BMC2

Voluntary PVI Report Dictionary

Updated with Q2 2020 report release

Patient Demographics/All Revascularizations

A PVI Discharge will be defined as "Any discharge containing a PVI procedure".

The demographic data listed below is reported at the discharge level, not at the procedure level.
Consider only PVI discharges. Where noted, procedures of other types may be considered as well, but even in these cases, the discharge will only be considered if it also includes at least one pvi procedure.

Discharges

The numerator is the total number of discharges containing a PVI procedure. The denominator is the same and will always equal 100%.

Average Age (mean, stdev)

Calculates the average (mean) age of each PVI patient (discharge record) as of the admission date.
Compare the birthdate listed in the discharge record with the admission date to compute the age of the patient at admission. Divide by the total number of PVI discharges.

Male Gender

The numerator is the number of PVI discharges with "Male" marked for Gender.
The denominator is the total number of PVI discharges.

Female Gender

The numerator is the number of PVI discharges with "Female" marked for Gender.
The denominator is the total number of PVI discharges

Ever Smoked

The numerator is the number of PVI discharges with "yes" marked for Ever Smoked.
The denominator is the total number of PVI discharges.

Current Smoker

The numerator is the number of PVI discharges with "yes" marked for Current Smoker.
The denominator is the total number of PVI discharges.

Hypertension

The numerator is the number of PVI discharges with "yes" marked for Hypertension.
The denominator is the total number of PVI discharges.

Hyperlipidemia

The numerator is the number of PVI discharges with "yes" marked for Hyperlipidemia.
The denominator is the total number of PVI discharges.

Diabetes Mellitus

The numerator is the number of PVI discharges with "yes" marked for Diabetes Mellitus.
The denominator is the total number of PVI discharges.

Cerebrovascular Disease (CVD)

The numerator is the number of PVI discharges with "yes" marked for Cerebrovascular Disease (CVD) or Transient Ischemic Attack (TIA).
The denominator is the total number of PVI discharges.

Coronary Artery Disease (CAD)

The numerator is the number of PVI discharges with "yes" marked for History of Coronary Artery Disease (CAD).
The denominator is the total number of PVI discharges.

Congestive Heart Failure (CHF)

The numerator is the number of PVI discharges with "yes" marked for Prior Congestive Heart Failure (CHF).
The denominator is the total number of PVI discharges.

Chronic Lung Disease (COPD)

The numerator is the number of PVI discharges with "yes" marked for Chronic Lung Disease (COPD).
The denominator is the total number of PVI discharges.

Renal Failure Currently Requiring Dialysis

The numerator is the number of PVI discharges with "yes" marked for Renal Failure Currently Requiring Dialysis.
The denominator is the total number of PVI discharges.
(Note that these patients are excluded from the CIN calculation.)

BMI (mean, stdev)

Calculates the average (mean) and standard deviation of each PVI Discharge's Body Mass Index (BMI).

BMI is defined as the weight in kilograms (on the discharge record) divided by the square of the height in meters (on the discharge record).

Note that height is currently captured in centimeters.

Creatinine (pre) >=1.5

The numerator is the number of PVI discharges in which, in the first procedure of any type, the patient was marked as having a Pre Procedure Creatinine of >= 1.5.
The denominator is the number of PVI discharges in which, in the first procedure of any type, there is a value for Pre Procedure Creatinine.

Anemia

The numerator is the number of PVI discharges in which, in the first procedure of any type, the patient was marked as having a Pre Procedure hemoglobin below the threshold. For men, the threshhold is 13. For women, it is 12.
The denominator is the number of PVI discharges in which, in the first procedure of any type, there is a value for Pre Procedure Hemoglobin.

(This matches the definition of anemia given by the World Health Organization. Source http://en.wikipedia.org/wiki/Anemia.)

Procedures

Data in this area is reported at the procedure level, rather than the discharge level. Each procedure may have more than one location.

For vessel location specifics, please reference Artery Man (see below).

Attachment	Size
Peripheral Arterial anatomy newest.pdf	414.42 KB

Procedures/All revascularizations

The numerator is the total number of PVI procedures.
The denominator is the same, so this will always show as 100%.

Procedures/Lower Extremity

The numerator is the number of PVI procedures with at least one Vessel Location in a lower extremity artery (Distal Aorta and below).
The denominator is the total number of PVI procedures.

Aorto-illiac

The numerator is the number of PVI procedures with at least one Vessel Location in an Aorto-Iliac Artery.
The denominator is the total number of PVI procedures.

Femoral popliteal

The numerator is the number of PVI procedures with at least one Vessel Location in an Femoral/Popliteal Artery.
The denominator is the total number of PVI procedures.

Below the knee

The numerator is the number of PVI procedures with at least one Vessel Location in an artery below the knee.
The denominator is the total number of PVI procedures.

Procedures/Other arterial beds

The numerator is the number of PVI procedures with at least one Vessel Location in an artery that is not in the lower extremity. This includes the upper extremity, renal, and mesenteric vessel locations.
The denominator is the total number of PVI procedures.

Subclavian

The numerator is the number of PVI procedures with at least one Vessel Location in a Subclavian artery (left or right).
The denominator is the total number of PVI procedures.

Left Subclavian

The numerator is the number of PVI procedures with at least one Vessel Location in in the Left Subclavian artery.
The denominator is the total number of PVI procedures.

Right Subclavian

The numerator is the number of PVI procedures with at least one Vessel Location in the Right Subclavian artery.
The denominator is the total number of PVI procedures.

Axillary

The numerator is the number of PVI procedures with at least one Vessel Location in an Axillary artery (left or right).
The denominator is the total number of PVI procedures.

Brachial

The numerator is the number of PVI procedures with at least one Vessel Location in a Brachial artery (left or right).
The denominator is the total number of PVI procedures.

Renal

The numerator is the number of PVI procedures with at least one location in a Renal Artery (left or right).
The denominator is the total number of PVI procedures.

Mesenteric

The numerator is the number of PVI procedures with at least one location in a Mesenteric Artery (Celiac, Superior Mesenteric, Inferior Mesenteric).
The denominator is the total number of PVI procedures.

Hybrid procedures

The numerator is the number of PVI procedures with "yes" marked for Hybrid Procedure.
The denominator is the total number of PVI procedures.

Outcomes in Lab

Discharges

The numerator is the total number of discharges containing a PVI procedure. The denominator is the same and will always equal 100%.

Death

The numerator is the number of PVI discharges with "yes" marked for Death in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Transfusion

The numerator is the number of PVI discharges with "yes" marked for Transfusion with PRBCs selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Vascular Complications

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication in Outcomesin Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Note: Multiple options may be selected.

Retroperitoneal Hematoma

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Retroperitoneal Hematoma selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Pseudoaneurysm

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Pseudoaneurysm selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Hematoma at access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Hematoma at Access Site selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Bleeding at access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Hematoma at Access Site selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

AV fistula

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with AV Fistula selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Acute thrombosis

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Acute Thrombosis selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Surgical repair of the vascular access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Surgical repair of the vascular access site selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Other

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Other selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Perforation

The numerator is the number of PVI discharges with "yes" marked for Perforation in Outcomes in lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Treatment successful

The numerator is the number of PVI discharges with "yes" marked for Perforation and "Successful" selected in Outcomes in Lab in any PVI procedure
The denominator is the total number of PVI discharges with "yes" marked for Perforation in Outcomes in Lab in any PVI procedure.

Treatment unsuccessful

The numerator is the number of PVI discharges with "yes" marked for Perforation and "Unsuccessful" selected in Outcomes in Lab in any PVI procedure
The denominator is the total number of PVI discharges with "yes" marked for Perforation in Outcomes in Lab in any PVI procedure.

Vascular Surgery Emergent

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Note: Multiple options may be selected.

Artery Rupture

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Artery Rupture selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Access Site Complication

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Access Site Complication selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Bleeding

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Bleeding selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Bowel Ischemia

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Bowel Ischemia selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Limb Ischemia

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Limb Ischemia selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Thrombosis/Embolus

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Thrombosis/Embolus selected in Outcomesin Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Other

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Other selected in Outcomes in Lab in any PVI procedure.
The denominator is the total number of PVI discharges.

Outcomes Prior to Discharge

A PVI Discharge will be defined as "Any discharge containing a PVI procedure". Consider only PVI discharges.

The outcome data listed below is reported at the discharge level, not at the procedure level.

Note: Discharges that contain multiple procedures/procedure types will have outcomes reported per discharge (any outcome in the discharge will appear on the report), not per procedure.

Discharges

The numerator is the total number of discharges containing a PVI procedure. The denominator is the same and will always equal 100%.

Death

The numerator is the number of PVI discharges with "yes" marked for Death in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Myocardial Injury

From 1/1/2019 - 8/19/2019 the following definition was in place.The numerator is the number of PVI discharges with "yes" marked for Myocardial Infarction (MI) in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

From 8/20/2019 and forward the definition is:
Numerator: The number of PVI discharges in which the patient was marked as having a Myocardial Injury post-procedure.
Denominator: The denominator is the total number of PVI discharges.

TIA/Stroke

The numerator is the number of PVI discharges with "yes" marked for TIA/Stroke in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Dissection

The numerator is the number of PVI discharges with "yes" marked for Dissection in Outcomes in Lab in any procedure of any type.
The denominator is the total number of PVI discharges.

Embolus (distal to treated segment)

The numerator is the number of PVI discharges with "yes" marked for Embolus in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Thrombosis (at treated segment)

The numerator is the number of PVI discharges with "yes" marked for Thrombus in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Vascular Surgery Emergent

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Note: Multiple options may be selected.

Artery Rupture

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Artery Rupture selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Access Site Complication

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Access Site Complication selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Bleeding

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Bleeding selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Bowel Ischemia

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Bowel Ischemia selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Limb Ischemia

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Limb Ischemia selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Thrombosis/Embolus

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Thrombosis/Embolus selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Other

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Emergent with Other selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Vascular Surgery Non-Emergent

The numerator is the number of PVI discharges with "yes" marked for Vascular Surgery Non-Emergent in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Infection/Sepsis

he numerator is the number of PVI discharges with "yes" marked for Infection/Sepsis in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Nephropathy Requiring Dialysis

The numerator is the number of PVI discharges with "yes" marked for New Requirement for Dialysis in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges in which "No" is marked for Renal Failure Currently Requiring Dialysis.

Contrast Induced Nephropathy

CIN is defined as post-procedure (peak, discharge, or post discharge) creatinine minus pre-procedure creatinine greater than or equal to .5.
CIN only applies to PVI or EVAR procedures.

Numerator: The number of PVI discharges in which all of the following things are true:

- At least one PVI procedure has a value for Pre Procedure Creatinine.
- The PVI procedure record (with a pre-creatinine value) has a value for Post Procedure Peak Creatinine or the discharge record has a value for Discharge Creatinine or Post Discharge Creatinine.
- If there exists a PVI procedure which has a Peak Creatinine filled in, then that procedure's Peak Creatinine minus that procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- If no PVI procedure has a Post Procedure Peak Creatinine, then there exists a PVI procedure such that the Discharge Creatinine minus a PVI procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- If no PVI procedure has a Post Procedure Peak Creatinine or Discharge Creatinine, then there exists a PVI procedure such that the Post Discharge Creatinine minus a PVI procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- The patient is not marked as having a history of renal failure currently requiring dialysis.
- The patient is not marked as having a history of renal transplant.
- In no procedure of any type is the patient marked as having an indication of renal salvage.
- The patient did not die in the lab in the CIN procedure.

Denominator: The number of PVI discharges in which all of the following things are true: (this is equivalent to "CIN Potential - see CIN report specifics)

- At least one PVI procedure has a value for Pre Procedure Creatinine.
- The PVI procedure record with a Pre Procedure creatinine has a value for Post Procedure Peak Creatinine or the discharge record has a value for Discharge Creatinine or Post Discharge Creatinine.
- The patient is not marked as having a history of renal failure currently requiring dialysis.
- The patient is not marked as having a history of renal transplant.
- In no procedure of any type is the patient marked as having an indication of renal salvage.
- The patient did not die in the lab.

Vascular Access Complications

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Note: Multiple options may be selected.

Retroperitoneal Hematoma

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Retroperitoneal Hematoma selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Pseudoaneurysm

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Pseudoaneurysm selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Hematoma at access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Hematoma at Access Site selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Bleeding at access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Bleeding at Access Site selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

AV fistula

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with AV Fistula selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Acute thrombosis

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Acute Thrombosis selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Surgical repair of the vascular access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Surgical repair of the vascular access site selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Other

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Other selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Transfusion

The numerator is the number of PVI discharges with "yes" marked for Transfusion with PRBCs selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

All discharges that contain a PVI procedure in which "yes" is marked for Hybrid and which received a transfusion of PRBCs Post Procedure are excluded from the numerator but left in the denominator.

Post Procedure Length of Stay (mean, median, stdev)

In PVI, all length of stay calculations count a same-day discharge as a stay of 1 day.
Computes the mean, median, and standard deviation of the number of days a patient remained hospitalized after their first procedure of *any* type. Computed as the discharge date minus the procedure date, plus one day. Consider only discharges in which there was at least one PVI procedure.

Length of Stay (mean, median, stdev)

In PVI, all length of stay calculations count a same-day discharge as a stay of 1 day.

Computes the mean, median, and standard deviation of the number of days a patient was hospitalized. Computed as the discharge date minus the admission date, plus one day. Consider only discharges that have at least one PVI procedure.

Amputation (planned)

The numerator is the number of PVI discharges with "yes" marked for Amputation in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.
Note: Multiple options may be selected.

Digit Amputation

The numerator is the number of PVI discharges with "yes" marked for Amputation with Right digit or Left digit selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges with "yes" marked for Amputation.

Metatarsal Amputation

The numerator is the number of PVI discharges with "yes" marked for Amputation with Right Metatarsal or Left Metatarsal selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges with "yes" marked for Amputation.

Foot Amputation

The numerator is the number of PVI discharges with "yes" marked for Amputation with Right Foot or Left Foot selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges with "yes" marked for Amputation.

Below Knee Amputation (BKA)

The numerator is the number of PVI discharges with "yes" marked for Amputation with Right BKA or Left BKA selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges with "yes" marked for Amputation.

Above Knee Amputation (AKA)

The numerator is the number of PVI discharges with "yes" marked for Amputation with Right AKA or Left AKA selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges with "yes" marked for Amputation.

Hip Disarticulation

The numerator is the number of PVI discharges with "yes" marked for Amputation with Right hip disarticulation or Left hip disarticulation selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges with "yes" marked for Amputation.

Additional Quality Indicators

Discharge Medications

Individual medications are listed below as sub-items. Each medication counts the number of PVI discharges in which the patient was given a medication at discharge.
Rate Calculation
(PVI Discharges in which the medication was given at discharge - exclusions) / (All PVI discharges - exclusions)

Excludes any PVI discharges in which the patient is marked, on the discharge medication record, as being contra-indicated for that med. Also excludes PVI discharges in which the patient is marked, in *any* procedure, as dying in lab or post-lab.

Discharges

The numerator is the total number of discharges containing a PVI procedure. The denominator is the same and will always equal 100%.

ACE Inhibitor / ARB

The numerator is the number of PVI discharges with "given" marked for ACE Inhibitor or ARB on the discharge medication record.
The denominator is the total number of PVI discharges.

Note: Discharges marked as contraindicated to either ACE inhibitors *or* ARBs *on the discharge medication record* will be excluded. They are also excluded if they are marked in any procedure as death in lab or death post procedure.

Anti-Platelets

Aspirin

The numerator is the number of PVI discharges with "given" marked for Aspirin on the discharge medication record.
The denominator is the total number of PVI discharges.

Note: Discharges marked as contraindicated to Aspirin *on the discharge medication record* will be excluded. They are also excluded if they are marked in any procedure as death in lab or death post procedure.

Any Anti-Platelet

The numerator is the number of PVI discharges in which, on the discharge medication record, one of the following is marked "given".

- Aspirin
- Clopidogrel (Plavix)
- Prasugrel (Effient)
- Ticlopidine (Ticlid)
- Ticagrelor (Brilinta)
- Cilostazol (Pletal)

The denominator is the number of PVI discharges in which the following are true:
* The patient did not die in lab or post procedure (in any procedure) OR
* The discharge record does not have "Hospice" or "Against Medical Advice" or "Other Acute Care Hospital" indicated for Discharge Status
  - AND -
* One of the above medications is marked "given" on the discharge medication record

NOTE: The only discharges that should be excluded due to contraindications are those individuals that are marked contraindicated to BOTH aspirin and clopidogrel AND are not marked "given" for one of the other listed anti-platelet medications.

Old definition
The numerator is the number of PVI discharges with "given" marked for any one (or more) of the following medications on the discharge medication record.

- Aspirin
- Clopidogrel (Plavix)
- Prasugrel (Effient)
- Ticlopidine (Ticlid)
- Ticagrelor (Brilinta)
- Cilostazol (Pletal)

The denominator is the total number of PVI discharges.

Dual Anti-Platelet

The numerator is the number of PVI discharges with "given" marked for two or more of the following medications on the discharge medication record.

- Aspirin
- Clopidogrel (Plavix)
- Prasugrel (Effient)
- Ticlopidine (Ticlid)
- Ticagrelor (Brilinta)
- Cilostazol (Pletal)

The denominator is the total number of PVI discharges.

Note: Discharges marked as contraindicated to Aspirin or Plavix *on the discharge medication record* will be excluded. Any contraindications to the other Thienopyridines are not considered. They are also excluded if they are marked in any procedure as death in lab or death post procedure.

Thienopyridines

The numerator is the number of PVI discharges with "given" marked for ANY of the following medications on the discharge medication record.

- Clopidogrel (Plavix)
- Prasugrel (Effient)
- Ticagrelor (Brilinta)

The denominator is the total number of PVI discharges.

Note: Discharges marked as contraindicated to Plavix *on the discharge medication record* will be excluded. Any contraindications to the other Thienopyridines are not considered in this category. When calculating exclusions for each individual medication (to be show as separate line items), we will consider the contraindications for that med, rather than using Plavix as a stand-in.
Discharges are also excluded if they are marked in any procedure as death in lab or death post procedure.

Clopidogrel (Plavix)

The numerator is the number of PVI discharges with "given" marked for Clopidogrel (Plavix) on the discharge medication record.
The denominator is the total number of PVI discharges.

Note: Discharges marked as contraindicated to Clopidogrel (Plavix) *on the discharge medication record* will be excluded. They are also excluded if they are marked in any procedure as death in lab or death post procedure.

Prasugrel (Effient)

The numerator is the number of PVI discharges with "given" marked for Prasugrel (Effient) on the discharge medication record.
The denominator is the total number of PVI discharges.

Discharges that meet *any* of the following criteria are excluded:

- The patient is age 75 or greater at admission
- The patient weighs less than 60 kg
- The patient has a history of stroke or other cerebrovascular disease
- Died in lab or post procedure for *any* procedure.

Source:　　http://www.effienthcp.com/Pages/important-safety-information.aspx

Beta Blockers

The numerator is the number of PVI discharges with "given" marked for Beta Blockers on the discharge medication record.
The denominator is the total number of PVI discharges.

Note: Discharges marked as contraindicated to Beta Blockers *on the discharge medication record* will be excluded. They are also excluded if they are marked in any procedure as death in lab or death post procedure.

Cholesterol Lowering Agents

The numerator is the number of PVI discharges with "given" marked for Statin and/or Other Cholesterol Lowering Agent on the discharge medication record.
The denominator is the total number of PVI discharges.

Note: Discharges marked as contraindicated to Statin *on the discharge medication record* will be excluded only if they did not receive a Statin at discharge. We do not capture contraindications to Other Cholesterol Lowering Agents. Discharges are also excluded if they are marked in any procedure as death in lab or death post procedure.

Statin

The numerator is the number of PVI discharges with "given" marked for Statin on the discharge medication record.
The denominator is the total number of PVI discharges.

Note: Discharges marked as contraindicated to Statin *on the discharge medication record* will be excluded only if they did not receive a Statin at discharge. Discharges are also excluded if they are marked in any procedure as death in lab or death post procedure or have "Against medical advice" or "Other acute care hospital" or "Hospice" indicated as their discharge status.

Old medication format:
The numerator is all discharges in which there was at least one PVI procedure and the patient was not dead at discharge and did not die in lab in any procedure, and in which the patient was given a statin at discharge (even those who are contraindicated for statin).

The denominator is all discharges in which there was at least one PVI procedure, and in which, in no procedure did the patient die in lab, and the patient did not die at

discharge, and either:
* in no procedure of any type was the patient marked as being
  contraindicated to statin.
   - OR -
* In some procedure of any type, the patient was marked as contraindicated
  for statin, but at discharge, the patient was
  given a statin anyway.

Other CLA

The numerator is the number of PVI discharges with "given" marked for Other Cholesterol Lowering Agent on the discharge medication record.
The denominator is the total number of PVI discharges.

Note: Discharges are excluded if they are marked in any procedure as death in lab or death post procedure.

Procedural Indicators

Procedures

The numerator is the total number of PVI procedures.
The denominator is the same, so this will always show as 100%.

Total Heparin dose (unit/kg) (mean, stdev)

Calculates the mean and standard deviation of the total heparin dose: The total heparin dose per procedure divided by the patient's weight in kilograms.

Note: If 0 was mistakenly entered for the weight, then the value for that procedure is 0. If heparin dose is "not documented" then the procedure is not included in the calculation.

Peak ACT (mean, stdev)

Calculates the mean and standard deviation of the recorded peak activated clotting time (ACT) in each PVI procedure.

Note: If Peak ACT is "not documented" then the procedure is not included in the calculation.

Peak ACT recorded

The numerator is the number of PVI procedures in which the Peak Activated Clotting Time (ACT) was recorded.
The denominator is the total number of PVI procedures.

Contrast per Procedure (mean, stdev)

Calculates the mean and standard deviation of the Contrast Volume per procedure (mL). The mean here is the total contrast volume used in all PVI procedures, divided by the number of PVI procedures.

Note: If Total IV Contrast Used is "not documented" then the procedure is not included in the calculation.

Lesion Success

The numerator is the number of Locations in which *neither* of the following is checked, under "PVI Procedure Performed":

- Not crossed with a device = ND
- Not crossed with a wire = NW

AND which have a recorded Post Stenosis of < or = to 30%.
The denominator is the number of Locations which have a documented Post-Stenosis.
Consider only Locations belonging to PVI procedures.

Technical Success (by lesion)

The numerator is the number of PVI procedures in which *all* Locations meet all these criteria:

- Neither of the following is checked, in "PVI Procedure Performed":
  - Not crossed with a device = ND

   ◦ Not crossed with a wire = NW
- Post Stenosis is documented.
- Post Stenosis is <= 30%.

The denominator is the number of PVI procedures in which *all* locations have post-procedure stenosis documented.
Consider only Locations belonging to PVI procedures.

Procedural Success (by procedure)

The numerator is the number of PVI procedures which meet the criteria of "Technical Success" **and** have no outcomes marked on *either* "Outcomes In Lab" or "Outcomes Post Procedure" (other than those listed below**) and** do not have CIN, which is a calculated outcome defined elsewhere in this document.

- Stay in ICU
- Respiratory (Vent cont. or Reintubation)
- Dysrhythmia
- CHF
- Infection/sepsis
- New Requirement for Dialysis
- Vascular Surgery Non Emergent
- Amputation

The denominator is the number of PVI procedures in which *all* locations have post-procedure stenosis documented.
Consider only Locations belonging to PVI procedures.

Discharges

The numerator is the total number of discharges containing a PVI procedure. The denominator is the same and will always equal 100%.

Smoking Cessation Counseling at DC (current smokers)

The numerator is the number of PVI discharges with "yes" marked for Current Smoker AND "yes" marked for Smoking Cessation Counseling.
The denominator is the total number of PVI discharges with "yes" marked for Current Smoker.

Note: Discharges are excluded if they are marked in any procedure as death in lab or death post procedure.

Exercise Counseling (all patients)

The numerator is the number of PVI discharges with "yes" marked for Exercise Counseling.
The denominator is the total number of PVI discharges.

Note: Discharges are excluded if they are marked in any procedure as death in lab or death post procedure.

Transfusions and Vascular Complications

Discharges

The numerator is the total number of discharges containing a PVI procedure. The denominator is the same and will always equal 100%.

Hybrid Discharges

The numerator is the number of PVI discharges in which at least one PVI procedure had "yes" marked for Hybrid.
The denominator is the total number of PVI discharges.

Transfusion

The numerator is the number of PVI discharges with "yes" marked for Transfusion with PRBCs selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

All discharges that contain a PVI procedure in which "yes" is marked for Hybrid and which received a transfusion of PRBCs Post Procedure are excluded from the numerator but left in the denominator.

Hybrid discharges with transfusion

The numerator is the number of PVI discharges that had at least one PVI procedure with "yes" marked for Hybrid and "yes" marked for Transfusion with PRBCs selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the number of Hybrid Discharges (see previous definition).

Pre-procedure Hemoglobin

The numerator is the number of PVI discharges in which the pre-procedure hemoglobin was recorded before the first procedure (no matter what the type).
The denominator is the total number of PVI discharges.

Anemia (pre-procedure)

The numerator is the number of PVI discharges in which the patient has anemia, as measured by their pre-procedure hemoglobin (before the first procedure of any type).
The denominator is the total number of PVI discharges that have a pre-procedure hemoglobin value before the first procedure of any type.

A patient has anemia if, before their first procedure (of any type), they had a pre-procedure hemoglobin measured as being below the threshold. For men, the threshold is 13. For women, it is 12.
(This matches the definition of anemia given by the World Health Organization. Source http://en.wikipedia.org/wiki/Anemia.)

Pre-procedure Hemoglobin (mean, stdev)

Calculates the mean and standard deviation of the pre-procedure hemoglobin that is recorded for the first procedure of any type. Considers only PVI discharges.

Nadir Hemoglobin (mean, stdev)

Calculates the mean and standard deviation of the minimum nadir hemoglobin, across all procedures in all PVI discharges.

BMI

Overall (mean, stdev)

Calculates the average (mean) and standard deviation of each PVI Discharge's Body Mass Index (BMI).

BMI is defined as the weight in kilograms (on the discharge record) divided by the square of the height in meters (on the discharge record).

Note that height is currently captured in centimeters.

Patients with vascular complication (mean, stdev)

Calculates the average (mean) and standard deviation of each PVI Discharge's Body Mass Index (BMI).

BMI is defined as the weight in kilograms (on the discharge record) divided by the square of the height in meters (on the discharge record).

Note that height is currently captured in centimeters.

This is calculated only for those PVI discharges in which there was a vascular complication.

Vascular Access Complications

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Note: Multiple options may be selected.

Retroperitoneal Hematoma

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Retroperitoneal Hematoma selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Pseudoaneurysm

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Pseudoaneurysm selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Hematoma at access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Hematoma at Access Site selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Bleeding at access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Bleeding at Access Site selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

AV Fistula

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with AV Fistula selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Acute Thrombosis

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Acute Thrombosis selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Surgical repair of the vascular access site

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Surgical repair of the vascular access site selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Other

The numerator is the number of PVI discharges with "yes" marked for Vascular Access Complication with Other selected in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges.

Procedures

The numerator is the total number of PVI procedures.
The denominator is the same, so this will always show as 100%.

Vascular Access Approach

Antegrade

The numerator is the number of PVI procedures in which at least one of the vascular access sites, the Access Approach was marked "antegrade".
The denominator is the total number of PVI procedures.

Retrograde

The numerator is the number of PVI procedures in which at least one of the vascular access sites, the Access Approach was marked "retrograde".
The denominator is the total number of PVI procedures.

Both

The numerator is the number of PVI procedures in which at least one of the vascular access sites, the Access Approach was marked "antegrade" AND in at least one of the vascular access sites, the Access Approach is marked "retrograde".
The denominator is the total number of PVI procedures.

Procedures with multiple access sites

The numerator is the number of PVI procedures that have more than one Vascular Access Site entered.
The denominator is the total number of PVI procedures.

Vascular Access Site

Femoral

The numerator is the number of PVI procedures with at least one Vascular Access Site in a femoral artery (L/R Common Femoral, L/R Superficial Femoral).
The denominator is the total number of PVI procedures.

Popliteal

The numerator is the number of PVI procedures with at least one Vascular Access Site in a popliteal artery (L/R Popliteal).
The denominator is the total number of PVI procedures.

Below the Knee

The numerator is the number of PVI procedures with at least one Vascular Access Site in an artery below the knee (L/R TPT, L/R Anterior Tibial, L/R Posterior Tibial, L/R Peroneal, L/R Dorsalis Pedis).
The denominator is the total number of PVI procedures.

Radial

The numerator is the number of PVI procedures with at least one Vascular Access Site in a radial artery (L/R Radial).
The denominator is the total number of PVI procedures.

Brachial

The numerator is the number of PVI procedures with at least one Vascular Access Site in a brachial artery (L/R Brachial).
The denominator is the total number of PVI procedures.

Procedure Medications

Total Heparin dose (unit/kg) (mean, stdev)

Calculates the mean and standard deviation of the total heparin dose: The total heparin dose per procedure divided by the patient's weight in kilograms.

Note: If 0 was mistakenly entered for the weight, then the value for that procedure is 0. If heparin dose is "not documented" then the procedure is not included in the calculation.

Peak ACT (mean, stdev)

Calculates the mean and standard deviation of the recorded peak activated clotting time (ACT) in each PVI procedure.

Note: If Peak ACT is "not documented" then the procedure is not included in the calculation.

Peak ACT recorded

The numerator is the number of PVI procedures in which the Peak Activated Clotting Time (ACT) was recorded.
The denominator is the total number of PVI procedures.

Reversed with Protamine

The numerator is the number of PVI procedures in which the patient received protamine "During" a PVI procedure (on the Procedure Medication record).
The denominator is the total number of PVI procedures.

Received Lytics

The numerator is the number of PVI procedures in which "Lysis" is marked for PVI Procedure Performed or any one of the following medications is marked as given at any timeframe (pre/during/post)
1. Tissue Plasminogin Activator (TPA)
2. Tenecteplase (TNK)
3. Retavase (rPA)
The denominator is the total number of PVI procedures.

CIN

Discharges

The numerator is the total number of discharges containing a PVI procedure. The denominator is the same and will always equal 100%.

CIN Potential

The numerator is the number of PVI discharges which are eligible for CIN consideration. To be eligible for CIN consideration, *all* these things must be true:

- At least one procedure has a value for Pre Procedure creatinine.
- The procedure record with a Pre Procedure creatinine has a value for Post Procedure Peak Creatinine or the discharge record has a value for Discharge Creatinine or Post Discharge Creatinine.
- The patient is not marked as having a history of renal failure currently requiring dialysis.
- The patient is not marked as having a history of renal transplant.
- In no procedure of any type is the patient marked as having an indication of renal salvage.
- The patient did not die in the lab.

The denominator is the total number of PVI discharges.

Contrast Induced Nephropathy

CIN is defined as post-procedure (peak, discharge, or post discharge) creatinine minus pre-procedure creatinine greater than or equal to .5.
CIN only applies to PVI or EVAR procedures.

Numerator: The number of PVI discharges in which all of the following things are true:

- At least one PVI procedure has a value for Pre Procedure Creatinine.
- The PVI procedure record (with a pre-creatinine value) has a value for Post Procedure Peak Creatinine or the discharge record has a value for Discharge Creatinine or Post Discharge Creatinine.
- If there exists a PVI procedure which has a Peak Creatinine filled in, then that procedure's Peak Creatinine minus that procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- If no PVI procedure has a Post Procedure Peak Creatinine, then there exists a PVI procedure such that the Discharge Creatinine minus a PVI procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- If no PVI procedure has a Post Procedure Peak Creatinine or Discharge Creatinine, then there exists a PVI procedure such that the Post Discharge Creatinine minus a PVI procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- The patient is not marked as having a history of renal failure currently requiring dialysis.
- The patient is not marked as having a history of renal transplant.
- In no procedure of any type is the patient marked as having an indication of renal salvage.
- The patient did not die in the lab in the CIN procedure.

Denominator: The number of PVI discharges in which all of the following things are true: (this is equivalent to "CIN Potential - see CIN report specifics)

- At least one PVI procedure has a value for Pre Procedure Creatinine.
- The PVI procedure record with a Pre Procedure creatinine has a value for Post Procedure Peak Creatinine or the discharge record has a value for Discharge Creatinine or Post Discharge Creatinine.
- The patient is not marked as having a history of renal failure currently requiring dialysis.
- The patient is not marked as having a history of renal transplant.
- In no procedure of any type is the patient marked as having an indication of renal salvage.
- The patient did not die in the lab.

Nephropathy Requiring Dialysis

The numerator is the number of PVI discharges with "yes" marked for New Requirement for Dialysis in Outcomes Post Procedure in any procedure of any type.
The denominator is the total number of PVI discharges in which "No" is marked for Renal Failure Currently Requiring Dialysis.

Contrast per Procedure (mean, stdev)

Calculates the mean and standard deviation of the Contrast Volume per procedure (mL). The mean here is the total contrast volume used in all PVI procedures, divided by the number of PVI procedures.

Note: If Total IV Contrast Used is "not documented" then the procedure is not included in the calculation.

Contrast Types

For each type of contrast, the number and percentage of dischrages receiving that contrast type are calculated.

The numerator is the number of PVI discharges in which, in at least one procedure of any type, "XXXX" was selected for Contrast Type.
The denominator is the total number of PVI discharges.

The Contrast Type is listed in the report as follows:

- Non ionic, low-osmolar (eg Omnipaque)
- Non ionic, Iso-osmolar (eg Visipaque)
- Ionic, hyperosmolar (eg Hypaque)
- Ionic, low-osmolar (eg Hexabrix)
- Gadolinium

- Carbon Dioxide (CO2)
- Other/Investigational contrast agent
- None

Note: More that one option may be selected.

Contrast per Discharge (mean, stdev)

Calculates the mean and standard deviation of the "Total IV Contrast Dose" for the entire discharge. All "Total IV Contrast Dose" values are added for all procedures (regardless of type). Considers all PVI discharges.

High Risk Patients

Creatinine >= 1.5 (pre 1st procedure)

The numerator is the number of PVI discharges in which the pre procedure creatinine value for the first PVI procedure is >= 1.5 AND "No" is indicated for Renal Failure Currently Requiring Dialysis on the discharge record.

The denominator is the total number of PVI discharges with a pre procedure creatinine value entered for the first PVI procedure.

CIN with pre-creatinine >=1.5

The numerator is the number of PVI discharges in which the pre procedure creatinine value for the first PVI procedure is >= 1.5 AND the discharge meets the criteria for CIN (see previous definition).

The denominator is the number of PVI discharges in which the pre procedure creatinine value for the first PVI procedure is >= 1.5

NRD with pre-creatinine >=1.5

The numerator is the number of PVI discharges in which the pre procedure creatinine value for the first PVI procedure is >= 1.5 AND with "yes" marked for New Requirement for Dialysis in Outcomes Post Procedure.

The denominator is the number of PVI discharges with "No" marked for Renal Failure Currently Requiring Dialysis AND in which the pre procedure creatinine value for the first PVI procedure is >= 1.5

GFR of patients with pre-creatinine >=1.5 (mean, stdev)

Calculates (at each procedure level) the mean and standard-deviation of the eGFR for those patients that had a pre-procedure creatinine >= 1.5 prior to the first PVI.

Here is the formula we are using for eGFR:
Please note: eGFR is calculated by using the CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) formula via the QxMD calculator found here http://www.qxmd.com/calculate-online/nephrology/ckd-epi-egfr . Fields utilized for this calculation are: Creatinine, Age, Sex, & Race.

About this GFR calculator
The CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) equation was developed in an effort to create a formula more precise than the MDRD formula, especially when actual GFR is > 60 mL/min per 1.73 m^2. Researchers pooled data from multiple studies to develop and validate this new equation. They randomly divided 10 studies which included 8,254 participants, into separate data sets for development and internal validation. 16 additional studies, which included 3,896 participants, were used for external validation. The CKD-EPI equation performed better than the MDRD (Modification of Diet in Renal Disease Study) equation, especially at higher GFR, with less bias and greater accuracy. When looking at NHANES (National Health and Nutrition Examination Survey) data, the median estimated GFR was 94.5 mL/min per 1.73 m^2 vs. 85.0 mL/min per 1.73 m^2, and the prevalence of chronic kidney disease was 11.5% versus 13.1%. The CKD-EPI equation, expressed as a single equation, is:
GFR = 141 X min(Scr/κ,1)^α X max(Scr/κ,1)$^{-1.209}$ X 0.993^{Age} X 1.018 [if female] X 1.159 [if black]
Where Scr is serum creatinine (mg/dL), κ is 0.7 for females and 0.9 for males, α is –0.329 for females and –0.411 for males, min indicates the minimum of Scr/κ or 1, and max indicates the maximum of Scr/κ or 1.
Citations
Levey AS, Stevens LA, Schmid CH, Zhang YL, Castro AF 3rd, Feldman HI, Kusek JW, Eggers P, Van Lente F, Greene T, Coresh J; CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration). A New Equation to Estimate Glomerular Filtration Rate. *Ann Intern Med* 150(9):604-12. (2009)

eGFR < 60

The numerator is the number of PVI discharges in which (in any procedure) the eGFR is less than 60.
The denominator is the total number of PVI discharges.

This is the equation we are using for eGFR:
Please note: eGFR is calculated by using the CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) formula via the QxMD calculator found here http://www.qxmd.com/calculate-online/nephrology/ckd-epi-egfr . Fields utilized for this calculation are: Creatinine, Age, Sex, & Race.

About this GFR calculator
The CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) equation was developed in an effort to create a formula more precise than the MDRD formula, especially when actual GFR is > 60 mL/min per 1.73 m^2. Researchers pooled data from multiple studies to develop and validate this new equation. They randomly divided 10 studies which included 8,254 participants, into separate data sets for development and internal validation. 16 additional studies, which included 3,896 participants, were used for external validation. The CKD-EPI equation performed better than the MDRD (Modification of Diet in Renal Disease Study) equation, especially at higher GFR, with less bias and greater accuracy. When looking at NHANES (National Health and Nutrition Examination Survey) data, the median estimated GFR was 94.5 mL/min per 1.73 m^2 vs. 85.0 mL/min per 1.73 m^2, and the prevalence of chronic kidney disease was 11.5% versus 13.1%. The CKD-EPI equation, expressed as a single equation, is:

$$GFR = 141 \times \min(Scr/\kappa,1)^{\alpha} \times \max(Scr/\kappa,1)^{-1.209} \times 0.993^{Age} \times 1.018 \text{ [if female]} \times 1.159 \text{ [if black]}$$

Where Scr is serum creatinine (mg/dL), κ is 0.7 for females and 0.9 for males, α is –0.329 for females and –0.411 for males, min indicates the minimum of Scr/κ or 1, and max indicates the maximum of Scr/κ or 1.

Citations

Levey AS, Stevens LA, Schmid CH, Zhang YL, Castro AF 3rd, Feldman HI, Kusek JW, Eggers P, Van Lente F, Greene T, Coresh J; CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration). A New Equation to Estimate Glomerular Filtration Rate. *Ann Intern Med* 150(9):604-12. (2009)

CIN with eGFR < 60

The numerator is the number of PVI discharges in which (in any procedure) the eGFR is calculated to be less than 60 AND the discharge meets the criteria for CIN (see previous definition).

The denominator is the total number of PVI dischargesin which (in any procedure) the eGFR is calculated to be less than 60 AND the discharge meets the criteria for CIN Patential (see previous definition).

NRD with eGFR < 60

The numerator is the number of PVI discharges with "yes" marked for New Requirement for Dialysis in Outcomes Post Procedure in any procedure of any type AND in which, in at least one procedure of any type, the eGFR is calculated to be less than 60.

The denominator is the number of PVI discharges with "No" marked for Renal Failure Currently Requiring Dialysis AND which, in at least one procedure of any type, the eGFR is calculated to be less than 60.

Baseline eGFR

The numerator is the number of PVI discharges in which, in the first PVI procedure, the eGFR is calculated to be within the given range.

The denominator is the number of PVI discharges.

The eGFR ranges are listed in the report as follows:

- eGFR <30
- eGFR 30-44
- eGFR 45-60
- eGFR >60

Please note: eGFR is calculated by using the CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) formula via the QxMD calculator found here http://www.qxmd.com/calculate-online/nephrology/ckd-epi-egfr . Fields utilized for this calculation are: Creatinine, Age, Sex, & Race.

About this GFR calculator

The CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) equation was developed in an effort to create a formula more precise than the MDRD formula, especially when actual GFR is > 60 mL/min per 1.73 m^2. Researchers pooled data from multiple studies to develop and validate this new equation. They randomly divided 10 studies which included 8,254 participants, into separate data sets for development and internal validation. 16 additional studies, which included 3,896 participants, were used for external validation. The CKD-EPI equation performed better than the MDRD (Modification of Diet in Renal Disease Study) equation, especially at higher GFR, with less bias and greater accuracy. When looking at NHANES (National Health and Nutrition Examination Survey) data, the median estimated GFR was 94.5 mL/min per 1.73 m^2 vs. 85.0 mL/min per 1.73 m^2, and the prevalence of chronic kidney disease was 11.5% versus 13.1%. The CKD-EPI equation, expressed as a single equation, is:

$$GFR = 141 \times \min(Scr/\kappa,1)^{\alpha} \times \max(Scr/\kappa,1)^{-1.209} \times 0.993^{Age} \times 1.018 \text{ [if female]} \times 1.159 \text{ [if black]}$$

Where Scr is serum creatinine (mg/dL), κ is 0.7 for females and 0.9 for males, α is –0.329 for females and –0.411 for males, min indicates the minimum of Scr/κ or 1, and max indicates the maximum of Scr/κ or 1.

Citations

Levey AS, Stevens LA, Schmid CH, Zhang YL, Castro AF 3rd, Feldman HI, Kusek JW, Eggers P, Van Lente F, Greene T, Coresh J; CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration). A New Equation to Estimate Glomerular Filtration Rate. *Ann Intern Med* 150(9):604-12. (2009)

Post Creatinine Drawn - High Risk Patients (PVI)

The numerator is the number of PVI discharges in which "Renal Failure Currently Requiring Dialysis" is marked "no" on the discharge record AND in which the first PVI procedure has a pre-procedure creatinine >=1.5 AND Death in lab is marked "no" for that PVI procedure AND one of the following is true:

1. That PVI procedure or any procedure after it has a post procedure peak creatinine value.
2. There is a discharge creatinine value.
3. There is a post discharge creatinine value.

The denominator is the number of PVI discharges in which the first PVI has a pre-procedure creatinine >=1.5 and in which "Renal Failure Currently Requiring Dialysis" is marked "no" on the discharge record and Death in lab is marked "no" for that PVI procedure.

NOTE: Both the numerator and denominator will also exclude PVI discharges in which, for all PVI procedures within the discharge, "None" or "CO2" are the only selections indicated for "Contrast Type"

Pre Procedure Hydration - High Risk Patients (PVI)

The numerator is the number of PVI discharges in which "Renal Failure Currenly Requiring Dialysis" is marked "no" on the discharge record AND in which the first PVI procedure has a pre-procedure creatinine >=1.5 and that PVI procedure medication record has Saline, Lactated Ringer's, Other Hydration, or Sodium Bicarbonate marked "pre" at any timeframe.

The denominator is the number of PVI discharges in which "Renal Failure Currenly Requiring Dialysis" is marked "no" on the discharge record AND in which the first PVI procedure has a pre-procedure creatinine >=1.5.

*Keep in mind we changed the saline field in 2013 from pre/during/post to giving all those options at multiple timeframes. We want to count the "pre" in any of them (<1 hour, 1-3 hours, etc)

Pre Procedure Hydration by eGFR

The numerator is the number of PVI discharges in which there was a GFR in the given range and, in any procedure of any type, "Pre" is marked for Saline, Lactated Ringer's, Other Hydration, or Sodium Bicarbonate at any timeframe.
The denominator is the number of PVI discharges in which the GFR is calculated within the given range.

The eGFR ranges are listed in the report as follows:

- Pre Hydration when eGFR < 30
- Pre Hydration when 30 <= eGFR <= 44
- Pre Hydration when 45 <= eGFR <= 60

Ratio of Contrast Volume to eGFR

The ratio of contrast volume to eGFR is calculated at the procedure level. This will exclude all discharges with "yes" indicated for "Renal Failure Currently Requiring Dialysis" on the discharge record as well as those porcedures lacking information in data fields used to calculate this field (Including, but not limited to: DOB, weight, sex, pre procedure creatinine value, contrast volume).

This ratio is calculated by dividing the contrast volume by the eGFR.
Please note: eGFR is calculated by using the CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) formula via the QxMD calculator found here
http://www.qxmd.com/calculate-online/nephrology/ckd-epi-egfr . Fields utilized for this calculation are: Creatinine, Age, Sex, & Race.

About this GFR calculator
The CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) equation was developed in an effort to create a formula more precise than the MDRD formula, especially when actual GFR is > 60 mL/min per 1.73 m^2. Researchers pooled data from multiple studies to develop and validate this new equation. They randomly divided 10 studies which included 8,254 participants, into separate data sets for development and internal validation. 16 additional studies, which included 3,896 participants, were used for external validation. The CKD-EPI equation performed better than the MDRD (Modification of Diet in Renal Disease Study) equation, especially at higher GFR, with less bias and greater accuracy. When looking at NHANES (National Health and Nutrition Examination Survey) data, the median estimated GFR was 94.5 mL/min per 1.73 m^2 vs. 85.0 mL/min per 1.73 m^2, and the prevalence of chronic kidney disease was 11.5% versus 13.1%. The CKD-EPI equation, expressed as a single equation, is:
GFR = 141 X min$(Scr/\kappa,1)^\alpha$ X max$(Scr/\kappa,1)^{-1.209}$ X 0.993^{Age} X 1.018 [if female] X 1.159 [if black]
Where Scr is serum creatinine (mg/dL), κ is 0.7 for females and 0.9 for males, α is –0.329 for females and –0.411 for males, min indicates the minimum of Scr/κ or 1, and max indicates the maximum of Scr/κ or 1.
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Interpretation example:
Contrast dose=150ml eGFR=50 would equal ratio of three
Contrast dose=100 ml eGFR=50 would equal ratio of two
A lower ratio is more desirable than a higher ratio. Higher ratio is associated with higher incidence of CIN.

Prior to Q2 2016, this field was claculated:
Contrast Exceeding 3x GFR
The numerator is the number of PVI discharges in which there was a GFR in the given range and in which the "Total IV Contrast Dose" of that procedure is >= 3 times the GFR.
The denominator is the number of PVI discharges in which the GFR is calculated within the given range and there is a value for "Total IV Contrast Dose" in any procedure.

The GFR ranges are listed in the report as follows:

- Contrast Exceeding 3X GFR < 30
- Contrast Exceeding 3X a GFR between 30 and 44
- Contrast Exceeding 3X a GFR between 45 and 60

Ratio of Contrast Volume to GFR ≤ 3 (Significant Risk of CIN)

The numerator is the number of PVI procedures calculated to have a ratio of contrast volume to eGFR ≤ 3 (see previous definition for specifics on calculation).

The denominator is the total number of PVI procedures, excluding procedures lacking information in data fields used to calculate this field, as well as patients currently on dialysis. Including, but not limited to: DOB, weight, sex, pre procedure creatinine value, contrastvolume.

Ratio of Contrast Volume to GFR > 3 (Substantial Risk of CIN)

The numerator is the number of PVI procedures calculated to have a ratio of contrast volume to eGFR > 3.0 (see previous definition for specifics on calculation).

The denominator is the total number of PVI procedures, excluding procedures lacking information in data fields used to calculate this field, as well as patients currently on dialysis. Including, but not limited to: DOB, weight, sex, pre procedure creatinine value, contrastvolume.

CIN Exclusions

Discharges

The numerator is the total number of discharges containing a PVI procedure. The denominator is the same and will always equal 100%.

CIN Potential

The numerator is the number of PVI discharges which are eligible for CIN consideration. To be eligible for CIN consideration, *all* these things must be true:

- At least one procedure has a value for Pre Procedure creatinine.
- The procedure record with a Pre Procedure creatinine has a value for Post Procedure Peak Creatinine or the discharge record has a value for Discharge Creatinine or Post Discharge Creatinine.
- The patient is not marked as having a history of renal failure currently requiring dialysis.
- The patient is not marked as having a history of renal transplant.
- In no procedure of any type is the patient marked as having an indication of renal salvage.
- The patient did not die in the lab.

The denominator is the total number of PVI discharges.

Contrast Induced Nephropathy

CIN is defined as post-procedure (peak, discharge, or post discharge) creatinine minus pre-procedure creatinine greater than or equal to .5.
CIN only applies to PVI or EVAR procedures.

Numerator: The number of PVI discharges in which all of the following things are true:

- At least one PVI procedure has a value for Pre Procedure Creatinine.
- The PVI procedure record (with a pre-creatinine value) has a value for Post Procedure Peak Creatinine or the discharge record has a value for Discharge Creatinine or Post Discharge Creatinine.
- If there exists a PVI procedure which has a Peak Creatinine filled in, then that procedure's Peak Creatinine minus that procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- If no PVI procedure has a Post Procedure Peak Creatinine, then there exists a PVI procedure such that the Discharge Creatinine minus a PVI procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- If no PVI procedure has a Post Procedure Peak Creatinine or Discharge Creatinine, then there exists a PVI procedure such that the Post Discharge Creatinine minus a PVI procedure's Pre Procedure Creatinine is greater than or equal to 0.5. This procedure shall be referred to as "the CIN procedure".
- The patient is not marked as having a history of renal failure currently requiring dialysis.
- The patient is not marked as having a history of renal transplant.
- In no procedure of any type is the patient marked as having an indication of renal salvage.
- The patient did not die in the lab in the CIN procedure.

Denominator: The number of PVI discharges in which all of the following things are true: (this is equivalent to "CIN Potential - see CIN report specifics)

- At least one PVI procedure has a value for Pre Procedure Creatinine.
- The PVI procedure record with a Pre Procedure creatinine has a value for Post Procedure Peak Creatinine or the discharge record has a value for Discharge Creatinine or Post Discharge Creatinine.
- The patient is not marked as having a history of renal failure currently requiring dialysis.
- The patient is not marked as having a history of renal transplant.
- In no procedure of any type is the patient marked as having an indication of renal salvage.
- The patient did not die in the lab.

Excluded Patients

Hx Renal Failure req Dialysis

The numerator is the number of PVI discharges with "Yes" marked for Renal Failure Currently Requiring Dialysis.
The denominator is the total number of PVI discharges.

Renal Transplant

The numerator is the number of PVI discharges with "Yes" marked for Renal Transplant.
The denominator is the total number of PVI discharges.

Renal Salvage

The numerator is the number of PVI discharges in which, in at least one procedure of any type, "Renal Salvage" is marked as an indication.
The denominator is the total number of PVI discharges.

Excluded Patients without Labs

Missing Creatinine (pre)

The numerator is the number of PVI discharges in which, in no PVI procedure do we have a value for Pre Procedure Creatinine.
The denominator is the total number of PVI discharges.

Missing Creatinine (post)

The numerator is the number of PVI discharges in which we do not have a value for Post Procedure Peak Creatinine for any PVI procedure AND the discharge record is missing a Discharge Creatinine value and a Post Discharge Creastinine value.
The denominator is the total nimber of PVI discharges.

Same day discharge

The numerator is the number of PVI discharges in which we have no value for Post Procedure Peak Creatinine for any PVI procedure AND the Post Procedure LOS is 1 day.
The denominator is the number of PVI discharges in which we have no value for Post Procedure Peak Creatinine for any PVI procedure.

Next day discharge

The numerator is the number of PVI discharges in which we have no value for Post Procedure Peak Creatinine for any PVI procedure AND the Post Procedure LOS is 2 days.
The denominator is the number of PVI discharges in which we have no value for Post Procedure Peak Creatinine for any PVI procedure.

Length of Stay (mean, median, stdev)

In PVI, all length of stay calculations count a same-day discharge as a stay of 1 day.
Computes the mean, median, and standard deviation of the number of days a patient was hospitalized. Computed as the discharge date minus the admission date, plus one day. Consider only discharges that have at least one PVI procedure and fall into the givencategory.

The categories are listed in the report as follows/:

- All discharges
- CIN - all patients
- CIN - high risk patients
- No CIN - high risk patients
- NRD

Note: The definitions of "CIN", "High-risk patients", and "NRD" are given elsewhere in this document.

PVI Goal Graphs

Each of our graphs is a bar plot. On the x axis, each hospital is listed. On the y axis, whatever metric we are displaying on our graph.

The hospitals are not listed by their hospital code number, but rather, the data is sorted, and the hospitals are assigned new numbers, 1-n (where n is the number of hospitals). This number is called the "blinded" hospital code. It shows what rank your hospital has in the metrics, without showing you which other hospitals had which ranks. For convenience, we also color the bar representing your hospital.

Each graph will usually have a "goal number". For example, complications under X%. We will draw a horizontal line at y=X%, so you can see if your hospital falls above or below the goal.

Percentage of Vascular Complications - Goal ≤ 3%

For each hospital, compute the percentage of discharges that had *any* Vascular Access Complication. This is the same as the definition for Vascular Access Complication under "Outcomes Prior to Discharge", with the same exclusions.

Goal - ≤ 3%

Percentage of Post-Procedure Transfusions - Goal ≤ 6%

For each hospital, compute the number of discharges in which a transfusion of PRBC was given post procedure.
This should be the same as the definition as Transfusions in Outcomes Prior to Discharge, with the same exclusions.
Goal - ≤ 6%

Percentage of Contrast Induced Nephropathy - Goal ≤ 4%

For each hospital, compute the percentage of discharges which had Contrast Induced Nephropathy. This is the same definition of Contrast Induced Nephropathy from the Outcomes Post Procedure section, with the same exclusions.
Goal - ≤ 4%

Percentage of Statin at Discharge - Goal ≥ 80%

For each hospital, compute the percentage of discharges in which Statin was given post-procedure after the *last* procedure of *any* type. This is the same as the definition of Statin in Additional Quality Indicators, with the same exclusions.

Goal - ≥ 80%

Percentage of Any Anti-Platelet at Discharge - Goal ≥ 95%

For each hospital, compute the number of discharges in which any anti-platelet was given post-procedure after the *last* procedure of *any* type. This is the same as the definition of Any Anti-Platelet in Post-procedure Meds, with the same exclusions.
Goal - ≥ 95%

Percentage of Pre Procedure Hydration - High Risk Patients (PVI)

For each hospital, compute the percentage of discharges containing a PVI with a pre procedure creatinine >=1.5 that had pre procedure hydration. This is the same as the definition for Pre Procedure Hydration - High Risk Patients (PVI) on the PVI CIN page.

No Goal Line 2014

Percentage of Post Creatinine Drawn - High Risk Patients (PVI) - Goal ≥ 75%

For each hospital, compute the percentage of discharges containing a PVI with a pre procedure creatinine >=1.5 that had a post creatinine drawn. This is the same as the definition for Post Creatinine Drawn - High Risk Patients (PVI) on the PVI CIN page.

Goal ≥ 75%