency available.

## Paralytics Used (Non-depolarizing NMBs only)

### Description

Indicates if any non-depolarizing neuromuscular blockers (paralytic medications) were used during the case. Succinylcholine is excluded from this phenotype.

### Limitation

None.

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	Non-depolarizing neuromuscular blockers were NOT used during the case
Yes	1	Non-depolarizing neuromuscular blockers were used during the case

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

This phenotype uses the following MPOG medication concepts to determine if a paralytic was administered during the case:

- 10043 Atracurium
- 10046 Atropine-Edrophonium
- 10129 Cisatracurium
- 10167 Doxacurium



- 10170 Edrophonium
- 10305 Mivacurium
- 10344 Pancuronium
- 10363 Pipecuronium
- 10388 Rapacuronium
- 10393 Rocuronium
- 10446 Vecuronium

There are no time bounds for this documentation. If any of these concepts are found on the case, regardless of the anesthesia start and end times, the case will be considered as **Yes, non-depolarizing neuromuscular blockers were used during the case.**

---

## Dependencies

No dependency available.



## Patient In Room Date/Time

### Description

Returns date/time of patient documented in room for a given procedure. One value per case.

### Limitation

Dependent on proper documentation.

### Value Type

**Datetime**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

### Granularity

**One value per case**

### Logic

Looks for the concept 50003 - Patient In Room Date/Time, and returns this date/time as long as the documentation was not deleted. If multiple, returns the earliest.

### Dependencies

No dependency available.



## Patient Out Of Room Date/Time

### Description

Returned the date/time of the documented patient out of room for a given case.

### Limitation

Dependent upon proper documentation.

### Value Type

**Datetime**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

### Granularity

**One value per case**

### Logic

Looks for the concept 50008 - Patient Out Of Room Date/Time, and returns this date/time as long as the documentation was not deleted. If multiple, returns the latest.

### Dependencies

No dependency available.



## Peak Inspiratory Pressure (Median)

---

### Description

This phenotype determines the median of all non-artifact peak inspiratory pressure values captured between Case Start and Case End.

---

### Limitation

Only values mapped to the specific concept IDs included in the logic section during the specified time range will be used for calculation. This phenotype does not apply any ranges or logic to the values.

---

### Value Type

**Numeric**

---

### Return Columns

**Phenotype table not stored in database. No column returned.**

---

### Granularity

**One value per case**

---

### Logic

This phenotype returns the median value for peak inspiratory pressure (PIP) using values mapped to MPOG concept 3185. Non-artifact values captured between case start and case end are used in determining the median value.

---

### Dependencies

No dependency available.

# PEEP Actual Median

## Description

This phenotype determines the median PEEP value for all measured (actual) PEEP values captured between Case Start and Case End.

## Limitation

Only values mapped to MPOG concept 3210 Positive End Expiratory Pressure - Measured will be considered for this phenotype. Case start and case end times are determined using additional MPOG logic- please reference those phenotypes specifications for more details on limitations.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Median	numeric
MPOG_Case_ID	uniqueidentifier
Row_Count	int

## Granularity

**One value per case**

## Logic

This phenotype returns the median value for positive end expiratory pressure (PEEP) using actual or measured values mapped to MPOG concept 3210 Positive End Expiratory Pressure- Measured. Only values captured between case start and case end are included in determining the median value.

The PEEPActual phenotype is used to determine the list of starting PEEP values. The median PEEP is then determined from the resulted list.

## Dependencies

Airway Type Notes

Anesthesia CPT (All)

Anesthesia End

Anesthesia Start

Anesthesia Technique: General

xRetiredx Arrived Intubated to the OR

Case End

Case Start

Data Capture Start

Extubation Times

GeneralNotes

Induction End

Induction Start

Institution

Intubation Time

MPOG Patient ID

Obstetric Anesthesia Type

Paralytics Used (All)

Patient Out Of Room Date/Time

Patient In Room Date/Time

PEEP Actual

Procedure Text

Surgery End

Surgery Start Date/Time

# PEEP Set Median

## Description

This phenotype determines the median PEEP value for all set PEEP values captured between Case Start and Case End.

## Limitation

Only values mapped to MPOG concept 3212 Positive End Expiratory Pressure - Set will be considered for this phenotype. Case start and case end times are determined using additional MPOG logic- please reference those phenotypes specifications for more details on limitations.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Median	numeric
MPOG_Case_ID	uniqueidentifier
Row_Count	int

## Granularity

**One value per case**

## Logic

This phenotype returns the median value for positive end expiratory pressure (PEEP) using set PEEP values mapped to MPOG concept 3212 Positive End Expiratory Pressure- Set. Only values captured between case start and case end are included in determining the median value.

The PEEPSets phenotype is used to determine the list of starting PEEP values for calculating the median PEEP set value.

Documented dates before January 1, 1995 will not be included.

## Dependencies

Airway Type Notes

Anesthesia CPT (All)

Anesthesia End  
Anesthesia Start  
Anesthesia Technique: General  
xRetiredx Arrived Intubated to the OR  
Case End  
Case Start  
Data Capture Start  
Extubation Times  
GeneralNotes  
Induction End  
Induction Start  
Institution  
Intubation Time  
MPOG Patient ID  
Obstetric Anesthesia Type  
Paralytics Used (All)  
Patient Out Of Room Date/Time  
Patient In Room Date/Time  
PEEP Set  
Procedure Text  
Surgery End  
Surgery Start Date/Time



# Postop Troponin (Highest)

## Description

Highest postoperative troponin (I or T) with 72 hours (3 days) after surgery.

**Note that additional troponin-related collations include:**

- PreopTroponin - most recent (not necessarily highest) preoperative troponin (I or T) within 42 days (6 weeks) prior to surgery
- ComplicationMyocardialInfarctionTroponinPreop - highest (not necessarily most recent) preoperative troponin (I or T) within 42 days (6 weeks) prior to surgery

*\* Rationale for preoperative troponin monitoring up to 42 days prior is based upon ACC/AHA guidelines recommending a delay in elective surgery for 6 weeks following myocardial infarction (1)*

*\*\* Rationale for preoperative and postoperative troponin monitoring within 72 hours of surgery based upon the Third Universal Definition of Myocardial Infarction, recommending routine troponin monitoring 48-72 hours after surgery in high-risk patients. (2)*

### References:

1. Fleisher L, et al. 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. J. Nucl. Cardiol. (2015) 22: 162. doi:10.1007/s12350-014-0025-z
2. Thygesen K, et al. Third Universal Definition of Myocardial Infarction, Global Heart, Volume 7, Issue 4, December 2012, Pages 275-295, ISSN 2211-8160, <http://dx.doi.org/10.1016/j.gheart.2012.08.001>.

## Limitation

none

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Postoperative	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Obtain highest valid troponin level (MPOG Concept ID 5011) within 72 hours\* of anesthesia end

1. Valid = =0 ng/ml
2. If "< cutoff" is documented (example: < 0.01). Output = 0
3. If data missing or invalid ? Output = -999
4. If data valid ? Output = (numeric value in g/dL)

Reference Values:

- Different per assay
- Either Troponin T or Troponin I is measured – this is registered for every institution separately.

Conversion not necessary when mcg/l is used.

Conversion of mcg/ml to ncg/ml:

amount mcg/ml x 1000 =amount in ng/ml

---

## Dependencies

Anesthesia End

# Postoperative Destination

## Description

This phenotype returns the Postoperative Destination Classification assigned to a case based on collation mapping of raw text and numeric values documented within the electronic medical record.

## Limitation

Collation mapping is completed at the MPOG Coordinating Center. This involves manual review of notes and is subject to human error.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Missing or unknown
Invalid	-998	Invalid documentation
Conflicting	-997	Conflicting documentation
Patient transported to ICU	0	Patient transported to ICU
Patient transported to PACU	1	Patient transported to PACU
Patient transported to another destination	2	Patient transported to another destination
Intraop mortality	3	Documented intraoperative mortality

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

---

## Logic

The Postoperative Destination Classification phenotype returns a single postop destination per case based on the concept IDs and/or collation mapping of raw text/numeric values documented within the following concepts:

PACU (based on concept IDs):

- 50008 - AACD Patient Out of Room Date/Time
- 50010 - AACD Recovery Room In Date/Time
- 50066 - Phase I Recovery Room In Date/Time
- 50067 - Phase I Recovery Room Out Date/Time
- 50068 - Phase II Recovery Room In Date/Time
- 50069 - Phase II Recovery Room Out Date/Time

Manually mapped as PACU, ICU, or another destination based on contents of the note:

- 50706 - Categorized note-Postoperative Recovery
- 50734 - Emergence-Patient recovery location
- 50642 - Emergence-Transported with monitors and oxygen by anesthesia personnel

If none of the concept IDs are found with the case, the phenotype returns "Missing or unknown" -999

If the concept ID is manually mapped as "Invalid" or not mapped at all, the phenotype returns "Invalid" -998

If there is a concept ID that is mapped for more than one value, the phenotype returns "Conflicting" -997

If more than one note is documented, the highest value code is chosen as the final postoperative destination

---

## Dependencies

Institution

Postoperative Destination Notes

# Preop Albumin

## Description

**Most recent preoperative albumin within 365 days**

### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. Kermansaravi M, Abdolhosseini MR, Kabir A, Pazouki A.; Severe hypoalbuminemia and steatohepatitis leading to death in a young vegetarian female, 8 months after mini gastric bypass: A case report; Int J Surg Case Rep. 2016 Dec 11;31:17-19.
5. Yoo SH, Kim HJ, Kim JH, Lee GW, Lee JH, Kim SH, Kim JW, Kim JW, Lee JO, Kim YJ, Lee KW, Kim JH, Bang SM, Lee JS.; Nephrotic syndrome associated with metastatic thymoma treated with chemotherapy. Medicine (Baltimore). 2017 Jan;96(1);
6. Mutlu EA, Keshavarzian A, Mutlu GM; Hyperalbuminemia and elevated transaminases associated with high-protein diet. Scand J Gastroenterol. 2006 Jun;41(6):759-60.

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

# Granularity

## One value per case

---

### Logic

Values collected under MPOG ID 5057 (Formal Lab – Albumin Serum/Plasma)

All values converted to g/dL.

Obtain most recent (latest) valid serum albumin level in g/dL prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid: >0 g/dL and <50 g/dL
2. If data invalid → Output = -998
3. If data valid → Output = (numeric value in g/dL)

General reference ranges

- 3.5-5.5 g/dL (Conventional Unit) 1,2,3
- 35-55 g/L (SI Unit)2
- Mild hypoalbuminemia 2.5-3.5 g/dL4
- Severe hypoalbuminemia: < 2.5 g/dL4, 5
- Low: case report: 1.1 g/dL4
- Limited data on hyperalbuminemia. Case report 5.7 g/dL5

Conversion to g/dL before classifying as valid or invalid

- amount g/L ÷ 10 =amount in g/dL

---

### Dependencies

Anesthesia Start



## Preop Alk Phosphatase

### Description

Most recent preoperative alkaline phosphatase within 365 days

### Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

### Granularity

**One value per case**

### Logic

Values collected under MPOG ID 5033 (Formal lab - Alkaline Phosphatase, Serum/Plasma)

Range 0-1000 IU/L

### Dependencies

Anesthesia Start



## Preop ALT

### Description

Most recent preoperative alanine aminotransferase (ALT) within 365 days.

### Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

### Granularity

**One value per case**

### Logic

Values collected under MPOG ID 5032 (Formal lab - ALT (SGPT), Serum/Plasma)

Range 0-100000 units/L

### Dependencies

Anesthesia Start





## Preop AST

### Description

Most recent preoperative aspartate aminotransferase (AST) within 365 days

### Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

### Granularity

**One value per case**

### Logic

Values collected under MPOG ID 5031 (Formal lab - AST (SGOT), Serum/Plasma)

Range 0-100000 units/L

### Dependencies

Anesthesia Start



## Preop BUN

### Description

Most recent preoperative Blood Urea Nitrogen (BUN) within 365 days

### Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

### Granularity

**One value per case**

### Logic

Values collected under MPOG ID 5012 (Formal lab - Blood Urea Nitrogen, Serum/Plasma)

Range 0-1000 mg/dl or mmol/L

### Dependencies

Anesthesia Start



# Preop Calcium Ionized

## Description

Most recent preoperative ionized calcium within 365 days

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 3395 (POC - Blood gas - Ionized Calcium) OR MPOG ID 5028 (Formal lab - Ionized Calcium, Serum/Plasma) OR MPOG ID 5039 (Formal lab - Blood gas - Ionized Calcium)

Range: 0-100 md/dl

## Dependencies

Anesthesia Start



# Preop Calcium Total

## Description

Most recent preoperative calcium total within 365 days

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5058 (Formal lab - Calcium (Total), Serum/Plasma)

Range 0-100 md/dl

## Dependencies

Anesthesia Start

# Preop carbon dioxide (CO2), arterial

## Description

Most recent preoperative arterial carbon dioxide (CO2) from 365 days prior to anesthesia start to anesthesia start

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5020 (POC – Blood gas - pCO2 (arterial)) OR MPOG ID 5042 (Formal lab – Blood gas - pCO2 (arterial))

All values expressed in mmHg

Obtain most recent (latest) value, prior to anesthesia start and within 365 days of anesthesia start. Return with number of days prior to surgery

1. Valid >0 mmHg and <200 mmHg
2. If data invalid → Output = -999
3. If data valid → Output = (numeric value)

General normal reference ranges:

35-45 mmHg (5.1 to 5.6 kPa)

## Dependencies

Anesthesia Start

# Preop carbon dioxide (CO2), mixed venous

## Description

Most recent preoperative mixed venous carbon dioxide (CO2) from 365 days prior to anesthesia start to anesthesia start

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5124 (Formal lab – Blood gas – pCO2 (mixed venous))

All values expressed in mmHg

Obtain most recent (latest) value, prior to anesthesia start and within 365 days of anesthesia start. Return with number of days prior to surgery

1. Valid >0 mmHg and <200 mmHg
2. If data invalid → Output = -999
3. If data valid → Output = (numeric value)

General normal reference ranges:

40-50 mmHg

## Dependencies

Anesthesia Start

# Preop carbon dioxide (CO2), serum

## Description

Most recent preoperative serum carbon dioxide (CO2) from 365 days prior to anesthesia start to anesthesia start

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5029 (Formal lab – CO2 (Serum/Plasma))

All values expressed in mmHg

Obtain most recent (latest) value, prior to anesthesia start and within 365 days of anesthesia start. Return with number of days prior to surgery

1. Valid >0 mmHg and <200 mmHg
2. If data invalid ? Output = -999
3. If data valid ? Output = (numeric value)

General normal reference ranges:

40-50 mmHg

## Dependencies

Anesthesia Start

# Preop carbon dioxide (CO2), venous

## Description

Most recent preoperative venous carbon dioxide (CO2) from 365 days prior to anesthesia start to anesthesia start

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5023 (POC - Blood gas - pCO2 (venous) OR (Formal lab - Blood gas - CO2 (venous))

All values expressed in mmHg

Obtain most recent (latest) value, prior to anesthesia start and within 365 days of anesthesia start. Return with number of days prior to surgery

1. Valid >0 mmHg and <200 mmHg
2. If data invalid → Output = -999
3. If data valid → Output = (numeric value)

General normal reference ranges:

40-50 mmHg

## Dependencies

Anesthesia Start





# Preop Chloride

## Description

Most recent preoperative chloride within 365 days

## Limitation

This collation does not set “normal” ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5030 (Formal lab - Chloride, Serum/Plasma) OR MPOG ID 5035 (Formal lab - Blood gas - Chloride)

Range 0-200 mEq/L

## Dependencies

Anesthesia Start

# Preop Creatinine

## Description

Most recent preoperative creatinine within 60 days

### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
3. Farmacotherapeutisch kompas, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
4. Abuhasna SD; Highest serum creatinine ever reported; Hemodial Int. 2013 Jan;17(1) 137-8

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units. There is no returned "invalid" value as this collation only uses values in the valid range.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	numeric
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5002 (Formal lab – Creatinine, Serum/Plasma)

All values converted to mg/dl.

Obtain most recent (latest) valid creatinine (MPOG concept ID 5002) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid  $\geq 0.2$  mg/dl and  $< 25$  mg/dl
2. If data invalid ? collation only returns values in the valid range (if there are only invalid values, a -999 would be returned)
3. If data valid ? Output = (numeric value in mg/dl)
4. If there are no values a -999 will be returned

General reference ranges 1,2

- 1-2 mg/dl (Conventional Unit)
- 45-100  $\mu\text{mol/L}$  (SI Unit) 3
- Extreme value: 61.3mg/dl 4

Conversion to mg/dl before classifying as valid or invalid

amount  $\mu\text{mol/L} \div 88.4 = \text{amount in mg/dl}$  3

---

## Dependencies

Anesthesia Start

# Preop EGFR (Lowest within 60 Days)

## Description

Lowest estimated glomerular filtration rate (eGFR) within 60 days.

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. Collation is based upon the creatinine collation. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

**Phenotype table not stored in database. No column returned.**

## Granularity

**One value per case**

## Logic

This phenotype calculates values from the PreopCreatinine, MPOG ID 5002 (Formal lab – Creatinine, Serum/Plasma in mg/dl; when in mmol/l: mount mmol/l ÷ 88.4 = amount in mg/dl).

All values expressed in ml/min/1.73m<sup>2</sup>

Obtain the lowest valid eGFR within 60 days of anesthesia start.

- 1 Valid >0 and <300
2. If data invalid ? Output = -998
3. If data is completely missing ? Output = -999

If data valid ? Output = (numeric value in ml/min/1.73m<sup>2</sup>)

Reference values:

- >150 ml/min/1.73m<sup>2</sup>

eGFR can be derived from creatinine values: first conversion from mmol/l to mg/dl for centers using SI units (the Netherlands) instead of Conventional Units. Then use:

## References:

- Frank H. Wians, Jr., PhD; Merck Manual, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
- Farmacotherapeutisch compas 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
- FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspection/IOM/UCM135835.pdf>

Adults  $\geq$  18 years old:

### CKD-EPI

$$eGFR = 142 \times \min(Scr/a, 1)^a \times \max(Scr/a, 1)^{-1.200} \times 0.9938^{Age} \times 1.01 \text{ [if female]}$$

1. Scr is serum creatinine in mg/dL,
2. a is 0.7 for females and 0.9 for males,
3. a is -0.241 for females and -0.302 for males
4. min indicates the minimum of Scr/a or 1
5. max indicates the maximum of Scr/a or 1.

### Requirements:

1. Age is mandatory
2. If no gender data available assume female

## Reference:

- Inker, L. A., Eneanya, N. D., Coresh, J., Tighiouart, H., Wang, D., Sang, Y., Crews, D. C., Doria, A., Estrella, M. M., Froissart, M., Grams, M. E., Greene, T., Grubb, A., Gudnason, V., Gutiérrez, O. M., Kalil, R., Karger, A. B., Mauer, M., Navis, G., ... Levey, A. S. (2021). New creatinine- and cystatin C–based equations to estimate GFR without race. *New England Journal of Medicine*, 385(19), 1737–1749. <https://doi.org/10.1056/nejmoa2102953>

Pediatric Patients  $<18$  years old:

### Bedside Schwartz

$$eGFR = 0.413 * (\text{height in cm}) / (\text{baseline creatinine})$$

1. Height is mandatory

## Reference:

- Schwartz GJ, Muñoz A, Schneider MF, Mak RH, Kaskel F, Warady BA, Furth SL.; New equations to estimate GFR in children with CKD. *J Am Soc Nephrol*. 2009 Mar;20(3):629-37

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## Dependencies

No dependency available.

# Preop Glucose

## Description

**Most recent preoperative glucose within 365 day**

### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. <http://www.guinnessworldrecords.com/world-records/highest-blood-sugar-level>; accessed 10-17-2016
5. Viswanathan V, Beardsley AL, Walvoord EC, Nebesio TD; Extreme hyperglycemia and hyperosmolar state in new onset type 1 diabetes: are sugar- and salt-containing beverages at fault? Clin Pediatr (Phila). 2011 Apr;50(4)
6. Piot VM, Verrijcken A, Vanhoof M, Mertens I, Soetens F; Full neurological recovery after extreme hypoglycemia during intensive insulin therapy: a case report.; J Diabetes Sci Technol. 2012 Jul 1;6(4):973-7.
7. Abellán P, Cámara R, Merino-Torres JF, Pérez-Lazaro A, del Olmo MI, Ponce JL, Rayón JM, Piñón F; Severe hypoglycemia after gastric bypass surgery for morbid obesity; Diabetes Res Clin Pract. 2008 Jan;79(1):e7-9. Epub 2007 Sep 5.
8. Erasmus Medical Center Rotterdam; Diagnostiek, Conversiefactoren; published March 2010; accessed 10-17-2016; <http://www.erasmusmc.nl/akc/Diagnostiek/Diagnostiek/4012531/?view=active>

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier

Value	numeric
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## Granularity

**One value per case**

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## Logic

Values collected under MPOG ID 5003 (formal lab – Glucose, Serum/Plasma), or MPOG ID 5036 (Formal lab – Blood gas – Glucose), or MPOG ID 3405 (POC – Blood gas – Glucose) or MPOG ID 3361 (POC – Glucose (Fingerstick)) or MPOG ID 3362 (POC – Glucose (unspecified source)) All values expressed in mg/dl

Obtain most recent (latest) valid glucose (MPOG concept ID 3405, 3361, 3362, 5003 or 5036) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid >0 and <3000
2. If data invalid → Output = -998
3. If data valid → Output = (numeric value in mg/dl)

General reference ranges

- 80-120 mg/dl (Conventional Unit) 1,2,3
- 4- 6.4 mmol/l (SI Unit, institution) 1,2,3
- Extreme values: 2656 mg/dl<sup>4,5</sup> and 13 mg/dl<sup>6,7</sup>

Conversion to g/dl before classifying as valid or invalid  
amount mmol/l ÷ 0.0555 =amount in mg/dl<sup>8</sup>

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## Dependencies

Anesthesia Start

## Preop HCG

### Description

**Most recent preoperative human chorionic gonadotropin (HCG) within 365 days**

#### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chesitry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. Berkowitz RS, Goldstein DP; Clinical practice. Molar pregnancy. N Engl J Med; 2009 Apr 16;360(16):1639-45
5. van Cromvoirt SM1, Thomas CM2, Quinn MA1, McNally OM1, Bekkers RL3. Gynecol Oncol.; Identification of patients with persistent trophoblastic disease after complete hydatidiform mole by using a normal 24-hour urine hCG regression curve. 2014 Jun;133(3):542-5.

### Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

### Granularity

**One value per case**

### Logic



Values collected under MPOG ID 5063 (formal lab – HCG, Serum/Plasma) OR MPOG ID 3368 (POC – HCG, Urine)

Obtain most recent (latest) valid HCG prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid >0 IU/L and <350,000 IU/L
2. If data invalid → Output = -998
3. If data valid → Output = (numeric value in IU/L)

General reference ranges

- <5 mIU/mL (Conventional Unit) 1,2,3
- <5 IU/L (SI Units) 1,2,3

Extremes: "Molar pregnancy: levels of hCG >100,000 mIU per milliliter in 41-46% of cases. Only 1 of 17 patients with a partial mole had levels >300,000 mIU per milliliter." 4,5

No conversion necessary when mIU/mL used.1,2,3

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## Dependencies

Anesthesia Start

# Preop Hematocrit

## Description

**Most recent preoperative hematocrit within 365 days**

### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chesitry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. Ferrant A; What clinical and laboratory data are indicative of polycythemia and when are blood volume studies; needed?; Nouv Rev Fr Hematol. 1994 Apr;36(2):151-4.
5. de Araújo Azi LM1, Lopes FM, Garcia LV; Postoperative management of severe acute anemia in a Jehovah's Witness; Transfusion. 2014 Apr;54(4):1153-7
6. Braun SL, Eicken A, Kaemmerer H.; Iron deficiency in a patient with extreme erythrocytosis due to cyanotic congenital heart disease.Int J Cardiol. 2007 Mar 20;116(2):e74-5. Epub 2006 Nov 9.
7. Erasmus Medical Center Rotterdam; Diagnostiek, Conversiefactoren; published March 2010; accessed 10-17-2016; <http://www.erasmusmc.nl/akc/Diagnostiek/Diagnostiek/4012531/?view=active>

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

# Granularity

## One value per case

---

### Logic

Values collected under MPOG ID 3415 (POC – Blood gas – HCT measured) OR MPOG ID 3435 (POC – hematocrit spun) OR MPOG ID 3450 (POC – Coulter Counter – Hematocrit) OR MPOG ID 5006 (Formal lab – hematocrit) OR 5038 (Formal lab – blood gas – HCT measured)

All values converted to %.

Obtain most recent (latest) valid hematocrit (MPOG concept ID 3415 OR 3435 OR 3450 OR 5006 OR 5038) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid >0% and < 100 %
2. If data invalid → Output = -999
3. If data valid → Output = (numeric value %)

General reference ranges 1,2,3

- 36-51% (Conventional Unit)
- 0.36-0.51 L/l (SI Unit, proportion)
- absolute polycythemia: male 60%, female > 55%<sup>4</sup>
- Extreme: low: 6%<sup>5</sup>, high 80%<sup>6</sup>

Conversion to % before classifying as valid or invalid

- amount L/l \* 100 =amount in %<sup>7</sup>

---

### Dependencies

Anesthesia Start

# Preop Hemoglobin

## Description

**Most recent preoperative hemoglobin within 365 days**

### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chesitry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. Chojnowski K, Janus A, Blizniewska K, Robak M1, Trelinski J.; Long-lasting extreme anemia during the therapy of acute lymphoblastic leukemia in a Jehovah's Witness patient; Transfusion. 2016 Oct;56(10):2438-2442. doi: 10.1111/trf.13703. Epub 2016 Jul 7.
5. Kariya T, Ito N, Kitamura T, et al. Recovery from extreme hemodilution (hemoglobin level of 0.6 g/dL) in cadaveric liver transplantation. A Case Rep 2015;4:132-6.
6. Braun SL, Eicken A, Kaemmerer H.; Iron deficiency in a patient with extreme erythrocytosis due to cyanotic congenital heart disease. Int J Cardiol. 2007 Mar 20;116(2):e74-5. Epub 2006 Nov 9.
7. Erasmus Medical Center Rotterdam; Diagnostiek, Conversiefactoren; published March 2010; accessed 10-17-2016; <http://www.erasmusmc.nl/akc/Diagnostiek/Diagnostiek/4012531/?view=active>

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

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## Granularity

**One value per case**

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## Logic

Values collected under MPOG ID MPOG ID 3440 (POC – Coulter Counter – Hemoglobin) OR MPOG ID 5005 (Formal lab – Hemoglobin) OR MPOG ID 5080 (Formal lab – Blood gas – Hemoglobin) OR MPOG ID 5081(POC – Blood gas – Hemoglobin)

All values expressed in g/dl

Obtain most recent (latest) valid hemoglobin. (MPOG concept ID 3440 OR 5005 OR 5080 OR 5081) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid >0 g/dl and <30 g/dl
2. If data invalid → Output = -998
3. If data valid → Output = (numeric value g/dl)

General reference ranges

- 12-18 g/dl (Conventional Unit, whereas SI unit = g/l)<sup>1,2,3</sup>
- 7.5-11 mmol/l <sup>1,2,3</sup>
- Extreme values: 0.6 g/dl<sup>4,5</sup> and 25.76

Conversion to g/dl before classifying as valid or invalid<sup>7</sup>

- amount in mmol/l / 0.6206 =amount in mg/dl<sup>7</sup>

---

## Dependencies

Anesthesia Start

# Preop HgbA1c

## Description

Most recent preoperative HgbA1c percentage within 365 days

## Limitation

There is a conversion for this collation for sites that use alternate units.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

This phenotype returns the **most recent** of all valid labs with concept 5026 [Formal lab - Glycosylated Hemoglobin, Serum/Plasma (HbA1c)] and a numeric value that were observed within the preop date range defined as [Anesthesia Start minus 365 days] to [Anesthesia Start]. If a lab value is returned as a text field (for example with a > or < sign), the pheontype returns the numeric por on of that value.

Please note that cases occuring at University of Amsterdam - Academic Medical Center and University Medical Center – Utrecht are converted using the following formula:  $0.09148 * \text{Lab Value} + 2.152$ .

The phenotype returns the following:

- The value of the lab if it was within the valid result range (0, 20) *not inclusive*
- -998 if the lab was out of the valid result range
- -999 if no lab was found

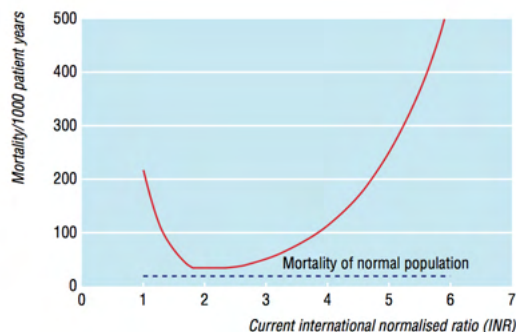
## Dependencies

Anesthesia Start

# Preop INR

## Description

Most recent preoperative international normalized ratio (INR) within 365 days



Ref: Odén A., Fahlén M. Oral anticoagulation and risk of death: a medical record linkage study ; *BMJ*. 2002 Nov 9; 325(7372): 1073–1075.

### References:

1. Odén A., Fahlén M. Oral anticoagulation and risk of death: a medical record linkage study ; *BMJ*. 2002 Nov 9; 325(7372): 1073–1075.
2. Lee JE, Ryu DH, Jeong HJ, Kim JH, Jun JE, Kim JS, Lee SY; Extremely elevated international normalized ratio of warfarin in a patient with CYP2C9\*1/\*3 and thyrotoxicosis; *J Korean Med Sci*. 2014 Sep;29(9)
3. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
4. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
5. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>

## Limitation

This collation does not set “normal” ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	

	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

### One value per case

## Logic

Values collected under MPOG ID 3460 (POC – International Normalized Ratio) or MPOG ID 5008 (Formal lab – International Normalized Ratio)

Obtain most recent (latest) valid INR (MPOG concept ID 3460 or 5008) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid >0 and <20
2. If data invalid → Output = -998
3. If data valid → Output = (numeric value)
4. Extreme value: 151,2

General reference ranges 3,4,5

- 0.8 – 1.2

No difference in units between institutions

## Dependencies

Anesthesia Start



# Preop Lactate

## Description

Most recent preoperative arterial lactate within 365 day

### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. Oster Y, Wexler ID, Heyman SN, Fried E.; Recoverable, Record-High Lactic Acidosis in a Patient with Glycogen Storage Disease Type 1: A Mixed Type A and Type B Lactate Disorder. Case Rep Med. 2016;2016:4362743.

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5086 (Formal lab - Blood gas - Lactate (arterial), MPOG ID 5018 (Formal lab - lactate, Serum/Plasma) MPOG ID 3410 ( POC - Blood gas - Lactate) or MPOG ID 5040 (Formal lab - Blood gas - lactate (unknown sample type))

All values reported in mg/dl.

Obtain most recent (latest) valid arterial lactate prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid >0 mg/dl and <30 mmol/l
2. If data invalid → Output = -998
3. If data valid → Output = (numeric value)

General reference ranges

- 0.5-2.2 mmol/l (SI unit) 1,2,3
- Extreme: 27 mmol/l 4

---

## Dependencies

Anesthesia Start

# Preop Platelet Count

## Description

Most recent preoperative platelet count within 365 days

### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. Hu R, Li J, Hu Y, Zhang J, Miao M, Zhu K, Liao A, Yang W, Liu Z.; Acute mono-megakaryoblastic leukemia associated with extreme thrombocytosis and complex karyotype abnormalities; Am J Case Rep. 2013 May 17;14:157-160.

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 3445 (POC – Coulter counter – Platelets) OR MPOG ID (5004 (Formal lab – Platelets)

All values converted to  $\times 10^3 / \text{mcl}$

Obtain most recent (latest) valid (MPOG concept ID 3345 or 5004) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. 1. Valid  $>0$  and  $<1500$
2. If data invalid ? Output = -998
3. If data valid ? Output = (numeric value  $\times 10^3 / \text{mcl}$  )

General reference ranges 1,2,3

- $150-450 \times 10^3 / \text{mcl}$  (Conventional units;  $= 10^3 / \text{mm}^3$ )
- $150-450 \times 10^9 / \text{l}$  (SI units)
- Extreme: thrombocytosis:  $2646 \times 10^3 / \text{mcl}$

No conversion necessary, numeric value  $\times 10^3 / \text{mcl}$  = numeric value  $\times 10^9 / \text{l}$  1,2,3

---

## Dependencies

Anesthesia Start



# Preop Potassium

## Description

Most recent preoperative potassium within 365 days

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 3390 (POC - Blood gas - Potassium) OR MPOG ID 5001 (Formal lab - Potassium, Serum/Plasma) OR MPOG ID 5051 (Formal lab - Blood gas - Potassium)

Range: 0-50 mmol/L

## Dependencies

Anesthesia Start



## Preop Protein

### Description

Most recent preoperative protein within 365 days

### Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

### Granularity

**One value per case**

### Logic

Values collected under MPOG ID 5062 (Formal lab - Protein (Total), Serum/Plasma)

Range: 0-500 mg/dl

### Dependencies

Anesthesia Start

## Preop PT

### Description

Most recent preoperative prothrombin time (PT) within 365 days

#### References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. Hough RE, Makris M; Recent onset of bleeding and gross coagulopathy.; Postgrad Med J. 2001 Jan;77(903):53, 57-8

### Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. Some institutions use partial thromboplastin time, whereas others use activated partial thromboplastin time.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

### Granularity

**One value per case**

### Logic

Values collected under MPOG ID 3455 (POC\_Prothrombin Time) or MPOG ID 5007 (Formal lab – Prothrombin Time)

All values expressed in seconds.

Obtain most recent (latest) valid PT (MPOG concept ID 3455 or 5007) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid >0 seconds or <150 seconds
2. If data invalid → Output = -999
3. If data valid → Output = (numeric value in seconds)

General reference ranges 1,2,3

- 10-20 seconds
- Extreme: 230 seconds<sup>4</sup>

No difference in unit between institutions.1,2,3

---

## Dependencies

Anesthesia Start



# Preop PTT

## Description

**Most recent preoperative activated partial thromboplastin time within 365 days**

References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
3. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
4. Takamizawa Y, Araki M, Yoshida N, Yoshioka T, Miura K.; A case of a severe factor XI deficiency in patient undergoing hemodialysis without the use of heparin. Blood Coagul Fibrinolysis. 2014 Dec;25(8):898-9.
5. Moon JM, Chun BJ; Severe Coagulopathy after Ingestion of "Snake Wine"; J Emerg Med. 2016 Jun;50(6)

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes. Some institutions use partial thromboplastin time, whereas others use activated partial thromboplastin time.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 3465 (POC – Partial Thromboplastin Time) or MPOG ID 5009 (Formal lab – Partial Thromboplastin Time)

All values expressed in seconds.

1. Obtain most recent (latest) valid PTT (MPOG concept ID 3465 or 5009) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery
  1. Valid >0 seconds or <170 seconds
  2. If data invalid → Output = -998
  3. If data valid → Output = (numeric value in seconds)

General reference ranges

- 30-45 seconds<sup>1,2,3</sup>
- Some institutions might be using PTT (reference 60-70)<sup>1,2,3</sup>
- Extreme: 145.2 seconds.<sup>4,5</sup>

No difference in unit between institutions<sup>4</sup>

---

## Dependencies

Anesthesia Start

# Preop Sodium

## Description

**Most recent preoperative sodium within 365 days**

References:

1. Frank H. Wians, Jr., PhD; Merck Manuel, professional version; Blood Tests: Normal Values; accessed 10-17-2016; <http://www.merckmanuals.com/professional/appendixes/normal-laboratory-values/blood-tests-normal-values#v8508814>
2. Farmacotherapeutisch kompass, 2016, the Netherlands; published 10-01-2016; accessed 10-17-2016; <https://www.farmacotherapeutischkompas.nl/bladeren-volgens-boek/inleidingen/inl-referentiewaarden-klinische-chemie>
3. FDA, investigations operations manual 2015, appendix C, Blood Serum Chemistry – Normal Values ; published 2015, accessed 10-17-2016; <http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM135835.pdf>
4. Sterns RH; Disorders of plasma sodium--causes, consequences, and correction. N Engl J Med. 2015 Jan 1;372(1):55-65.
5. Arambewela MH, Somasundaram NP, Garusinghe C; Extreme hyponatremia as a probable cause of fatal arrhythmia: a case report.; J Med Case Rep. 2016 Oct 1;10(1):272.
6. Smith JD, Roberts L, Schneider HG; A case of extreme hyponatremia secondary to a low solute diet and primary polydipsia. Pathology. 2016 Feb;48 Suppl 1:S13-S14.

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 3385 (POC – Blood gas –Sodium) or MPOG ID 5027 (Formal lab – Sodium – Serum/plasma) OR MPOG ID 5053 (Formal lab – Blood gas – Sodium)

All values expressed in mEq/L

Obtain most recent (latest) valid sodium (MPOG concept ID 3385 OR 5027 OR 5053) prior to anesthesia start and within 365 days of anesthesia start with number of days prior to surgery

1. Valid >90 mEq/L and <190 mEq/L.
2. If data invalid → Output = -998
3. If data valid → Output = (numeric value mEq/L)

General reference ranges

- 135-147 mEq/L (Serum; Conventional Unit) 1,2,3
- 135-145 mmol/L. (SI Unit)1,2,3
- Severe hyponatremia <120 mEq/L 4
- Severe hypernatremia >150 mEq/L, extreme >190 mEq/L (rare) 4,5
- Extreme: 94-226 mEq/L 5,6

No conversion necessary when mmol/L used.1,2,3

---

## Dependencies

Anesthesia Start



# Preop Total Bilirubin

## Description

Most recent preoperative total bilirubin within 365 days

## Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Values collected under MPOG ID 5014 (Formal lab - Bilirubin Total, Serum/Plasma) OR MPOG ID 3369 (Formal lab - Bilirubin Total, body fluid (not serum/plasma)) OR MPOG ID 5015 (Formal lab - Bilirubin Unconjugated, Serum/Plasma) OR MPOG ID 5016 (Formal lab - Bilirubin Conjugated, Serum/Plasma)

Range: 0-1000 mg/dl

## Dependencies

Anesthesia Start

# Preop Troponin (Highest)

## Description

Highest preoperative troponin (I or T) with 42 days (6 weeks) prior to surgery.

Note that additional troponin-related collations include:

- PreopTroponin - most recent (not necessarily highest) preoperative troponin (I or T) within 42 days (6 weeks) prior to surgery

ComplicationMyocardialInfarctionTroponinPostop - highest (not necessarily most recent) postoperative troponin (I or T) within 72 hours after surgery.

\*Rationale for preoperative troponin monitoring up to 42 days prior is based upon ACC/AHA guidelines recommending a delay in elective surgery for 6 weeks following myocardial infarction<sup>1</sup>

References:

Fleisher L, et al. 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. J. Nucl. Cardiol. (2015) 22: 162. doi:10.1007/s12350-014-0025-z

## Limitation

none

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	Missing value
Invalid	-999	Invalid value

## Return Columns

Column Name	Data Type
Days_Preoperative	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

---

## Granularity

### One value per case

---

## Logic

Obtain highest valid troponin level (MPOG Concept ID 5011) within 42 days\* of anesthesia start

1. Valid =  $\geq 0$  ng/ml
2. If "< cutoff" is documented (example: < 0.01). Output = 0
3. If data missing or invalid → Output = -999
4. If data valid → Output = (numeric value in g/dL)

Reference Values:

- Different per assay
- Either Troponin T or Troponin I is measured – this is registered for every institution separately.

Conversion not necessary when mcg/l is used.

Conversion of mcg/ml to ng/ml:

- amount mcg/ml x 1000 = amount in ng/ml aa

---

## Dependencies

Anesthesia Start

## Preop Troponin (Most Recent)

### Description

Most recent preoperative troponin (I or T) within 42 days (6 weeks) prior to surgery

Note that additional troponin-related collations include:

- ComplicationMyocardialInfarctionTroponinPreop - highest (not necessarily most recent) preoperative troponin (I or T) within 42 days (6 weeks) prior to surgery

ComplicationMyocardialInfarctionTroponinPostop - highest (not necessarily most recent) postoperative troponin (I or T) within 72 hours after surgery

\*Rationale for preoperative troponin monitoring up to 42 days prior is based upon ACC/AHA guidelines recommending a delay in elective surgery for 6 weeks following myocardial infarction<sup>1</sup>

References:

1. Fleisher L, et al. 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. J. Nucl. Cardiol. (2015) 22: 162.
2. Thygesen K, Alpert JS, Jaffe AS, Simoons ML, Chaitman BR, White HD. Third Universal Definition of Myocardial Infarction. Circulation. 2012;126:2035.

### Limitation

Differences exist in units (ng/ml, mcg/ml) between institutions. Most recent value is reported, not the highest. This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	int

### Granularity

**One value per case**



---

## Logic

Preoperative/Postoperative Troponin Values (MPOG Concept ID 5011)

MPOG Site-Specific Troponin reference range

Obtain most recent valid troponin level (MPOG Concept ID 5011) within 42 days\* of anesthesia start<sup>1</sup>

1. Valid 0-50,000 ng/ml
2. If data missing or invalid → Output = -998
3. If data valid → Output = (numeric value in g/dL)

Reference Values:

- Different per assay
- Either Troponin T or Troponin I is measured – this is registered for every institution separately.

Conversion not necessary when mcg/l is used.

Conversion of mcg/ml to ncg/ml:

amount mcg/ml x 1000 =amount in ng/ml

---

## Dependencies

Anesthesia Start



## Preop WBC

### Description

Most recent preoperative white blood count (WBC) within 365 days

### Limitation

This collation does not set "normal" ranges for the values. Valid ranges account only for data collection extremes.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
Days_Before	int
MPOG_Case_ID	uniqueidentifier
Value	numeric

### Granularity

**One value per case**

### Logic

Values collected under MPOG ID 5056 (Formal lab - White Blood Cell Count)

Range: 0-100

### Dependencies

Anesthesia Start

# Primary Provider

## Description

Returns multiple rows for each case: the anesthesia attending(s) (ID and Role Concept ID) and the "other provider(s)" (CRNA/Res/Fellow) (ID and Role Concept ID) signed in for the longest duration the case.

## Limitation

Limited to proper sign in documentation. Fellow sign ins are handled differently at individual sites. Many sites will not document the level of resident - please see the logic section of this document.

## Value Type

**Categorical**

## Enumeration

**No enumeration available right now.**

## Return Columns

Column Name	Data Type
AIMS_Staff_ID	varchar
MPOG_Case_ID	uniqueidentifier
MPOG_Staff_Role_Concept_ID	numeric

## Granularity

**Many values per case**

## Logic

Returns the attending anesthesiologist with the longest sign in time between CaseStart and CaseEnd, returns their ID and Role Concept ID (attending = 6000)

Returns the other (non-attending) anesthesia provider with the longest sign in time between CaseStart and CaseEnd, returns their ID and Role Concept ID: (for example, unspecified year resident = 6004, CRNA = 6005, etc.):

MPOG\_Staff\_Role\_Concept\_ID   concept\_desc   (relative count in MPOG)

6000   Staff Level - Anesthesia Attending   (12348756)

6001   Staff Level - Anesthesia Resident CA1   (371430)

6002   Staff Level - Anesthesia Resident CA2   (305358)

6003 Staff Level - Anesthesia Resident CA3 (88)  
6004 Staff Level - Anesthesia Resident - Unspecified Year (2981009)  
6005 Staff Level - Anesthesia CRNA (8646950)  
6010 Staff Level - Anesthesia Assistant (154801)  
6013 Staff Level - Anesthesia Technician (87)  
6014 Staff Level - Anesthesia Fellow (88502)

---

## Dependencies

Airway Type Notes  
Anesthesia CPT (All)  
Anesthesia End  
Anesthesia Start  
Anesthesia Technique: General  
xRetiredx Arrived Intubated to the OR  
Case End  
Case Start  
Data Capture Start  
Extubation Times  
GeneralNotes  
Induction End  
Induction Start  
Institution  
Intubation Time  
MPOG Patient ID  
Obstetric Anesthesia Type  
Paralytics Used (All)  
Patient Out Of Room Date/Time  
Patient In Room Date/Time  
Procedure Text  
StaffRoles  
Surgery End  
Surgery Start Date/Time



## Procedure Room Duration

### Description

This phenotype returns the duration of time a patient is in a procedure room. Returns time in minutes.

### Limitation

Dependent on proper documentation of in room and out of room.

### Value Type

**Numeric**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

### Granularity

**One value per case**

### Logic

Difference in time between Patient In Room and Patient Out of Room phenotypes.

### Dependencies

Patient Out Of Room Date/Time

Patient In Room Date/Time

# Procedure Text

## Description

This phenotype returns a descriptor of the performed or if unavailable planned surgical procedure as documented in the source documentation.

## Limitation

Preferentially chooses any documented procedure performed.

Indicated by the phrase (scheduled) if a procedure was planned.

Returns one row per case.

No row may be returned if text is unavailable.

## Value Type

### Raw Text

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar

## Granularity

### One value per case

## Logic

**Aim:** Return a textual description of the surgical procedure.

### Methods:

1. If the case has an actual procedure text, it is shown prepended by "(Actual)" (e.g. "(Actual)CABG")
  2. If the case does not have an actual procedure text but has a scheduled procedure text, the scheduled procedure text is shown prepended by "(Scheduled)" (e.g. "(Scheduled)ECT")
  3. If the case has neither an actual procedure text nor a scheduled procedure text, then no row is created for the case.
1. (Note: If the row is not created, how this shows to end users can vary. For example, if a query is written in such a way that a case must be in this collation to be included in the results, then all cases missing actual procedure text and scheduled procedure text will be missing. However queries can be written to include these cases, in which case the result will appear as NULL)

## Dependencies

No dependency available.

# Procedure Type: Adenotonsillectomy

## Description

This phenotype determines whether the case includes Tonsilectomy, Adenoidectomy, Adenotonsillectomy or control of postop tonsil bleed using logic based upon a combination of surgical CPT codes and procedure text.

## Limitation

May include cancelled cases. This phenotype may incorrectly result cases that are scheduled as tonsillectomy, possible adenoidectomy and vice versa.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	Case did not involve Tonsils or Adenoids
Tonsillectomy	1	Case was Tonsillectomy without removal of adenoids
Adenoidectomy	2	Case was Adenoidectomy without removal of tonsils
Adenotonsillectomy	3	Case was Adenotonsillectomy; Removal of both tonsils and adenoids
Tonsil Bleed	4	Case was a tonsil bleed; Control of tonsil bleeding, without removal of tonsils or adenoids

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

The following checks are processed in order. Once a check is true, that value is assigned and no further checks are applied.

1. Does procedure text include "Bleed" , "Coag" , "Control" AND was an Emergent procedure? If yes, assign **Tonsil Bleed** and stop. If no, proceed
2. Does procedure text include "Tons" AND "Adenoid" OR "Adenotons", "T&A", "T/A" OR matches on surgical CPT codes 42820 or 42821? If yes, assign **Adenotonsillectomy** and stop. If no, proceed
3. Does procedure text include "Tons" and not "Adenoid" and not "Adenotons" and not CPT code 42820 or 42821? If yes, assign **Tonsillectomy** and stop. If no, proceed
4. Does procedure text include 'adenoid' and not 'tons' and not CPT codes 42820 or 42821? If yes, assign **Adenoidectomy** and stop. If no, proceed
5. Does procedure text include 'tons' and not 'adenoid' and not 'adenotons'? If yes, assign **Tonsillectomy** and stop. If no, proceed
6. Does procedure text include 'adenoid' and not 'tons'? If yes, assign **Adenoidectomy** and stop. If no, proceed
7. Does case have Tonsil CPT codes (42825, 42826, 42842, 42844, 42845, 42870, 42961, 42962)? If yes, assign **Tonsillectomy** and stop. If no, proceed
8. Does case have Adenoid CPT codes (42830, 42831, 42835, 42836)? If yes, assign **Adenoidectomy** and stop. if no, return **No**.

Surgical CPT Code	Description
42820	Tonsillectomy and adenoidectomy; younger than age 12
42821	Tonsillectomy and adenoidectomy; age 12 or over
42825	Tonsillectomy, primary or secondary; younger than age 12
42826	Tonsillectomy, primary or secondary; age 12 or over
42842	Radical resection of tonsil, tonsillar pillars, and/or retromolar trigone; without closure
42844	Radical resection of tonsil, tonsillar pillars, and/or retromolar trigone; closure with local flap
42845	Radical resection of tonsil, tonsillar pillars, and/or retromolar trigone; closure with other flap
42830	Adenoidectomy, primary; younger than age 12
42831	Adenoidectomy, primary; age 12 or over
42835	Adenoidectomy, secondary; younger than age 12
42836	Adenoidectomy, secondary; age 12 or over
42870	Excision or destruction lingual tonsil, any method (separate procedure)
42961	Control oropharyngeal hemorrhage, primary or secondary; complicated, requiring hospitalization
42962	Control oropharyngeal hemorrhage, primary or secondary; with secondary surgical intervention

### Procedure Text Keywords

#### Tonsil

- "Tons"



## Adenoid

- "Adenoid"

## Adenotonsillectomy

- "Adenotons"
- "T&A"
- "T/A"

## Tonsil Bleed

- "Bleed"
- "Coag"
- "Control"

---

## Dependencies

Age (Years)

Anesthesia CPT (Measures)

Anesthesia Start

Emergency Status (ASA Class) Yes/No

Emergency Status (ASA Class)

Institution

Anesthesia CPT (Primary)

Surgical CPT (Primary)

Procedure Text

## Procedure Type: Cardiac (new)

### Description

This phenotype determines if a case is considered a cardiac procedure and identifies the type of cardiac procedure performed.

### Limitation

Lung Transplant cases will be categorized as 'Open Cardiac.'

All Pericardial Window cases will be categorized as 'Other Cardiac' per Cardiac Subcommittee recommendations.

Though the procedure text for a given case may not specify a cardiac procedure, the case may still be included based on the CPT codes on the case - see logic section for more details regarding inclusion criteria.

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No/Non-Cardiac	0	Procedure was not a cardiac case, has conflicting documentation, or unable to determine if procedure was a cardiac case
Open Cardiac	1	Procedure was an open cardiac case
EP/Cath	2	Procedure was an electrophysiology or cardiac catheterization case
Transcatheter/Endovascular	3	Procedure was a Transcatheter or Endovascular case
Other Cardiac	4	Procedure was a cardiac case that does not fit into the other categories

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Source_Text	nvarchar
Value	varchar
Value_Code	int

# Granularity

## One value per case

### Logic

#### Cardiac Phenotype Flow Chart

Start with all cases. Compile a list of all procedure types that the case may qualify for using steps 1-4. If the Obstetric Anesthesia Type phenotype is also triggered, the case is considered non-cardiac.

**Step 1: Determine if case meets Open Cardiac criteria**

- Exclude if:
  - Arterial line is not present (Arterial Line Used phenotype)
  - Case duration <120 minutes
  - Anesthesia CPT: 00500-00540 thoracic procedures for non-cardiac surgeries
  - Anesthesia CPT: 00550 sternal debridement
  - Anesthesia CPT: 00796 for liver transplant
  - Anesthesia CPG: 00868 for kidney transplant
  - Anesthesia CPT: 01990 for organ harvest
  - Anesthesia CPT: 00700-00797 for upper abdominal procedures (unless a predicted anesthesia CPT is 00560-00580 is also present)
  - Procedural service is:
    - 80016 Medical-Cardiology
    - 80017 Medical-Gastroenterology
    - 80044 Pediatric Cardiology
    - 80003; neurosurgery
    - 80009; orthopedics
    - 80023; urology
    - 80033; pediatric neurosurgery
    - 80034; pediatric orthopedics
    - 80035; pediatric urology
- Include if:
  - One of these surgical CPTs are present

Cardiac Surgical CPT Code	Text description of Surgical CPT code (CPT Code Range 33016-33999)
33020-33100	Surgical Procedures on the Pericardium **except 33025**
33120-33130	Excision Procedures of Cardiac Tumor
33140-33141	Transmyocardial Revascularization Procedures
33300-33315	Surgical Procedures on the Heart (Including Valves) and Great Vessels
33321-33322	Surgical Procedures on the Heart (Including Valves) and Great Vessels Continued

33335	Surgical Procedures on the Heart (Including Valves) and Great Vessels Continued
33390-33417	Surgical Procedures on Cardiac Valves Cont.
33422-33471	Surgical Procedures on Cardiac Valves Cont.
33474-33476	Surgical Procedures on Cardiac Valves Cont.
33478	Surgical Procedures on Cardiac Valves Cont.
33496	Other Cardiac Valvular Procedures
33500-33507	Coronary Artery Anomaly Procedures
33508	Endoscopy Procedures on the Heart and Pericardium
33510-33516	Venous Grafting Only for Coronary Artery Bypass
33517-33530	Combined Arterial-Venous Grafting for Coronary Bypass
33533-33548	Arterial Grafting for Coronary Artery Bypass
33572	Coronary Endarterectomy Procedures
33600-33622	Repair Procedures for Single Ventricle and Other Complex Cardiac Anomalies
33641-33697	Repair Procedures for Septal Defect
33702-33722	Repair Procedures for the Sinus of Valsalva
33724-33732	Repair Procedures for Venous Anomalies
33735-33768	Shunting Procedures on the Heart and Pericardium
33770-33783	Repair Procedures for Transposition of the Great Vessels
33786-33788	Repair Procedures for Truncus Arteriosus
33800-33853	Repair Procedures for Aortic Anomalies
33858-33877	Repair Procedures for Thoracic Aortic Aneurysm
33910-33926	Surgical Procedures on the Pulmonary Artery
33927-33945	Heart/Lung Transplantation Procedures
33975-33983	Cardiac Assist Procedures

2. If the above surgical CPTs are NOT present, consider the following anesthesia CPT codes with associated parameters
- Anesthesia CPTs:
    - 00560 - Anesthesia for procedures on heart, pericardial sac, and great vessels of chest; without pump oxygenator
      - Include in Open Cardiac if Anesthesia CPT is 00560, no surgical CPTs are present, and procedure text does NOT include "transcatheter", "TAVR", "MitraClip", "Mitra Clip", "Mitral Clip", "Mitral Valve Clip" "PEDCATH"
      - Include in Open Cardiac if anesthesia CPT is 00560, surgical CPTs are not present, but bypass notes (MPOG Concept IDs 50399, 50409, 50410, 50416, 50417, 50714) are present, and procedure text includes: "transcatheter", "TAVR", "MitraClip", "Mitra Clip", "Mitral Clip", "Mitral Valve Clip" "PEDCATH"
      - Exclude from Open Cardiac if anesthesia CPT is 00560, surgical CPTs are not present, bypass notes (MPOG Concept IDs 50399, 50409, 50410, 50416, 50417, 50714) are NOT present, and procedure text includes: "transcatheter", "TAVR", "MitraClip", "Mitra Clip", "Mitral Clip", "Mitral Valve Clip" "PEDCATH"
      - Bypass notes:
        - 50399 Cardiopulmonary bypass -- aortic clamp on/off note
        - 50409 Cardiopulmonary bypass (full/partial/left-heart) terminated
        - 50410 Cardiopulmonary bypass initiated (full/partial/left-heart)
        - 50416 Cardiopulmonary bypass -- crossclamp and circulatory arrest time totals
        - 50417 Cardiopulmonary bypass -- Access cannula removed note
        - 50714 Cardiopulmonary bypass - Full/partial/left-heart bypass start / stop event
    - 00561 - Anesthesia for procedures on heart, pericardial sac, and great vessels of chest; with pump oxygenator, younger than 1 year of age
    - 00562 - Anesthesia for procedures on heart, pericardial sac, and great vessels of chest; with pump oxygenator, age 1 year or older, for all non-coronary bypass procedures or for re-operation for coronary bypass more than 1 month after original operation
    - 00563 - heart Surg W/ circulatory arrest
    - 00566 - cabg w/o pump
    - 00567 - Anesthesia for direct coronary artery bypass grafting; with pump oxygenator
    - 00580 - Anesthesia for heart transplant or heart/lung transplant
  - IF none of the above anesthesia CPTs are present, and at least TWO of the following notes were documented AND procedure text does NOT include "intracran" or "crani" or "liver transplant" or "hepatic transplant"
    - 50399 Cardiopulmonary bypass -- aortic clamp on/off note
    - 50409 Cardiopulmonary bypass (full/partial/left-heart) terminated
    - 50410 Cardiopulmonary bypass initiated (full/partial/left-heart)
    - 50416 Cardiopulmonary bypass -- crossclamp and circulatory arrest time totals
    - 50417 Cardiopulmonary bypass -- Access cannula removed note
    - 50714 Cardiopulmonary bypass - Full/partial/left-heart bypass start / stop event
    - Performed under the cardiac surgical service (MPOG Concept ID: 80005, 80031, 80036, 80088, 80118)

## **Step 2: Determine if the case meets EP/Cath criteria**

- **Exclude if:**

- Anesthesia CPT: 00500-00529 or 00540-00548 thoracic procedures for non-cardiac surgeries
- Anesthesia CPT: 00550 sternal debridement
- Anesthesia CPT: 00796 for liver transplant
- Anesthesia CPT: 00868 for kidney transplant
- Anesthesia CPT: 01990 for organ harvest
- Procedure text contains "Port-A-Cath"
- Surgical service is:
  - 80003: neurosurgery
  - 80009: orthopedics
  - 80023: urology
  - 80033: pediatric neurosurgery
  - 80034: pediatric orthopedics
  - 80035: pediatric urology
  - 80017 Medical-Gastroenterology
- Surgical CPTs include (shoe-in transcath CPTs to bump to next bin):
  - 92986
  - 92987
  - 92990
  - 93580-93592
  - 33340
  - 33361-33364
  - 33418-33420
  - 33477
  - 33880-33891
  - 33990-33993

- **Include if:**

1. These Anesthesia CPTs are present:

- 00530 pacemaker insertion
- 00534 cardioverter/defib
- 00537 cardiac electrophys
- 01920 catheterize heart
- If Anesthesia 01926 or 01922 CPTs are present, include if procedure text includes "Transesophageal echo" or "ECHO TEE" UNLESS procedure text includes ("endovascular" AND ("thoracic aortic" or "thoracic aorta" or "TAA")) OR "valv" OR "TAVR" or "transcatheter aortic" or "TEVAR" or "Mitral Clip" or "MitraClip" or "Mitral Valv Clip" or "Mitra Clip" or "Tricuspid Clip" or "Tricuspid Valv Clip"

2. If these surgical CPTs are present:

<b>Cardiac Surgical CPT Code</b>	<b>Text Description of CPT Code</b>
33016-33019	pericardiocentesis and pericardial drainage with insertion of indwelling catheter
33202-33275	Pacemaker or Implantable Defibrillator Procedures

33285-33286	Introduction or Removal of Subcutaneous Cardiac Rhythm Monitor
33289	Implantation of Hemodynamic Monitor
92920-92979	Therapeutic Cardiovascular Services and Procedures on the Coronary Vessels
92950***- -92985	Other Therapeutic Cardiovascular Services and Procedures
92998	Other Therapeutic Cardiovascular Services and Procedures
93451- 93533	Cardiac Catheterization and Associated Procedures
93600- 93662	Intracardiac Electrophysiological Procedures/Studies

\*\*\*If CPT 92950 is present, include if another surgical CPT in this list is present or another anesthesia CPT in the EP/Cath list is present

3. Procedure text:

- "PEDCATH" "PED CATH" "CATHPED" "CATH PED" - can be an ICD implantation or a transcatheter, but should be EP/Cath still

4. If procedure text include ONLY: "Cardioversion" "Echocardiogram" "echo" "transesophageal echo" "transesophageal echocardiogram" or "TEE" AND was performed under one of these procedure services:

80005 Cardiac  
80088 Cardiothoracic  
80118 Cardiothoracic-vascular  
80016 Medical - cardiology  
80031 Pediatric Cardiac Surgery  
80044 Pediatric Cardiology  
80036 Pediatric Cardiothoracic Surgery  
80000 Surgical Service - Not specified  
80014 Surgical service - other, not listed

- Do NOT include if procedure text includes "endovascular" AND ("thoracic aortic" or "thoracic aorta" or "TAA") or "valve" or "valv" or "TAVR" or "transcatheter aortic" or "TEVAR" or "Mitral Clip" or "MitraClip" or "Mitral Valve Clip" or "Mitra Clip" or "Tricuspid Clip" or "Tricuspid Valve Clip", "percutaneous mitral valve", "percutaneous tricuspid valve" are also present in the text

1. Procedural service:

- 80016 - medical, cardiology
- 80044 - pediatric cardiology

**Step 3: Determine if the case meets Transcatheter/Endovascular criteria**

- Exclude if:
  - Anesthesia CPT: 00550 sternal debridement
  - Anesthesia CPT: 00796 for liver transplant
  - Anesthesia CPT: 00868 for kidney transplant
  - Anesthesia CPT: 01990 for organ harvest
  - Surgical Services:

- 80003: neurosurgery
- 80009: orthopedics
- 80023: urology
- 80033: pediatric neurosurgery
- 80034: pediatric orthopedics
- 80035: pediatric urology
- 80017 Medical-Gastroenterology

• Include if:

1. Anesthesia CPTs 01926 or 01922 are present, AND procedure text includes ("endovascular" AND ("thoracic aortic" or "thoracic aorta" or "TAA")) or "valv" or "TAVR" or "transcatheter aortic" or "TEVAR" or "Mitral Clip" or "MitraClip" or "Mitral Valv Clip" or "Mitra Clip" or "Tricuspid Clip" or "Tricuspid Valv Clip", "percutaneous mitral valv", "percutaneous tricuspid valv"
  - If procedure text includes "endovascular repair of abdominal aort" or "endovascular abdominal aort" or if JUST "EVAR" or "FEVAR" (not "TEVAR") is present then move to non-cardiac
2. Surgical CPTs are present, include

<b>Cardiac Surgical CPT Code</b>	<b>Text Description of Surgical CPT Code</b>
33340	Surgical Procedures on the Heart (Including Valves) and Great Vessels Continued (perc. LAA)
33361-33364	Surgical Procedures on Cardiac Valves (Transcatheter aortic valve)
33418-33420	Surgical Procedures on Cardiac Valves Cont. (Transcath mitral valves)
33477	Surgical Procedures on Cardiac Valves Cont. (transcath pulmonic valve)
33880-33891	Endovascular Repair Procedures of the Descending Thoracic Aorta
33990-33993	Cardiac Assist Procedures (perc. Assist device)
92986	Balloon aortic valvuloplasty CPT code and balloon aortic valvuloplasty work RVU / balloon aortic valvuloplasty
92987	Balloon mitral valvuloplasty CPT code and balloon mitral valvuloplasty work RVU / balloon mitral valvuloplasty
92990	Balloon pulmonary valvuloplasty CPT code and balloon pulmonary valvuloplasty work RVU / balloon mitral valvuloplasty
93580-93592	Repair Procedures of Structural Heart Defect



3. IF surgical CPTs are not present, include IF the anesthesia CPT is a cardiac case without a pump (00560) AND these procedure text items without use of bypass notes:

- Procedure text: "transcatheter", "TAVR", "MitraClip", "Mitra Clip", "Mitral Clip", "Mitral Valv Clip", "Tricuspid Clip", "Tricuspid Valv Clip", "percutaneous mitral valv", "percutaneous tricuspid valv"
- Without:
  - 50399 Cardiopulmonary bypass -- aortic clamp on/off note
  - 50409 Cardiopulmonary bypass (full/partial/left-heart) terminated
  - 50410 Cardiopulmonary bypass initiated (full/partial/left-heart)
  - 50416 Cardiopulmonary bypass -- crossclamp and circulatory arrest time totals
  - 50417 Cardiopulmonary bypass -- Access cannula removed note
  - 50714 Cardiopulmonary bypass - Full/partial/left-heart bypass start / stop event

#### **Step 4: Determine if the case meets Other Cardiac criteria**

- Exclude if:
  - Anesthesia CPT: 00796 for liver transplant
  - Anesthesia CPT: 00868 for kidney transplant
  - Anesthesia CPT: 01990 for organ harvest
  - Anesthesia CPT: 00500-00540 thoracic procedures for non-cardiac surgeries
  - Anesthesia CPT: 00700-00797 for upper abdominal procedures
  - Procedure text includes **only:** 'emergent intubation', 'emergently intubated', 'FLOOR/ICU INTUBATION', 'EMERGENT INTUBATION', 'emergency Intuba on', 'intuba on', 'INTUBATION – EMERGENT', and 'Intuba on out of OR'. Text searching is not case-sensitive and must be exact.
  - Procedure text includes **only:** "Nerve Block" or "RAAPS Nerve Block"
  - Surgical Services:
    - 80003: neurosurgery
    - 80009: orthopedics
    - 80023: urology
    - 80033: pediatric neurosurgery
    - 80034: pediatric orthopedics
    - 80035: pediatric urology
    - 80017 Medical-Gastroenterology
- Include if:
  1. Anesthesia CPT: 00550 sternal debridement
  2. If **predicted** CPT is 00550, include in other cardiac (overriding any primary CPT)
  3. These surgical CPTs are present:

Cardiac Surgical CPT Code	Text description of Surgical CPT code (CPT Code Range 33016- 33999)
33016-33019	Pericardiocentesis and pericardial drainage with insertion of indwelling catheter
33025	Creation of pericardial window or partial resection for drainage
35820***	Exploration for postoperative hemorrhage, thrombosis or infection
35840***	Exploration for postoperative

	hemorrhage, thrombosis or infection
33365-33369	Surgical Procedures on Cardiac Valves (transcatheter AVR via open approach with and without bypass)
33320	Surgical Procedures on the Heart (Including Valves) and Great Vessels (suture repair w/o shunt or bypass)
33330	Surgical Procedures on the Heart (Including Valves) and Great Vessels Continued (graft without shunt or bypass)
33946-33959	Extracorporeal Membrane Oxygenation or Extracorporeal Life Support Services and Procedures
33962-33974	Cardiac Assist Procedures (ECMO and IABP)
33984-33989	Cardiac Assist Procedures (ECMO and IABP)
33999	Other Cardiac Surgery Procedures

\*\*\* If CPTS 35820 and 35840, they must also have another cardiac open, cardiac ep/cath, cardiac transcath/endovasc or cardiac other surgical CPT, anesthesia CPT, or have another indicator of a cardiac case as listed below:

- 50399 Cardiopulmonary bypass -- aortic clamp on/off note
  - 50409 Cardiopulmonary bypass (full/partial/left-heart) terminated
  - 50410 Cardiopulmonary bypass initiated (full/partial/left-heart)
  - 50416 Cardiopulmonary bypass -- crossclamp and circulatory arrest time totals
  - 50417 Cardiopulmonary bypass -- Access cannula removed note
  - 50714 Cardiopulmonary bypass - Full/partial/left-heart bypass start / stop event
4. IF the anesthesia CPT is 00560, and a cardiac surgical service was documented, AND procedure text does NOT include "intracran" or "crani" or "liver transplant" or "hepatic transplant"
- Performed under the cardiac surgical service (MPOG Concept ID: 80005, 80031, 80036, 80088, 80118)
5. If any of the above (for Cardiac Open, EP/Cath, or Transcath.) PREDICTED or ACTUAL Surgical or Anesthesia CPTs are present, but the cases were removed due to other exclusions, include these cases in Cardiac Other

**Final Step: Determine the final category based on the hierarchy below (apply rules in this order). If a case meets criteria for more than one category, assign it to the category closest to the top of the list. If the case does not meet criteria listed in steps 1-4, will determine case to be non-cardiac.**

1. Open Cardiac
2. EP/Cath
3. Transcatheter/Endovascular
4. Other Cardiac
5. Non-Cardiac

## Dependencies

Halogenated Anesthetic Gases (Yes / No)

## Procedure Type: ECT

### Description

This phenotype determines if a case was electroconvulsive therapy (ECT).

### Limitation

to be added

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	Case was not Electroconvulsive Therapy
Yes	1	Case was Electroconvulsive Therapy

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

If case has any of the following, this phenotype will return a value of 'Yes':

- Anesthesia CPT - 00104
- Procedure text - 'electroconvulsive', 'ECT'

### Dependencies

Age (Years)	Anesthesia CPT (Primary)
Anesthesia CPT (Measures)	Surgical CPT (Primary)
Anesthesia Start	Procedure Text

## Procedure Type: Endoscopy

### Description

This phenotype determines whether a case was a Endoscopic procedure using logic based upon a combination of Anesthesia CPT codes and procedure text.

### Limitation

Cases where the endoscopy was performed though a PEG or ostomy will not be included in this phenotype.

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	The case did not have an Endoscopic procedure
Yes	1	The case did have an Endoscopic procedure

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

**Step 1.** Was case classified as non-operative procedure. If Yes, mark No. If No, proceed to step 2.

**Step 2.** Check if the case matches its Primary Anesthesia CPT OR Primary Surgical CPT with the list of CPT codes below. If the case doesn't have a surgical or anesthesia CPT code, use predicted anesthesia cpt value\_code 1. If yes, proceed to step 5. If no procedure to step 3.

- **Anesthesia CPT:** 00731, 00732, 00740, 00810, 00811, 00812, 00813,
- **Surgical CPT:** 43200, 43201, 43202, 43204, 43205, 43215, 43216, 43217, 43219, 43220, 43226, 43227, 43228, 43231, 43232, 43260, 43261, 43262, 43263, 43264, 43265, 43267, 43268, 43269, 43271, 43272, 43234, 43235, 43236, 43237, 43238, 43239, 43240, 43241, 43242, 43243, 43244, 43245, 43246, 43247, 43248, 43249, 43250, 43251, 43255, 43256, 43257, 43258, 43259, 47553, 47554, 47555, 47556, 44380, 44382, 44383, 44385, 44386, 44388, 44389, 44390, 44391, 44392, 44393, 44394, 44397, 45330, 45331, 45332, 45333, 45334, 45335, 45337, 45338, 45339, 45340, 45341, 45342, 45345, 45355, 45378, 45379, 45380, 45381, 45382, 45383, 45384, 45385, 45386, 45387, 45391, 45392, 44360, 44361, 44363, 44364, 44365, 44366, 44369, 44370, 44372, 44373, 44376, 44377, 44378, 44379

**Step 3.** Does the case have the following procedure text? If No, mark no. If Yes, proceed to step 4.

- COL, EGD, Endo ERCP, Endoscopic Retrograde Cholangiopancreatography, EUS, endoscopic ultrasound, flex sig **OR**
- Text that **begins** with the text on the list below **and ends** in **-scopy**.
  - Ana, ano, chol, colo, duoden, edo, end, enter, etra, esoph, esph, gastro, ileo, illeo, jeju, lanr, lary, lay, loop, naso, pancr, panendo, phar, pro, sial, sigm, simo, sinu,

**Step 4.** Was **Anesthesia Technique: General** → No, inhaled only, or NMB only (value\_code 0, 4, or 5)? If Yes, then proceed to step 5. Else, No.

**Step 5.** Does the case have the following procedure text? If yes, mark No. Else, mark Yes.

- Ankle, bone, burn, carpal, emboliza on, hip, port, tube, uterus, wrist **OR**
- Text that begins with arthro-, bronch-, circ-, cysto-, fluro-, hyster-, Lary-, vagin- **OR**
- Text that ends with -plasty

## Dependencies

Airway Type Notes

Anesthesia CPT (All)

Anesthesia End

Anesthesia Start

Anesthesia Technique: General

GeneralNotes

Institution

MPOG Patient ID

Obstetric Anesthesia Type

Paralytics Used (All)

Procedure Text

Procedure Type: Non-Operative

## Procedure Type: Liver Transplant

### Description

This phenotype determines whether the case is a liver transplant using logic based upon a combination of anesthesia CPT codes, surgical CPT codes, procedure text and surgical service. This phenotype considers both actual CPT codes and predicted CPT codes (when actual CPT is missing for a case). The phenotype returns a Yes/No value code; for cases flagged as a Yes, the phenotype will also return the associated source text that triggered the Yes value.

### Limitation

This phenotype may flag cancelled cases.

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	Procedure was not a liver transplant
Yes	1	Procedure was a liver transplant

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Source_Text	varchar
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

Case **MUST** have at least **ONE** of the following:

Anesthesia CPT Codes:

00796 - Anesthesia for intraperitoneal procedures in upper abdomen including laparoscopy; liver transplant (recipient)

Note: if 00796 is predicted then the case must have at least one other supporting item (surgical CPT code, text value, or surgical service)

Surgical CPT Codes:

47135 - Liver allotransplantation; orthotopic, partial or whole, from cadaver or living donor, any age

47136 - Liver allotransplantation; heterotopic, partial or whole, from cadaver or living donor, any age

Procedure Text:

Contains 'liver' and either 'transplant' or 'txp'

Case **MUST** also be **ONE** of the following Surgical Service Concept IDs:

0 - Unknown Concept

80000 - Surgical Service - Not Specified

80001 - Surgical Service - other

80002 - Vascular

80005 - Cardiac

80006 - General

80014 - Surgical service - other, not listed

80017 - Medical - gastroenterology

80023 - Urology

80027 - Transplant

80088 - Cardiothoracic

80118 - Cardiothoracic-Vascular

Case **CANNOT** be ASA Class 6 or 6E

---

## Dependencies

Age (Years)

Anesthesia CPT (Measures)

Anesthesia Start

ASA Class

ASA Notes

Institution

MPOG Case ID

Anesthesia CPT (Primary)

Surgical CPT (Primary)

Procedure Text

## Procedure Type: Lung Transplant

### Description

This phenotype determines whether the case is a lung transplant using logic based upon a combination of surgical CPT codes, procedure text and surgical service. The phenotype returns a Yes/No value code; for cases flagged as a Yes, the phenotype will also return the associated source text that triggered the Yes value.

### Limitation

This phenotype may flag cancelled cases.

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	Procedure was not a lung transplant
Yes	1	Procedure was a lung transplant

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Source_Text	varchar
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

Case **MUST** have at least **ONE** of the following:

Surgical CPT Codes:



32851 - Lung transplant, single; without cardiopulmonary bypass

32852 - Lung transplant, single; with cardiopulmonary bypass

32853 - Lung transplant, double (bilateral sequential or en bloc); without cardiopulmonary bypass

32854 - Lung transplant, double (bilateral sequential or en bloc); with cardiopulmonary bypass

Procedure Text:

Contains 'lung' and either 'transplant' or 'txp'

Case **MUST** also be **ONE** of the following Surgical Service Concept IDs:

Surgical Service Concept ID:

0 - Unknown Concept

80000 - Surgical Service - Not Specified

80001 - Surgical Service - other

80005 - Cardiac

80013 - Thoracic

80014 - Surgical service - other, not listed

80027 - Transplant

80088 - Cardiothoracic

80118 - Cardiothoracic-Vascular

Case **CANNOT** be ASA Class 6 or 6E

---

## Dependencies

ASA Class

ASA Notes

Institution

MPOG Case ID

Surgical CPT (Primary)

Procedure Text

## Procedure Type: MRI

### Description

This phenotype is used in measures to exclude anesthesia procedures for diagnostic imaging.

### Limitation

This phenotype is limited by accuracy of procedure text and variable mappings.

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	Case was not Radiology procedure
Yes	1	Case was Radiology procedure

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Source_Text	nvarchar
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

This phenotype considers the following conditions. If any are present on a case, phenotype returns 'Yes'. Otherwise returns 'No'. One value per case is returned.

- CPT of 01922 - Anesthesia for non-invasive imaging or radiation therapy based on AnesthesiaCptsForMeasures phenotype result
- Has following MRI keywords in procedure text

- MRI
  - MR Head
  - MR Brain
  - MR Chest
  - MR Torso
  - MR Abdomen
  - MR Lumbar
  - MR Spine
  - MR Knee
  - MR Femur
  - MR Abd
  - OFFSITE - RADIOLOGY PROCEDURE
  - Room mapped to location tag "Radiology – MRI"
- 

## Dependencies

Anesthesia Start

Anesthesia CPT (Primary)

Procedure Text

## Procedure Type: Strabismus

### Description

This phenotype determines whether a case was a Strabismus procedure using logic based upon a combination of Anesthesia CPT codes and procedure text.

### Limitation

This phenotype may flag cancelled cases

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	Case was not Strabismus
Yes	1	Case was Strabismus

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Source_Text	varchar
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

Case must have one of the following:

- Procedure Text
  - 'eye' AND 'muscle'
  - 'strab'

- 'tropia'
- 'ocular'
- Actual or predicted Anesthesia CPT code 00140

and does not have procedure text 'cataract' or 'implant'

---

## Dependencies

Age (Years)

Anesthesia CPT (Measures)

Anesthesia Start

Anesthesia CPT (Primary)

Surgical CPT (Primary)

Procedure Text

## Procedure Type: TEE/Cardioversion

### Description

This phenotype determines whether a case was a TEE or cardioversion, including EP studies and cardiac ablation procedures, based on a combination of Anesthesia CPTs, Surgical CPTs, procedure text, and using the Procedure Type: Cardiac (new) phenotype.

### Limitation

May include cancelled cases.

### Value Type

**Categorical**

### Enumeration

Value	Value Code	Definition
No	0	Not Transesophageal Echo (TEE) or Cardioversion
Yes	1	Transesophageal Echo (TEE) or Cardioversion

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

### Granularity

**One value per case**

### Logic

**Step 1:** Does case match at least one Anesthesia CPT, Surgical CPT or Room Tag? If actual CPTs are not available, use predicted rank 1 CPTs. **If yes, go to Step 1a. If no, go to Step 2.**

Anesthesia CPT	Anesthesia CPT Description
00410	Anesthesia for procedures on the integumentary system on the extremities, anterior trunk

	and perineum; electrical conversion of arrhythmias
00537	Anesthesia for cardiac electrophysiologic procedures including radiofrequency ablation
01922*	Anesthesia for non-invasive imaging or radiation therapy

<b>Surgical CPT</b>	<b>Surgical CPT Description</b>
92960	Cardioversion, elective, electrical conversion of arrhythmia; external
93312	Echocardiography, transesophageal, real-time with image documentation (2D) (with or without M-mode recording); including probe placement, image acquisition, interpretation and report
93313	Echocardiography, transesophageal, real-time with image documentation (2D) (with or without M-mode recording); placement of transesophageal probe only
93600	Bundle of His recording
93602	Intra-atrial recording
93603	Right ventricular recording
93610	Intra-atrial pacing
93612	Intraventricular pacing
93618	Induction of arrhythmia by electrical pacing
93619	Comprehensive electrophysiologic evaluation with right atrial pacing and recording, right ventricular pacing and recording, His bundle recording, including insertion and repositioning of multiple electrode catheters, without induction or attempted induction of arrhythmia
93620	Comprehensive electrophysiologic evaluation including insertion and repositioning of multiple electrode catheters with induction or attempted induction of arrhythmia; with right atrial pacing and recording, right ventricular pacing and recording, His bundle recording
93624	Electrophysiologic follow-up study with pacing and recording to test effectiveness of therapy, including induction or attempted induction of arrhythmia
93631	Intra-operative epicardial and endocardial pacing and mapping to localize the site of tachycardia or zone of slow conduction for surgical correction
93640	Electrophysiologic evaluation of single or dual chamber pacing cardioverter-defibrillator leads including defibrillation threshold evaluation (induction of arrhythmia, evaluation of sensing and pacing for arrhythmia termination) at time of initial implantation or replacement ;
93641	Electrophysiologic evaluation of single or dual chamber pacing cardioverter-defibrillator leads including defibrillation threshold evaluation (induction of arrhythmia, evaluation of sensing and pacing for arrhythmia termination) at time of initial implantation or replacement; with testing of single or dual chamber pacing cardioverter-defibrillator pulse generator
93642	Electrophysiologic evaluation of single or dual chamber pacing cardioverter-defibrillator (includes defibrillation threshold evaluation, induction of arrhythmia, evaluation of sensing and pacing for arrhythmia termination, and programming or reprogramming of sensing or therapeutic parameters)
93650	Intracardiac catheter ablation of atrioventricular node function, atrioventricular

	conduction for creation of complete heart block, with or without temporary pacemaker placement
93651	Intracardiac catheter ablation of arrhythmogenic focus; for treatment of supraventricular tachycardia by ablation of fast or slow atrioventricular pathways, accessory atrioventricular connections or other atrial foci, singly or in combination
93652	Intracardiac catheter ablation of arrhythmogenic focus; for treatment of ventricular tachycardia

**Room Tag:** Service specific room - Electrophysiology/Cardiac cath

**Step 1a:** Is the predicted or actual Anesthesia CPT is 01922? **If yes, go to Step 1b. If no, go to Step 1c.**

**Step 1b:** Does the procedure text includes "Transesophageal echo", cardioversion, TEE, echo, or "ECHO TEE"? **If yes, go to Step 2. If no, result 'No' and stop.**

**Step 1c:** Does the case match on [room tag only](#)? **If yes, go to Step 1d. If no, go to Step 2.**

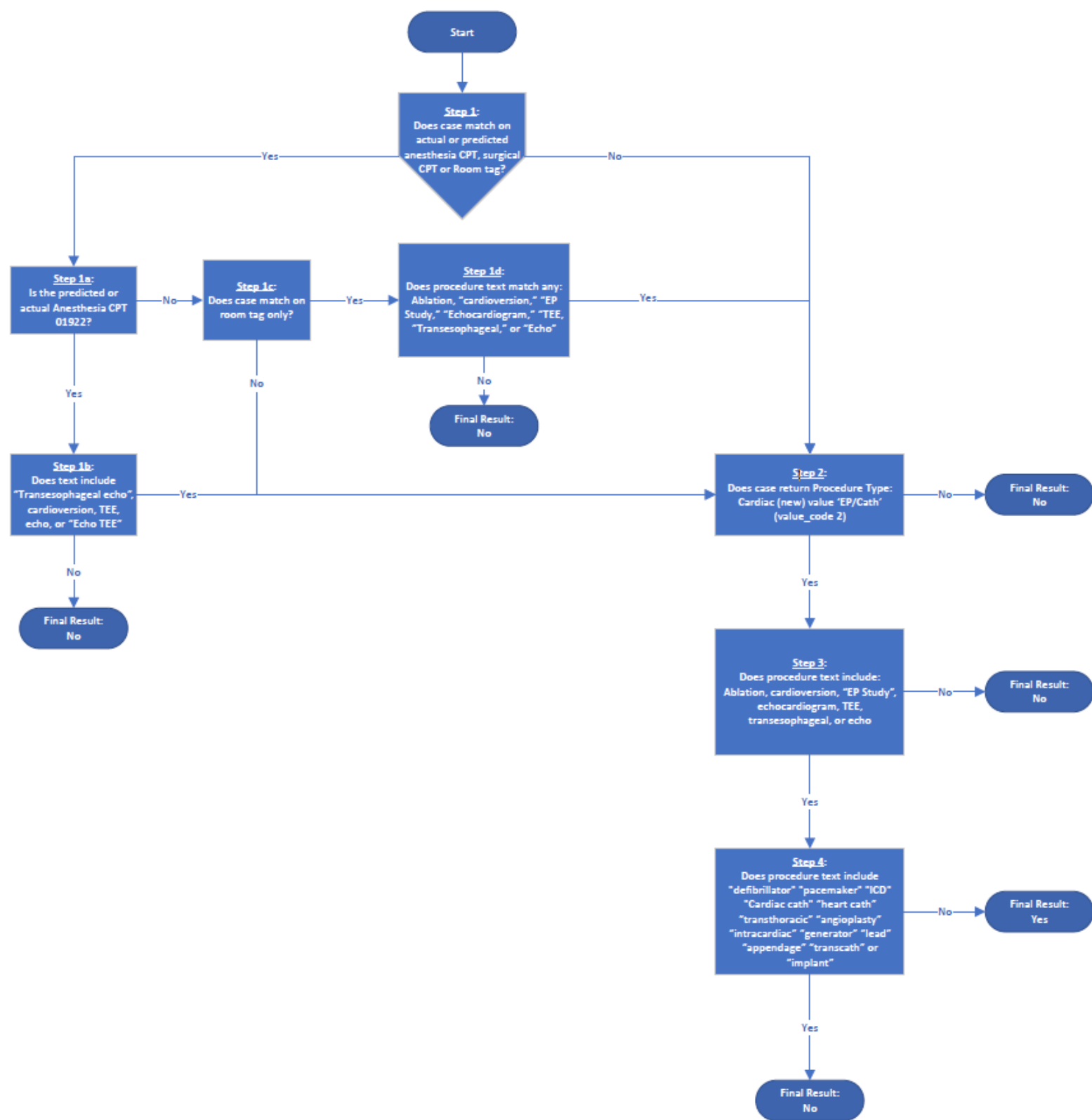
**Step 1d:** Does procedure text match any: Ablation, "Cardioversion", "EP study", "Echocardiogram", "TEE", Transesophageal, or Echo? **If yes, go to Step 2. If no, Result 'No' and stop.**

**Step 2:** Does case return [Procedure Type: Cardiac \(new\)](#) value 'EP/Cath' (value\_code 2)? **If Yes, continue to Step 3, if No, return No and stop.**

**Step 3:** Does procedure text include: Ablation, cardioversion, "EP Study", echocardiogram, TEE, transesophageal, or echo? **If yes continue to Step 4. If no, return No and stop.**

**Step 4:** Does procedure text include "defibrillator" "pacemaker" "ICD" "cardiac cath" "heart cath" "transthoracic" "angioplasty" "intracardiac" "generator" "lead" "appendage" "transcath" or "implant"? **If Yes, return No and stop. If No return Yes and stop.**





## Dependencies

Age (Years)

Airway Type Notes

Anesthesia CPT (All)

Anesthesia CPT (Measures)

Anesthesia Duration

Anesthesia End

Anesthesia Start

Anesthesia Technique: General

Arterial Line Used

GeneralNotes

Institution

Location Tags

MPOG Patient ID

Obstetric Anesthesia Type

Paralytics Used (All)

Anesthesia CPT (Primary)

Procedure Text

Procedure Type: Cardiac (new)

Surgical CPTs (All)

Surgical Service

# Procedure Type: Tympanoplasty

## Description

This phenotype determines if a case includes tympanoplasty using logic based upon a combination of surgical CPT codes and procedure text.

## Limitation

to be added

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
No	0	Case was not Tympanoplasty
Yes	1	Case was a Tympanoplasty

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

**STEP I:** Check for surgery CPT codes. If any codes listed below have the same start date as case, assign yes. If no, proceed to step II.

Surgical CPT Code	Description
69603	Revision mastoidectomy; resulting in tympanoplasty

69631	Tympanoplasty without mastoidectomy , initial or revision; without ossicular chain reconstruction
69632	Tympanoplasty without mastoidectomy, initial or revision; with ossicular chain reconstruction
69633	Tympanoplasty without mastoidectomy, initial or revision; with ossicular chain reconstruction and synthetic prosthesis
69635	Tympanoplasty with antrotomy or mastoidotomy; without ossicular chain reconstruction
69636	Tympanoplasty with antrotomy or mastoidotomy; with ossicular chain reconstruction
69637	Tympanoplasty with antrotomy or mastoidotomy; with ossicular chain reconstruction and synthetic prosthesis
69641	Tympanoplasty with mastoidectomy; without ossicular chain reconstruction
69642	Tympanoplasty with mastoidectomy; with ossicular chain reconstruction
69643	Tympanoplasty with mastoidectomy; with intact or reconstructed wall, without ossicular chain reconstruction
69644	Tympanoplasty with mastoidectomy; with intact or reconstructed wall, with ossicular chain reconstruction
69645	Tympanoplasty with mastoidectomy; radical or complete, without ossicular chain reconstruction
69646	Tympanoplasty with mastoidectomy; radical or complete, with ossicular chain reconstruction
69650	Stapes mobilization
69660	Stapedectomy or stapedotomy with reestablishment of ossicular continuity, with or without use of foreign material
69661	Stapedectomy or stapedotomy with reestablishment of ossicular continuity, with or without use of foreign material; with footplate drill out
69662	Revision of stapedectomy or stapedotomy
69666	Repair oval window fistula
69667	Repair round window fistula
69670	Mastoid obliteration
69676	Tympanic neurectomy
69799	Unlisted procedure, middle ear

**STEP II:** Check Procedure text. If none of the following keywords are found, **assign No** and stop. If case matches on one keyword, proceed to step III.

- Tympanoplasty
- Mastoidectomy
- Cochlear

**Step III:** Check General Anesthesia Technique. If case returns General - ETT, assign Yes. If not, assign No.

## Dependencies

Airway Type Notes

Institution

Anesthesia End

Paralytics Used (All)

Anesthesia Start

Procedure Text

Anesthesia Technique: General

Surgical CPTs (All)

GeneralNotes

# ProcedureTypeIVF

## Description

This phenotype is used to determine if a case is an IVF procedure.

## Limitation

Accuracy of this phenotype is dependent on either the accuracy of CPT billing codes or room location mapping. If a procedure takes place outside of a specific IVF procedure room, then IVF procedure room tagging will not be applicable. Surgical CPT billing codes are not available for all sites, in which case this phenotype would not be able to identify those cases based on CPTs.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	De nition
No	0	Case is not an IVF procedure
Yes	1	Case is an IVF procedure

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Source_Text	nvarchar
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

Evaluate for the following criteria:

1. Evaluate the result of the 'Anesthesia CPTs for Measures' phenotype. If 58970, 58974, or 58976 are present, then assign result 'Yes'
2. Evaluate room location tagging. If 'Room (IVF)' tag is present, then assign result 'Yes'

If neither criteria are present, then assign result 'No'

---

## Dependencies

Age (Years)

Anesthesia CPT (Measures)

Anesthesia Start

Anesthesia CPT (Primary)

# Propofol Infusion

## Description

Determines if the propofol infusion was a meaningful part of the anesthesia technique for the case. Includes both a dose based requirement (= 40 mcg/kg/min or equivalent) and a time based requirement (= 50% of case duration).

This does not imply a Total Intravenous Anesthetic Technique was used.

## Limitation

Only examines propofol charted in mcg/kg/min

Other units are considered non-valid and not used. A propofol infusion must be documented in mcg/kg/min to be counted.

Requires propofol to be administered at a dose = 40 mcg/kg/min.

Total duration of infusion must be = 50% of Case Duration (mins)

Does NOT imply the absence of volatile anesthetic or nitrous oxide.

Does NOT imply a general anesthetic was employed.

## Value Type

### Categorical

## Enumeration

Value	Value Code	Definition
No	0	
Yes	1	

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

Logic

- 1. Using the Concept Propofol (MPOG Concept ID: 10377) obtain all the cases where a Propofol infusion was used.
- 2. Obtain Case Duration (in minutes)
- 3. Calculate total propofol infusion duration (in minutes):
  - Between Case Start and Case End
  - Propofol is documented at a dose = 40mcg/min
  - Missing end times are inferred as being the first of either:
    - Dose Change
    - Case End
- 3. Compare propofol infusion duration to case duration.
  - If the propofol infusion (minutes) is documented for = 50% of case duration (minutes) return 1 else return 0

Dependencies

Airway Type Notes	Intubation Time
Anesthesia CPT (All)	MPOG Patient ID
Anesthesia Duration	Obstetric Anesthesia Type
Anesthesia End	Paralytics Used (All)
Anesthesia Start	Patient Out Of Room Date/Time
Anesthesia Technique: General	Patient In Room Date/Time
xRetiredx Arrived Intubated to the OR	Procedure Text
Case Duration	Surgery End
Case End	Surgery Start Date/Time
Case Start	
Data Capture Start	
Extubation Times	
GeneralNotes	
Induction End	
Induction Start	
Institution	



# Race

## Description

Race or Ethnicity of the patient.

## Limitation

to be added

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Unknown race	0	Unknown race
Hispanic, white	1	Hispanic, white
Hispanic, black	2	Hispanic, black
Hispanic, unknown color	3	Hispanic, unknown color
Black, not of hispanic origin	4	Black, not of hispanic origin
White, not of hispanic origin	5	White, not of hispanic origin
American Indian or Alaska Native	6	American Indian or Alaska Native
Asian or Pacific Islander	7	Asian or Pacific Islander
Bi or Multi Racial	8	Bi or Multi Racial
Middle Eastern	9	Middle Eastern
Other, race not listed	10	Other, race not listed

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

---

## Granularity

### One value per case

---

## Logic

A new race\_ethnicity value will be created as a categorical variable will be made per the following logic:

- 0 = Unknown race (MPOG Concept ID = 4000)
  - 1 = Hispanic, White (MPOG Concept ID = 4001)
  - 2 = Hispanic, Black (MPOG Concept ID = 4002)
  - 3 = Hispanic, Color Unknown (MPOG Concept ID = 4003)
  - 4 = Black, not of Hispanic Origin (MPOG Concept ID = 4004)
  - 5 = White, not of Hispanic Origin (MPOG Concept ID = 4005)
  - 6 = American Indian or Alaska Native (MPOG Concept ID = 4006)
  - 7 = Asian or Pacific Islander (MPOG Concept ID = 4007)
  - 8 = Bi or Multiracial (MPOG Concept ID = 4008)
  - 9 = Middle Eastern (MPOG Concept ID = 4009)
  - 10 = Other race not listed (MPOG Concept ID = 4050)
- 

## Dependencies

No dependency available.

## Sex

### Description

Provides the documented sex of the patient in a given case at the time of the case.

### Limitation

Does not reflect gender as much as the sex of the individual. The distinction between sex and gender differentiates sex (the anatomy of an individual's reproductive system and secondary sex characteristics) from gender, which can refer to either social roles based on the sex of the person (gender role) or personal identification of one's own gender based on an internal awareness.

### Value Type

#### Categorical

### Enumeration

Value	Value Code	Definition
Unknown	-1	There is conflicting data that is not identifiable as "male" or "female"
Male	0	The sex of this patient is "male"
Female	1	The sex of this patient is "female"

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

### Granularity

#### One value per case

### Logic

This collation looks at the pre-op note and determines if the patient is identified as a "M" (returns a 0) or a "F" (1).

If there is alphanumeric entry but does not identify as "male" or "female" this collation returns an "unknown" (-1)

### Dependencies

No dependency available.



## Surgery End

### Description

Return the documented date/time of documented procedure/surgery end.

### Limitation

Dependent on proper documentation.

### Value Type

**Datetime**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

### Granularity

**One value per measure result**

### Logic

This phenotype looks for the Procedure End Date/Time (MPOG Concept ID: 50007) documented in the case starting from anesthesia start (MPOG Concept ID: 50002) and looks up to 1 hour after anesthesia end (MPOG Concept ID: 50009) as long as the documentation was not deleted. If multiple Procedure End Date/Times exist, will return the latest.

### Dependencies

Anesthesia End

Anesthesia Start

# Surgery Start Date/Time

## Description

This phenotype returns the documented date/time of procedure start for each case. One value per case.

## Limitation

Sites must map to specific MPOG concepts to be identified by this phenotype. See logic section for concepts included in this phenotype.

This phenotype only results "observed" dates and times. "Observed" dates and times are those that are explicitly entered or documented in the record and must be documented as part of the note. MPOG will not default to the "time entered" to determine case start. "Time entered" reflects the time that the documentation was written, and not necessarily the time that care was provided.

## Value Type

**Datetime**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	datetime

## Granularity

**One value per case**

## Logic

This phenotype assesses the case for documentation mapped to Procedure Start Date/Time (MPOG Concept ID: 50006) and Surgical Incision Time (MPOG Concept ID: 50235), and returns the earliest date/time as long as the documentation was not deleted. Concepts between Anesthesia Start (MPOG Concept ID: 50002) and Anesthesia End (MPOG Concept ID: 50009) are considered. If no procedure start or incision time is found between anesthesia start and anesthesia end, the phenotype will look for a procedure start or incision time documented within 1 hour before anesthesia start and then select the time closest to the anesthesia start time. If the procedure start or incision is not found, it will return NULL. Only the observed date/time will be used; entered time is not considered for this phenotype.

## Dependencies

Anesthesia End

Anesthesia Start



## Surgical CPTs (All)

### Description

Returns all of the surgical CPTs listed for each individual operative case.

### Limitation

Not all procedures are reported with CPT codes. There exist errors in CPT reporting from individual sites.

### Value Type

**Not Set**

### Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Rownum	int
Value	varchar

### Granularity

**Many values per case**

### Logic

Gathers all Surgical CPT for each operative case. Crosswalks all Surgical CPTs to Anesthesiology CPTs. Returns all surgical CPTs in the value column. The rownum is the priority of the surgical CPT ordered by crosswalk MPOG anesthesia CPT base units.

### Dependencies

No dependency available.

# Tidal Volume Actual (Median)

## Description

Returns a single value as the median for the Tidal Volume Actual (MPOG concept id: 3190) for a case, among valid tidal volumes.

## Limitation

There is no age limitations for this collation, but there are bounds on valid values as described in the logic section. The number of recordings are not limited, so the mean can represent a lot of data points, or few, for a given case.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Median	numeric
MPOG_Case_ID	uniqueidentifier
Row_Count	int

## Granularity

**One value per case**

## Logic

Median for the Tidal Volume Actual (MPOG concept id: 3190) for a case, among valid tidal volumes.

A tidal volume is noted to be valid, if the following conditions are true:

- 1) ETCO<sub>2</sub>  $\geq$  5 mmHg
- 2) Peak Inspiratory Pressure  $\geq$  5 cm H<sub>2</sub>O
- 3) Tidal Volume Actual  $\geq$  100 mL and  $\leq$  2000
- 4) The above conditions are true for 3 consecutive minutes, following the time of measurement.

## Dependencies

Airway Type Notes

Anesthesia CPT (All)

Anesthesia End

Anesthesia Start

Anesthesia Technique: General

xRetiredx Arrived Intubated to the OR

Case End

Case Start

Data Capture Start

Extubation Times

GeneralNotes

Induction End

Induction Start

Institution

Intubation Time

MPOG Patient ID

Obstetric Anesthesia Type

Paralytics Used (All)

Patient Out Of Room Date/Time

Patient In Room Date/Time

Procedure Text

Surgery End

Surgery Start Date/Time

Tidal Volume Actual



# Tidal Volume Set (Median)

## Description

Median for the Tidal Volume Set (MPOG concept id: 3192) for a case, among valid tidal volumes.

## Limitation

There is no age limitations for this collation, but there are bounds on valid values as described in the logic section. The number of recordings are not limited, so the mean can represent a lot of data points, or few, for a given case.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
Median	numeric
MPOG_Case_ID	uniqueidentifier
Row_Count	int

## Granularity

**One value per case**

## Logic

Median for the Tidal Volume Set (MPOG concept id: 3192) for a case, among valid tidal volumes. A SET tidal volume is noted to be valid, if  $\geq 100$  mL and  $\leq 2000$  mL

## Dependencies

Airway Type Notes	Extubation Times	Patient In Room Date/Time
Anesthesia CPT (All)	GeneralNotes	Procedure Text
Anesthesia End	Induction End	Surgery End
Anesthesia Start	Induction Start	Surgery Start Date/Time
Anesthesia Technique: General	Institution	Tidal Volume Set
xRetiredx Arrived Intubated to the OR	Intubation Time	
Case End	MPOG Patient ID	
Case Start	Obstetric Anesthesia Type	
Data Capture Start	Patient Out Of Room Date/Time	

# Total Colloid Administered

## Description

This phenotype returns the sum total of the colloids used in the intraoperative case, returned in mL. Colloids include those listed in the concept subset "colloids" and includes albumin and starch solutions.

Included Concepts:

ALBUMIN 25%

ALBUMIN 5%

HETASTARCH

PENTASTARCH

ALBUMIN 20%

HYDROXYETHYL STARCH 130/0.4 6% IN 0.9% SALINE (VOLUVEN)

HYDROXYETHYL STARCH 6% IN LACTATED SOLUTION (HEXTEND)

This collation DOES NOT take into account the relative potency of the administered colloids. It returns raw mL's of colloids administered within a case.

### Version History:

1/22/2018:

- This phenotype was previously published as "Colloids".
- This phenotype was renamed when a potency adjusted Colloid collation was created.

9/27/2021

- Restriction of maximum of 20L per component type added
- Explicit restriction to within Anesthesia Start + Stop added.

## Limitation

See below for full details of conversion factors used.

If the unit of measure does not appear below then it is not used.

Applies to all ages.

Excludes negative values or values charted as 0 mL.

Only examines colloids administered between anesthesia start + stop

## Value Type

**Numeric**

## Return Columns

--	--

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

To obtain this phenotype we analyze the unit of measure for the Colloid and do the appropriate conversion. Maximum contribution per colloid type is 20L

### Albumin 25%

Albumin 25% (g to mL) = g Amount / 0.25

Albumin 25% (mg to mL) = (mg Amount / 1000) / 0.25

Albumin 25% Units - ASSUMED TO BE 50ml

Albumin 25% mL = mL

Albumin 25% mL/hr = mL/hr \* (Time Stop - Time Start) CAPPED AT 250mL/Case.

For Albumin 25% in Puffs, mL/hr, mcg/kg/min, Other and Unknown assumed to be non-valid.

### Albumin 20%

Albumin 20% (g to mL) = g Amount / 0.2

Albumin 20% (mg to mL) = (mg Amount / 1000) / 0.2

Albumin 20% in mL = mL

Albumin 20% in L = L Value / 1000

For Albumin 20% in all other measures considered to be invalid.

### Albumin 5%

Albumin 5% in mL = mL

Albumin 5% in L = L Value/1000

Albumin 5% in mL/hr = mL/hr \* (Time Stop - Time Start).

Albumin 5% in g = g Amount / 0.05

For Albumin 5% in all other measures are considered to be invalid.

### Hetastarch

Hetastarch in mL = mL

Heatstarch in Units = Unit Number \* 500. Max 10 units/case.

Heatstarch in mL/hr = mL/Hr \* (Time Stop - Time Start)

For Hetastarch all other measures are considered to be invalid.

### HYDROXYETHYL STARCH 130/0.4 6% IN 0.9% SALINE (VOLUVEN)

Voluven in mL = mL

Voluven in L = L value / 1000

Voluven in mL/hr = mL/hr \* (Time Stop - Time Start)

### HYDROXYETHYL STARCH 6% IN LACTATED SOLUTION (HEXTEND)

Hextend in mL

Hextend in L = L Amount / 1000

Hextend in mL/Hr = mL/Hr \* (Time Stop - Time Start)

### **Pentastarch**

Pentastarch in mL

---

## **Dependencies**

Anesthesia End

Anesthesia Start

# Total Crystalloid Administered

## Description

Sum of all Crystalloids Used in the intraoperative portion of a specific case. For details of specific crystalloids see below.

### Version History:

9/27/2021

- Anesthesia Start/Stop Requirements clarified
- Maximum value of any component is 40L

## Limitation

Includes the concepts and units listed above below.

Does not include volumes used for medication administered (ie vasopressor infusions in 250ml D5 etc).

Infusion rates must be positive.

Only includes infusions/fluids between anesthesia start and stop.

Applies to all ages.

Returns one value per case.

Component fluids limited to 40L per case.

Excludes negative values or values charted as 0 mL.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

## Logic

### For All Fluids in Time Based Units:

Fluid start time is the later of Fluid Start Time or Anesthesia Start

Fluid stop time is the earlier of Fluid Stop Time or Anesthesia Stop

Infusion rates must be positive.

### Unit Conversions:

If the unit conversion is not listed, then it is not used for that fluid.

#### **SODIUM CHLORIDE 0.9%**

- SODIUM CHLORIDE 0.9% in mL = mL
- SODIUM CHLORIDE 0.9% in mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

#### **SALINE 3%**

- SALINE 3% in mL = mL
- SALINE 3% in mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

#### **SALINE 0.9%**

- SALINE 0.9% in mL = mL
- SALINE 0.9% in mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)
- SALINE 0.9% in mL/min converted to mL based on charted Start/Stop Time (subject to logic above)

#### **SALINE 0.45%**

- SALINE 0.45% in mL = mL
- SALINE 0.45% in mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)
- SALINE 0.45% in mL/min converted to mL based on charted Start/Stop Time (subject to logic above)

#### **LACTATED RINGERS**

- LACTATED RINGERS mL = mL
- LACTATED RINGERS mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

#### **NORMOSOL**

- NORMOSOL mL = mL
- NORMOSOL mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

#### **DEXTROSE / WATER 5%**

- DEXTROSE / WATER 5% mL = mL
- DEXTROSE / WATER 5% mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)
- DEXTROSE / WATER 5% g. Converted to mL:  $\text{g Amount} / 0.05$
- DEXTROSE / WATER 5% mg. Converted to mL:  $(\text{mg Amount} / 0.05) / 1000$

#### **DEXTROSE / LACTATED RINGERS 5%**

- DEXTROSE / LACTATED RINGERS 5% mL = mL
- DEXTROSE / LACTATED RINGERS 5% mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

#### **DEXTROSE / WATER 10%**

- DEXTROSE / WATER 10% mL = mL
- DEXTROSE / WATER 10% mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)
- DEXTROSE / WATER 10% in g. mL =  $\text{g Amount} * 10$

**SALINE W/KCL 0.45% + 20 MEQ/L**

- SALINE W/KCL 0.45% + 20 MEQ/L mL = mL
- SALINE W/KCL 0.45% + 20 MEQ/L mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**SALINE W/KCL 0.9% + 20 MEQ/L**

- SALINE W/KCL 0.9% + 20 MEQ/L mL = mL
- SALINE W/KCL 0.9% + 20 MEQ/L mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**DEXTROSE / SALINE 5% / 0.225%**

- DEXTROSE / SALINE 5% / 0.225% mL = mL
- DEXTROSE / SALINE 5% / 0.225% mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)
- For DEXTROSE / SALINE 5% / 0.225% all other charting units considered non-valid

**DEXTROSE / SALINE 5% / 0.45%**

- DEXTROSE / SALINE 5% / 0.45% mL = mL
- DEXTROSE / SALINE 5% / 0.45% mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)
- For DEXTROSE / SALINE 5% / 0.45% all other charting units considered non-valid.

**DEXTROSE / SALINE 5% / 0.9%**

- DEXTROSE / SALINE 5% / 0.9% mL = mL
- DEXTROSE / SALINE 5% / 0.9% mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**DEXTROSE / SALINE W/KCL 5% / 0.45% + 20 MEQ/L**

- DEXTROSE / SALINE W/KCL 5% / 0.45% + 20 MEQ/L mL = mL
- DEXTROSE / SALINE W/KCL 5% / 0.45% + 20 MEQ/L mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**DEXTROSE / SALINE W/KCL 5% / 0.9% + 20 MEQ/L**

- DEXTROSE / SALINE W/KCL 5% / 0.9% + 20 MEQ/L mL = mL
- DEXTROSE / SALINE W/KCL 5% / 0.9% + 20 MEQ/L converted to mL based on charted Start/Stop Time (subject to logic above)

**DEXTROSE / SALINE 10% / 0.45%**

- DEXTROSE / SALINE 10% / 0.45% mL = mL
- DEXTROSE / SALINE 10% / 0.45% mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**DEXTROSE 10% W/LR**

- DEXTROSE 10% W/LR mL = mL

**PLASMALYTE 148 W/DEXTROSE 5%**

- **Used only at columbia and not currently listed in AIMS\_IntraopInputOutput**

**PLASMALYTE 56**

- PLASMALYTE 56 mL = mL
- PLASMALYTE 56 mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**SALINE W/NAHCO<sub>3</sub> 0.45% + 150 MEQ/L**

- SALINE W/NAHCO<sub>3</sub> 0.45% + 150 MEQ/L in mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)
- SALINE W/NAHCO<sub>3</sub> 0.45% + 150 MEQ/L in mL = mL

**DEXTROSE / SALINE W/KCL 5% / 0.225% + 20 MEQ/L**

- DEXTROSE / SALINE W/KCL 5% / 0.225% + 20 MEQ/L in mL = mL
- DEXTROSE / SALINE W/KCL 5% / 0.225% + 20 MEQ/L in mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

DEXTROSE / SALINE W/KCL 5% / 0.45% + 40 MEQ/L - not used widely in MPOG database - Excluded

**DEXTROSE / SALINE W/KCL 10% / 0.225% + 20 MEQ/L**

- DEXTROSE / SALINE W/KCL 10% / 0.225% + 20 MEQ/L mL = mL
- DEXTROSE / SALINE W/KCL 10% / 0.225% + 20 MEQ/L mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**DEXTROSE / SALINE W/KCL 5% / 0.45% + 10 MEQ/L**

- DEXTROSE / SALINE W/KCL 5% / 0.45% + 10 MEQ/L mL = mL
- DEXTROSE / SALINE W/KCL 5% / 0.45% + 10 MEQ/L mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**DEXTROSE / SALINE 10% / 0.225%**

- DEXTROSE / SALINE 10% / 0.225% mL = mL
- DEXTROSE / SALINE 10% / 0.225% mL/Hr converted to mL based on infusion start/stop time
- DEXTROSE / SALINE 10% / 0.225% all other values considered non-valid

**SALINE W/KCL 0.9% + 40 MEQ/L**

- SALINE W/KCL 0.9% + 40 MEQ/L mL = mL

**SALINE 2%**

- SALINE 2% mL = mL
- SALINE 2% mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

**PLASMALYTE A (PH BALANCED)**

- PLASMALYTE A (PH BALANCED) mL = mL
- PLASMALYTE A (PH BALANCED) mL/hr converted to mL based on charted Start/Stop Time (subject to logic above)

---

## Dependencies

Anesthesia End

Anesthesia Start



# Total Estimated Blood Loss (EBL)

## Description

This returns in mL the sum of all recorded Estimated Blood Loss for the case as charted in the Intraoperative Record for a given case.

## Limitation

Converts mL and returns between 0mL and 250,000 mL.

Applies to all ages.

Captures EBL documented as occurring between anesthesia start and anesthesia stop.

Excludes negative values or charted as 0 mL.

If no data exists for a specific case, then either 0 mL charted or a grossly erroneous (ie negative or extremely high value) was calculated.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

**Aim:** Calculate Total Volume of EBL During a Case using values charted in MPOG Concept ID 10499

### Methods:

- 1) Convert all values to mL
- 2) Sum all values in Concept 10499 and report.

## Dependencies

Anesthesia End

Anesthesia Start



# Total Urine Output

## Description

Converts values to mL and sums to total. Returns is capped to values between 0 - 20,000 mL.

## Limitation

Urine > 20,000mL is considered non-valid

Uses only values charted in mL's.

Excludes negative values or values charted as 0 mL.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Sums all reported urine output for a case. Converted to mL.

## Dependencies

Anesthesia End

Anesthesia Start

# US Institution

## Description

This phenotype returns yes/no based on whether the institution where the case took place is based in the United States or not.

## Limitation

None

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
US Institution No	0	The case took place at an institution outside the United States.
US Institution Yes	1	The case took place at an institution based in the United States.

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

## Granularity

**One value per case**

## Logic

The US Institution phenotype maps to a "Yes" (1) or a "No" (0) response. Yes (1) indicates that case took place at an institution in the United States, and a No (0) indicates it took place at an institution that is not based on in the United States.

There should be no cases with an unknown/missing value.

## Dependencies

Institution



# Ventilator Respiratory Rate Actual (Median)

---

## Description

This phenotype determines the median of all non-artifact ventilator respiratory rate (actual) values captured between Case Start and Case End.

---

## Limitation

Only values mapped to the specific concept IDs included in the logic section during the specified time range will be used for calculation. This phenotype does not apply any ranges or logic to the values.

---

## Value Type

**Numeric**

---

## Return Columns

**Phenotype table not stored in database. No column returned.**

---

## Granularity

**One value per case**

---

## Logic

This phenotype returns the median value for ventilator respiratory rate (actual) using values mapped to MPOG concept 3195. Non-artifact values captured between case start and case end are used in determining the median value.

---

## Dependencies

No dependency available.



## Ventilator Respiratory Rate Set (Median)

---

### Description

This phenotype determines the median of all ventilator respiratory rate (set) values captured between Case Start and Case End.

---

### Limitation

Only values mapped to the specific concept IDs included in the logic section during the specified time range will be used for calculation. This phenotype does not apply any ranges or logic to the values.

---

### Value Type

**Numeric**

---

### Return Columns

**Phenotype table not stored in database. No column returned.**

---

### Granularity

**One value per case**

---

### Logic

This phenotype returns the median value for ventilator respiratory rate (set) using values mapped to MPOG concept 3198. Values captured between case start and case end are used in determining the median value.

---

### Dependencies

No dependency available.



# Waiting For Transport Duration

## Description

This phenotype returns the duration (minutes) from procedure end to when a patient is transported out of the procedure room.

## Limitation

Depends on proper documentation.

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	int

## Granularity

**One value per case**

## Logic

This phenotype calculates the difference between Patient out of room (MPOG concept ID 50008) and Procedure End (MPOG concept ID 50007).

## Dependencies

Anesthesia End

Anesthesia Start

Patient Out Of Room Date/Time

Surgery End

# Weekend

## Description

Returns a 1 if case occurred on a Weekend. Definition of weekend is Anesthesia Start Date occurred on a Saturday or Sunday. Returns a 0 if these conditions are not met.

## Limitation

Takes no account of Anesthesia End or Surgical Times, Out of Normal Hours (ie Nighttime surgery), or Holiday Status.

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Weekday	0	case occurred on a Monday through Friday
Weekend	1	case occurred on a Saturday or Sunday

## Return Columns

Column Name	Data Type
Is_Weekend	int
MPOG_Case_ID	uniqueidentifier
Value	varchar

## Granularity

**One value per case**

## Logic

Examines Anesthesia Start Date/Time. If this occurs on a Saturday or Sunday, then returns 1 else 0.

## Dependencies

Anesthesia Start

# Weight (kg)

## Description

Cleaned AIMS Weight and converted to kilograms (if needed)

## Limitation

none

## Value Type

**Numeric**

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	numeric

## Granularity

**One value per case**

## Logic

Valid weight range is considered 0.5-250kg

1. If case only reported weight in kilograms, use AIMS\_Weight\_kg and only include values [0.5-250]. If outside that range returns NULL value
2. If case only reported weight in pounds, use AIM\_Weight\_lb and multiply by 2.205 to convert to MPOG\_Weight\_kg. Valid ranges will be considered [0.5-250]. If outside that range returns NULL value

[ ] = inclusive (meaning including 0.5 and 250 kg values)

Age is determined in weeks (boundaryies are interpolated linerally from CDC growth charts) up to one month. After one month, the age is converted to months and the average of the surrounding months are averaged and used. For patients 20+ years of age, the 20-year-old bounds are used.

We omit all entries that are outside the CDC bounds based on age. Then, we take the **latest** weight in the period of one hour before and one hour after anesthesia start. If there are no valid entries in this time, we look 12 hours prior and 12 hours after anesthesia start and we take the **closest** valid entry to anesthesia start. Finally, if there were no entries in either of these windows, we look 30 days prior to anesthesia start and take the **closest** valid entry. If still no entries, we return NULL.

## Dependencies

Anesthesia End



# WHO BMI Classification

## Description

This collation is used to determine the body mass index (BMI) based on the World Health Organization classification

References:

1. [http://apps.who.int/bmi/index.jsp?introPage=intro\\_3.html](http://apps.who.int/bmi/index.jsp?introPage=intro_3.html)

## Limitation

Only available when both height and weight are non-missing and valid (from the BMI collation)

## Value Type

**Categorical**

## Enumeration

Value	Value Code	Definition
Missing	-999	BMI is <10 or >80, or BMI is NULL
Underweight	1	BMI is between [10-18.5)
Normal Weight	2	BMI is between [18.5-25)
Pre-Obese	3	BMI is between [25-30)
Obese class I	4	BMI is between [30-35)
Obese class II	5	BMI is between [35-40)
Obese class III	6	BMI is between [40-80]

## Return Columns

Column Name	Data Type
MPOG_Case_ID	uniqueidentifier
Value	varchar
Value_Code	int

---

## Granularity

**One value per case**

---

## Logic

This collation returns the WHO Classification for BMI. It takes the result of the BMI collation (a numerical value or a NULL) and categorizes it into the WHO classifications:

Underweight - BMI [10, 18.5)

Normal Weight - BMI [18.5, 25)

Pre-obese - BMI [25, 30)

Obese class 1 - BMI [30, 35)

Obese class 2 - BMI [35, 40)

Obese class 3 - BMI [40, 80]

---

## Dependencies

Anesthesia End

BMI

Height (cm)

Weight (kg)