



## Pharmacy Accountability Measures Quality Measure Pseudocode

### Developed by

Nick Schutz, PharmD  
Janice Taylor, PharmD, BCPS  
Mary Andrawis, PharmD, MPH

### Pharmacy Accountability Measures Description

The Pharmacy Accountability Measures (PAM) Work Group identifies and prioritizes medication-related quality measures that health system pharmacists can use to establish accountability for and demonstrate value in clinical outcomes. The [measures](#) recommended by the PAM Work Group fall into six clinical domains for inpatient and outpatient settings and during transitions of care: antithrombotic safety, cardiovascular control, glycemic control, pain management, behavioral health, and antimicrobial stewardship.

### Purpose of Pseudocodes

Pseudocodes are simplified coding algorithms based on programming language, or in the case of quality measures, measure specification language, that can be used for developing dashboards. The pseudocodes provided in this file can be used to initiate conversations with analytics, quality, and/or informatics departments within your institution to pull the numerator and denominator data needed to monitor and benchmark performance on the selected Pharmacy Accountability Measures.

The pseudocodes were developed by expert members to support ASHP members in the development and use of quality measure benchmarking and dashboards. They have not been fully vetted or tested. They will vary based on the system and they will need to be validated within your own institution. It may be easiest to test and implement pseudocodes within one therapeutic category at a time. ASHP is not legally responsible for these pseudocodes. If you identify an issue working with these pseudocodes, please contact us at [PracticeAdvancement@ashp.org](mailto:PracticeAdvancement@ashp.org).

# Measure Definitions

## Anticoagulation Therapy for Atrial Fibrillation/Flutter (NQF 0436(e))

### Numerator

Patients prescribed or continuing to take anticoagulation therapy at hospital discharge

### Denominator

Patients with a principal diagnosis of ischemic stroke, and a history of atrial ablation, or current or history of atrial fibrillation/flutter

Please see the HealthIT website for documentation:

- <https://ecqi.healthit.gov/system/files/ecqm/measures/CMS71v8.html>

## ICU VTE Prophylaxis (NQF 0372(e))

### Numerator

Patients who received VTE prophylaxis or have documentation why no VTE prophylaxis was given:

- the day of or the day after hospital admission
- the day of or the day after surgery end date for surgeries that start the day of or the day after hospital admission

### Denominator

All discharged hospital inpatients.

Please see the HealthIT website for documentation:

- [https://ecqi.healthit.gov/system/files/ecqm/measures/CMS190v5\\_0.html](https://ecqi.healthit.gov/system/files/ecqm/measures/CMS190v5_0.html)

## Preoperative Beta Blockade (NQF 0127)

### Numerator

Number of patients undergoing isolated CABG who received beta blockers within 24 hours preceding surgery

### Denominator

Patients undergoing isolated CABG

### Exclusions

Cases are removed from the denominator if preoperative beta blocker was contraindicated or if the clinical status of the patient was emergent or emergent salvage prior to entering the operating room.

The exclusions criteria are difficult to exclude, since it is common for this information not to be stored as discrete information. Encoding those exclusions in a report is beyond the scope of this document, but it is possible to use this metric without the exclusions as a surrogate marker for historical benchmarking.

Pseudocode	Clinical Translation
<p><b><u>Qualifying Encounter List</u></b>  <b>SELECT</b>            [Patient Encounter ID]            [CABG Start Time]            [Medication Administration Time]  <b>FROM</b> [Patient Encounters]  <b>INNER JOIN</b> [Procedures]  <b>LEFT JOIN</b> [Administered Medications]  <b>WHERE</b>            [Patient Encounter] IN [Report Date Range]   <b>AND</b>  [Medication Administered] IN [Beta Blocker List]  <b>AND</b>  [Procedure Type] IN [CABG Procedure List]</p>	<p>For encounters in the date range  Only consider beta blockers  Only CABG procedures</p>
<p><b><u>Beta Blocker Timing List</u></b>  <b>SELECT</b>            [Patient Encounter ID]            MAX(DATEDIFF(HH, [Medication Administration Time],            [CABG Start Time])) [Time Difference]   <b>FROM</b> [Qualifying Encounter List]  <b>WHERE</b>            [Medication Administration Time] &lt; [CABG Start Time]   <b>OR</b>    [Medication Administration Time] IS NULL   <b>GROUP BY</b>            [Patient Encounter ID]</p>	<p>Amount of time (in hours) between beta blocker administration and start of CABG procedure; only consider the last medication given   Only consider administrations before the procedure  Keep procedures without medication administrations</p>
<p><b><u>Numerator</u></b>  <b>SELECT</b>            COUNT ([Patient Encounter ID])  <b>FROM</b> [Beta Blocker Timing List]  <b>WHERE</b>            [Time Difference] &lt;= 24</p>	<p>Count the unique encounters where last the beta blocker given before CABG procedure happened 24 hours before the procedure</p>
<p><b><u>Denominator</u></b>  <b>SELECT</b>            COUNT(DISTINCT [Patient Encounter ID])  <b>FROM</b> [Qualifying Encounter List]</p>	<p>Count number of unique encounters</p>

## Glycemic Control – Hypoglycemia (NQF 2362e)

### Numerator

Total number of hypoglycemic events (<40 mg/dL) that were preceded by administration of rapid/short-acting insulin within 12 hours or an anti-diabetic agent other than short-acting insulin within 24 hours, were not followed by another glucose value greater than 80 mg/dL within five minutes, and were at least 20 hours apart

Optional numerator: Total number of hypoglycemic events (<70 mg/dL) that were preceded by administration of rapid/short-acting insulin within 12 hours or an anti-diabetic agent other than short-acting insulin within 24 hours, were not followed by another glucose value greater than 80 mg/dL within five minutes, and were at least 20 hours apart

### Denominator

Total number of hospital days with at least one anti-diabetic agent administered

### Exclusions

Admissions with lengths of stay greater than 120 days are excluded

More information, including a list of antidiabetic medications, is available at:

<https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/qualitymeasures/index.html>

Pseudocode	Clinical Translation
<p><b><u>Identify inclusion/exclusion criteria flags</u></b></p> <p><b>Hypoglycemic Event Flag ()</b>  <b>IF Blood Glucose &lt; 40 mg/dL</b>  <b>THEN 'Y'</b>  <b>ELSE 'N'</b></p> <p><b>LOS Too Long Flag ()</b>  <b>IF ([Discharge Date] – [Admission Date] + 1) &gt; 120</b>  <b>THEN 'Y'</b>  <b>ELSE 'N'</b></p>	<p>Check if the glucose value &lt; 40 mg/dL; this could be changed to 70 for the optional numerator</p> <p>Identify patients with length of stay over 120 days</p>
<p><b><u>Evaluate lookback hours</u></b></p> <p><b>Lookback Hours ()</b>  <b>IF Medication Type IN (insulin aspart, insulin lispro, insulin glulisine, insulin regular)</b>  <b>THEN 12</b>  <b>ELSE 24</b></p>	<p>Short and fast acting insulin have a lookback time of 12 hours, everything else has a lookback time of 24 hours</p>

Pseudocode	Clinical Translation
<p><b><u>Lab and Administration Information</u></b></p> <p><b>Glucose List ()</b>  <b>SELECT</b>            [Patient Encounter ID]            [Glucose Collection Time]            [Glucose Value]  <b>FROM</b> [Glucose Labs]</p> <p><b>Medication List ()</b>  <b>SELECT</b>            [Patient Encounter ID]            [Administration Time]            Lookback Hours ()  <b>FROM</b> [Administered Medications]  <b>WHERE</b>            Medication Type = Antihyperglycemic</p>	<p>Get a list of all the glucose values in the in hospital</p> <p>For each encounter, return a list of when the antihyperglycemic medications were administered, and how long to look back</p> <p>Only consider antihyperglycemic medications; the specifics on this may vary from system to system</p>

Pseudocode	Clinical Translation
<p><b><u>Hypoglycemia Information</u></b></p> <p><b>Hypoglycemia List ()</b>  <b>SELECT</b>            [Patient Encounter ID]            [Glucose Collection Time]  <b>FROM</b> [Glucose List]  <b>INNER JOIN</b> [Medication List]  <b>WHERE</b>            Hypoglycemic Event Flag = 'Y'</p> <p><b>AND</b> [Glucose Collection Time] –            [Administration Time] &lt; [Lookback Hours]</p> <p><b>Adjusted Hypoglycemia List ()</b>  <b>SELECT</b>            [Patient Encounter ID]            [Glucose Collection Time]            ROW_NUMBER () OVER (                PARTITION BY                    [Patient Encounter ID]                ORDER BY                    [Glucose Collection Time]            ) AS [Row Number]  <b>FROM</b> [Hypoglycemia List]  <b>INNER JOIN</b> [Glucose List]  <b>WHERE</b>            [Glucose List].[Glucose Collection Time] –            [Hypoglycemia List].[Glucose Collection Time]            BETWEEN 0 AND 5 minutes</p> <p><b>GROUP BY</b>            [Patient Encounter ID]            [Glucose Collection Time]</p> <p><b>HAVING</b>            MAX([Glucose List].[Glucose Value]) &lt; 80</p>	<p>Return a list of encounters where a hypoglycemic agent was given before a glucose level was taken</p> <p>Only look at hypoglycemic events</p> <p>Only consider administrations of hypoglycemic agents that were given within the lookback window before the glucose level was taken</p> <p>For each patient encounter, number the glucose collections by the time that they were taken</p> <p>Look at all the glucose values taken within five minutes of the low glucose value</p> <p>Eliminate any instances where a glucose value of 80 or higher was taken within 5 minutes of the hypoglycemic event</p>

Pseudocode	Clinical Translation
<b><u>Define numerator and denominator</u></b>	
<b><u>Numerator</u></b> <b>SELECT</b> <b>COUNT(h2.[Patient Encounter ID])</b>  <b>FROM [Adjusted Hypoglycemia List] AS h2</b> <b>LEFT JOIN [Adjusted Hypoglycemia List] AS h1</b>  <b>WHERE</b> <b>h1.[Patient Encounter ID] = h2.[Patient Encounter ID]</b> <b>AND h1.[Row Number] = h2.[Row Number] – 1</b> <b>AND h2.[Glucose Collection Time] –</b> <b>h1.[Glucose Collection Time] &lt; 20 hours</b> <b>AND h1.[Patient Encounter ID] IS NULL</b> <b>AND h2.[Glucose Collection Time] BETWEEN</b> <b>[Start Date] AND [End Date]</b>	 Count the encounters  Self-join the lists of patients with hypoglycemic events to eliminate events that happen within 20 hours of each other  Self-join sequential events per patient encounter  Eliminate events that happen within 20 hours of each other  Filter the dates in the date range
<b><u>Denominator</u></b> <b>SELECT</b> <b>COUNT(DISTINCT</b> <b>[Patient Encounter ID]</b> <b>CONVERT(DATE, [Administration Time])</b> <b>)</b> <b>FROM [Medication List]</b>  <b>WHERE</b> <b>[Administration Time] BETWEEN</b> <b>[Start Date] AND [End Date]</b>	 Count the patient days where antihyperglycemics were given  Only pull from the antihyperglycemic list  Only look at dates in the date range

## Glycemic Control – Hyperglycemia (NQF 2362e)

<p><b>Numerator</b> Sum of the percentage of hospital days in hyperglycemia for each admission in the denominator</p> <p><b>Denominator</b> Total number of admissions with a diagnosis of diabetes mellitus, at least one administration of insulin or any anti-diabetic medication except metformin, or at least one elevated blood glucose value (&gt;200 mg/dL [11.1 mmol/L]) at any time during the entire hospital stay</p> <p><b>Exclusions</b> The following admissions are excluded from the denominator:</p> <ul style="list-style-type: none"> <li>• Admissions with diagnosis of diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolar syndrome (HHS)</li> <li>• Admissions without any hospital days included in analysis</li> <li>• Admissions with lengths of stay greater than 120 days</li> </ul>
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More information, including a list of antidiabetic medications, is available at:

<https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/qualitymeasures/index.html>

Pseudocode	Clinical Translation
<p><b><u>Identify inclusion criteria flags</u></b></p> <p><b>Diabetes Diagnosis Flag ()</b>  <b>IF diabetes mellitus in [Problem List]</b>              <b>THEN 'Y'</b>              <b>ELSE 'N'</b></p> <p><b>Received Antidiabetic Flag ()</b>  <b>IF COUNT non-metformin antidiabetic medication</b>  <b>administrations &gt; 1</b>              <b>THEN 'Y'</b>              <b>ELSE 'N'</b></p> <p><b>Elevated Blood Glucose Flag ()</b>  <b>IF MAX(Blood Glucose) &gt; 200 mg/dL</b>              <b>THEN 'Y'</b>              <b>ELSE 'N'</b></p>	<p>Identify patients with diagnosis of diabetes mellitus</p> <p>Identify patients who received at least one administration of insulin, or any anti-diabetic medication except metformin</p> <p>Check if the highest glucose value for the hospital stay &gt; 200 mg/dL</p>
<p><b><u>Identify exclusion criteria flags</u></b></p> <p><b>Acute Hyperglycemia Diagnosis Flag ()</b>  <b>IF (DKA or HHS) in [Problem List]</b>              <b>THEN 'Y'</b>              <b>ELSE 'N'</b></p> <p><b>LOS Too Long Flag ()</b>  <b>IF ([Discharge Date] – [Admission Date] + 1) &gt; 120</b>              <b>THEN 'Y'</b>              <b>ELSE 'N'</b></p>	<p>Identify patients with diagnosis of diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolar syndrome (HHS)</p> <p>Identify patients with length of stay over 120 days</p>

Pseudocode	Clinical Translation
<p><b>Qualifying Patient List</b></p> <p><b>Patient List ()</b>  <b>SELECT *</b>  <b>FROM [Patient Encounters]</b>  <b>INNER JOIN [Problem List]</b>  <b>INNER JOIN [Medication List]</b>  <b>INNER JOIN [Glucose Labs]</b>  <b>WHERE (</b>                    <b>Diabetes Diagnosis Flag = Y</b>            <b>OR Received Antidiabetic Flag = Y</b>            <b>OR Elevated Blood Glucose Flag = Y</b>            <b>)</b>  <b>AND Acute Hyperglycemia Diagnosis Flag = N</b>  <b>AND LOS Too Long Flag = N</b></p>	<p>Consider patients who EITHER had a diagnosis of diabetes, received an antidiabetic medication, OR an elevated blood glucose read; AND did not have an acute hyperglycemic diagnosis AND did not have a length of stay of over 120 days</p>

Pseudocode	Clinical Translation
<p><b><u>Define numerator and denominator</u></b></p> <p><b>Maximum Glucose Per Day ()</b>  <b>SELECT</b>            [Patient Encounter ID]            [Admission Date]            [Discharge Date]            [Glucose Level Date]            MAX([Glucose Level]) AS [Max Glucose]  <b>FROM</b> Qualifying Patient List  <b>GROUP BY</b>            [Patient Encounter ID]            [Glucose Level Date]</p> <p><b>Patient Count List ()</b>  <b>SELECT</b>            (              SUM(CASE WHEN [Max Glucose] &gt; 200                    mg/dL THEN 1 ELSE 0)            ÷              ([Discharge Date] – [Admission Date] + 1)            )  <b>FROM</b> Maximum Glucose Per Day  <b>GROUP BY</b>            [Patient Encounter ID]            [Admission Date]            [Discharge Date]</p> <p><b><u>Numerator</u></b>  <b>SELECT</b>            COUNT (*)  <b>FROM</b> Patient Count List</p> <p><b><u>Denominator</u></b>  <b>SELECT</b>            COUNT (*)  <b>FROM</b> Qualifying Patient List</p>	<p>Get the highest blood glucose level for each patient on each date; dates on which no glucose levels were taken are considered not to be hyperglycemic</p> <p>Count the number of days in hyperglycemia</p> <p>Length of stay</p>

## Patients Treated with an Opioid who are Given a Bowel Regimen (NQF 1617)

### Numerator

Patients from the denominator that are given a bowel regimen or there is documentation as to why this was not needed.

### Denominator

Patient stays, except for those with an exclusion, where a scheduled opioid that is initiated or continued.

### Exclusions

Patients are excluded from the denominator if they are under 18 years of age.

Although metric covers inpatient and outpatient, this pseudocode only covers the inpatient metric.

More information, including a list of bowel regimen medications, is available at:

<https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Hospice-Quality-Reporting/Current-Measures.html>

Pseudocode	Clinical Translation
<p><b><u>Identify inclusion criteria flags</u></b></p> <p><b>Opioid Ordered Flag ()</b>  <b>IF COUNT opioid orders &gt; 1</b>  <b>THEN 'Y'</b>  <b>ELSE 'N'</b></p> <p><b>Bowel Regimen Exception Flag ()</b>  <b>If [Documentation that Bowel Regimen not needed]</b>  <b>THEN 'Y'</b>  <b>ELSE 'N'</b></p>	<p>Identify patients who got an order for an opioid</p> <p>This measure may not be in the system as discrete data</p>

Pseudocode	Clinical Translation
<p><u>Qualifying Encounter List</u></p> <pre> SELECT     [Patient Encounter ID] FROM [Patient Encounters] WHERE     [Patient Encounter] IN [Report Date Range] AND [Opioid Ordered Flag] = Y AND [Admit Date] – [Birth Date] ≥ 18 years  AND (     [Admit Date] – [Birth Date] &gt; 74 years     OR [VES-13 Score] &gt; 2      OR [Poor prognosis/terminal illness]      OR [Stage IV Cancer] ) </pre>	<p>The list of qualifying encounters consists of vulnerable adults</p> <p>For encounters in the date range Only patients with an opioid Adults only Vulnerable adults have at least one of the following characteristics:</p> <ul style="list-style-type: none"> <li>• &gt;74 years of age</li> <li>• Vulnerable Elder Survey-13 (VES-13) score &gt;2 (Saliba 2001): this score may not be in the system, and if it is it may not be discrete data</li> <li>• Poor prognosis/terminal illness defined as life expectancy of &lt;6 months): this measure may not be in the system as discrete data</li> <li>• Stage IV Cancer): this may not be available as discrete data</li> </ul>
<p><u>Lab and Administration Information</u></p> <p><b>Diet List ()</b></p> <pre> SELECT     [Patient Encounter ID] FROM [Patient Diet] WHERE     Diet = [High Fiber Diet] </pre> <p><b>Medication List ()</b></p> <pre> SELECT     [Patient Encounter ID] FROM [Ordered Medications] WHERE     Medication Type IN [Laxative, Stool Softener, High Fiber Supplement] </pre>	<p>Get a list of patients on a high fiber diet</p> <p>Diet information may not be in the system as discrete data</p> <p>Get a list of patients with a medication that qualifies as a bowel regimen</p> <p>Only consider laxatives, stool softeners, and high fiber supplements; the specifics on this may vary from system to system</p>

Pseudocode	Clinical Translation
<p><b><u>Define numerator and denominator</u></b></p> <p><b><u>Numerator</u></b>  <b>SELECT</b>                    <b>COUNT([Patient Encounter ID])</b>  <b>FROM [Qualifying Encounter List]</b>  <b>LEFT JOIN [Medication List]</b>    <b>LEFT JOIN [Diet List]</b>    <b>WHERE</b>                      <b>[Mediation List] IS NOT NULL</b>  <b>OR</b>          <b>[Diet List] IS NOT NULL</b>  <b>OR</b>          <b>[Documentation that Bowel Regiment not needed]</b>                    <b>= 'Y'</b></p> <p><b><u>Denominator</u></b>  <b>SELECT</b>                    <b>COUNT(DISTINCT [Patient Encounter ID])</b>  <b>FROM [Qualifying Encounter List]</b></p>	<p>Count the encounters</p> <p>Connect to the list of patients who received a medication bowel regiment</p> <p>Connect to the list of patients who received a dietary bowel regiment</p> <p>Three ways to qualify for the numerator:</p> <ul style="list-style-type: none"> <li>• Qualify with medication</li> <li>• Qualify with diet</li> <li>• Qualify through documentation</li> </ul> <p>Count the vulnerable adults prescribed an opioid inpatient</p>

## NHSN Antimicrobial Use Measure (NQF 2720)

### Numerator

Days of antimicrobial therapy for antibacterial agents administered to adult and pediatric patients in medical, medical/surgical, and surgical wards and medical, medical/surgical, and surgical intensive care units.

### Denominator

Days present for each patient care location—adult and pediatric medical, medical/surgical, and surgical wards and adult and pediatric medical, medical/surgical, and surgical intensive care units—is defined as the number of patients who were present for any portion of each day of a calendar month for each location. The day of admission, discharge, and transfer to and from locations are included in days present. All days present are summed for each location and month, and the aggregate sums for each location-month combination comprise the denominator data for the measure.

### Exclusions

Hospital patient care locations other than adult and pediatric medical, medical/surgical, and surgical wards and adult and pediatric medical, medical/surgical, and surgical intensive care units are excluded from this measure.

Please see NHSN website for documentation:

- <https://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf>
- <https://www.cdc.gov/nhsn/ipfs/aur/index.html>

## Measure Definitions

### Atrial Fibrillation and Atrial Flutter: Chronic Anticoagulation Therapy (NQF1525)

#### Numerator

Patients who are prescribed warfarin or another oral anticoagulant drug that is FDA approved for the prevention of thromboembolism (i.e. apixaban, dabigatran, edoxaban, rivaroxaban).

#### Denominator

All patients aged 18 years and older with a diagnosis of nonvalvular atrial fibrillation or atrial flutter whose assessment of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score indicates a need for anticoagulation therapy. According to the 2018 CHEST guidelines a score of  $\geq 1$  in a male or  $\geq 2$  in a female should be offered stroke prevention. \*Note: This definition was updated from the original metric that was only evaluating CHADS2 risk to instead reflect the most current clinical guidance.

[https://journal.chestnet.org/article/S0012-3692\(18\)32244-X/fulltext](https://journal.chestnet.org/article/S0012-3692(18)32244-X/fulltext)

#### Exclusions

Denominator Exclusions:

- Patients with mitral stenosis or prosthetic heart valves
- Patients with transient or reversible causes of AF (eg, pneumonia, hyperthyroidism, pregnancy, cardiac surgery)

Denominator Exceptions:

Documentation of medical reason(s) for not prescribing warfarin OR another oral anticoagulant drug that is FDA approved for the prevention of thromboembolism (eg, allergy, risk of bleeding, other medical reason)

Documentation of patient reason(s) for not prescribing warfarin OR another oral anticoagulant drug that is FDA approved for the prevention of thromboembolism (eg, economic, social, and/or religious impediments, noncompliance, patient refusal, other patient reason)

Pseudocode	Clinical Translation
<p><b><u>Atrial fibrillation/flutter cohort and CHA<sub>2</sub>DS<sub>2</sub>-VASc Score components</u></b></p> <pre> SELECT   A.[Patient ID] ,A.[ Age] ,A.[Gender] ,B.[Afib Aflutter Diagnosis] ,C.[CHF ICD Diagnosis] ,D.[HTN ICD Diagnosis] ,E.[Stroke TIA Thromboembolism ICD Diagnosis] ,F.[Vascular Disease ICD Diagnosis] ,G.[Diabetes ICD Diagnosis]  INTO #Diagnosis FROM [Patient Demographics] as A  INNER JOIN [Diagnosis Table] as B on A.Patient ID = B.Patient ID LEFT JOIN [Diagnosis Table] as C on A.Patient ID = C.Patient ID LEFT JOIN [Diagnosis Table] as D on A.Patient ID = D.Patient ID LEFT JOIN [Diagnosis Table] as E on A.Patient ID = E.Patient ID LEFT JOIN [Diagnosis Table] as F on A.Patient ID = F.Patient ID LEFT JOIN [Diagnosis Table] as G on A.Patient ID = G.Patient ID  WHERE A. [Patient Age] &gt;= 18 and (C.[ICD9 codes] in (CHF* ) or C.[ICD10 codes] in (CHF*)) and (D.[ICD9 codes] in (HTN* ) or D.[ICD10 codes] in (HTN*)) and (E.[ICD9 codes] in (Stoke/TIA/Thromboembolism* ) or E.[ICD10 codes] in (Stoke/TIA/Thromboembolism*)) and (F.[ICD9 codes] in (Vascular Disease* ) or F.[ICD10 codes] in (Vascular Disease*)) and (G.[ICD9 codes] in (Diabetes* ) or G.[ICD10 codes] in (Diabetes*)) </pre>	<p>Identifying all patients that are over age 18 that have a diagnosis of atrial fibrillation or a flutter.</p> <p>Left joining on the components of the CHA<sub>2</sub>DS<sub>2</sub>-VASc Score. For patients that do NOT have those diagnosis the field should be blank.</p> <p>Limitation Note: CHF diagnosis will have to be further defined and confirmed by looking at ejection fraction data in the chart.</p> <p>* Please refer to index for ICD code definitions.</p>

### CHA<sub>2</sub>DS<sub>2</sub>-VASc Score Calculation

/\*\*\*\*\*\*Step 1\*\*\*\*\*\*/

```
SELECT
    [Patient ID]
    ,SUM ([CHFScore] + [HTNScore] + [AgeScore] + [DMScore] +
[STTScore] + [VascularScore] + [GenderScore])
AS 'TotalScore'
```

INTO #Score

FROM(

SELECT

```
    [Patient ID]
    ,[Age]
    ,[Gender]
    ,[Afib Aflutter Diagnosis]
    ,[CHF ICD Diagnosis]
    ,[HTN ICD Diagnosis]
    ,[Stroke TIA Thromboembolism ICD Diagnosis]
    ,[Vascular Disease ICD Diagnosis]
    ,[Diabetes ICD Diagnosis]
    ,CASE WHEN [CHF ICD Diagnosis] is not null then 1
        ELSE 0 END as CHFScore
    ,CASE WHEN [HTN ICD Diagnosis] is not null then 1
        Else 0 END as HTNScore
    ,CASE WHEN [Patient Age] >= 75 then 2
        WHEN [Patient Age] BETWEEN 65 and 74 then 1
        ELSE 0 END AS AgeScore
    ,CASE WHEN [Diabetes ICD Diagnosis] is not null then 1
        ELSE 0 END as DMScore
    ,CASE WHEN [Stroke TIA Thromboembolism ICD Diagnosis]
is not null then 2
        ELSE 0 END as STTScore
    ,CASE WHEN [Vascular Disease ICD Diagnosis] is not null
then 1
        ELSE 0 END as VascularScore
    ,CASE WHEN [Patient Gender] = 'Female' then 1
        ELSE 0 END as GenderScore
```

FROM #Diagnosis as A

) As Query1

GROUP BY [Patient ID]

/\*\*\*\*\*\*Step 2\*\*\*\*\*\*/

SELECT

```
    [Patient ID]
    ,[Total Score]
```

Create CASE statements to assign the right numbers to the components of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score and then sum up each for a total score for each patient.

Then determine if patient has a qualifying CHA<sub>2</sub>DS<sub>2</sub>-VASc score to be in the cohort. If they do, then flag them for being in the cohort and will use this to narrow down the final list in the next query.

Pseudocode	Clinical Translation
<pre> Into #FinalScore SELECT     A.[Patient ID]     ,A.[Gender]     ,A.[TotalScore]     ,CASE WHEN [Patient Gender] = Female and [TotalScore] &gt;= 2 then 1     WHEN [Patient Gender] = Male and [TotalScore] &gt;= 1 then 1     ELSE 0 END as 'Belongs In Cohort'     From #Score     ) as Query1 Where [Belongs In Cohort] = 1 </pre>	
<p><u>Medication List</u></p> <pre> SELECT     A.[Patient ID]     ,A.[Anticoagulant Medication Name]     ,A.[Anticoagulant Medication Last Filled Date]     ,A.[Anticoagulant Prescriber] INTO #Anticoagulant FROM [Medications Table] as A Where [Patient ID] in Select ([Patient ID] From #FinalScore) and [Anticoagulant Medication Name] in (Warfarin, apixaban, dabigatran, edoxaban, rivaroxaban) </pre>	<p>Get a list of all the patients on anticoagulant therapy and narrow it down to only those that have a qualifying CHA<sub>2</sub>DS<sub>2</sub>-VASc score and are in the cohort we care about.</p>
<p><u>Complete Cohort</u></p> <pre> SELECT     A.[Patient ID]     ,A.[Patient Age]     ,A.[Patient Gender]     ,A.[Afib Aflutter Diagnosis]     ,A.[CHF ICD Diagnosis]     ,A.[HTN ICD Diagnosis]     ,A.[Stroke TIA Thromboembolism ICD Diagnosis]     ,A.[Vascular Disease ICD Diagnosis]     ,A.[Diabetes ICD Diagnosis]     ,B.[TotalScore]     ,C.[Anticoagulant Medication Name]     ,C.[Anticoagulant Medication Last Filled Date]     ,C.[Anticoagulant Prescriber] INTO [Final Cohort] FROM #Diagnosis as A INNER JOIN #FinalScore as B on A.[Patient ID] = B.[Patient ID] LEFT JOIN #Anticoagulant as C on A.[Patient ID] = C.[Patient ID] </pre>	<p>Combine diagnosis cohort Final score, and anticoagulant queries to now get the final cohort of patients that have Atrial fibrillation or Atrial Flutter and a qualifying CHA<sub>2</sub>DS<sub>2</sub>-VASc score that are either on or not on an anticoagulant.</p> <p>If they are NOT on an anticoagulant, those fields will be NULL.</p>

Pseudocode	Clinical Translation
<p><b><u>Numerator and Denominator</u></b></p> <p><b>SELECT</b></p> <p style="padding-left: 40px;"><b>COUNT DISTINCT [Patient ID] as 'Numerator'</b></p> <p><b>FROM [Final Cohort]</b></p> <p><b>Where [Anticoagulant Medication] is not null</b></p> <p><b>SELECT</b></p> <p style="padding-left: 40px;"><b>COUNT DISTINCT [Patient ID] as 'Denominator'</b></p> <p><b>FROM [Final Cohort]</b></p>	<p>Numerator is a count the unique number of patients that are on an anticoagulant medication.</p> <p>Denominator is a count of the unique number of patients in the final cohort.</p> <p>Actionable will be all those patients not currently on an anticoagulant medication.</p>

## INR Monitoring for Individuals on Warfarin (NQF 055)

### Numerator

Percentage of individuals 18 years of age and older with at least 56 days of warfarin therapy who receive and International Normalized Ratio (INR) test during each 56-day interval with warfarin

### Denominator

Total number of individuals in the denominator with an active warfarin prescription for at least 56 days.

### Exclusions

1. Individuals who are monitoring INR at home. These individuals are excluded because the claims associated with home INR monitoring are associated with up to four INR tests per claim. Therefore, a single claim for home INR monitoring would not be representative of a single INR test and would prohibit being able to distinguish if the home INR test was within the 56-day timeframe specified by the numerator of this measure.
2. Individuals who have first or last warfarin claims with missing days' supply.

Pseudocode	Clinical Translation
<p><b><u>Identify all patients still actively on Warfarin</u></b></p> <pre> SELECT DISTINCT   [Patient ID]   ,[Medication Name]   ,[Medication Filled Date] as LastFilledDate   ,[FirstFilledDate]   ,[Medication Status]   ,[Prescriber] INTO #EligibleWarfarinPatients FROM( SELECT DISTINCT   A.[Patient ID]   ,A.[Medication Name]   ,A.[Medication Filled Date]   ,A.[Medication Status]   ,A.[Prescriber]   ,ROW_NUMBER() over (PARTITION by [PatientID] order by [Medication Filled Date] desc) as LastRXRank   ,MIN([Medication Filled Date]) over (PARTITION by [PatientID] as FirstFilledDate FROM [Medications Table] as A WHERE [Medication Name] = 'Warfarin' AND [Medication Status] IN ('ACTIVE', 'HOLD', 'PROVIDER HOLD', 'SUSPENDED') )as A WHERE LastRXRank = 1 and FirstFilledDate &lt;=GETDATE() - 56 </pre>	<p>First identify all patients currently on an active warfarin RX that received their first fill longer than 56 days ago.</p>

Pseudocode	Clinical Translation
<p><b><u>Check for an INR to be completed</u></b></p> <pre> SELECT Distinct * INTO #INR FROM( SELECT     A.[Patient ID]     ,B.[Lab Name] as 'INR Lab Name'     ,B.[Lab Date] as 'INR Lab Date'     ,B.[Lab Result] as 'INR Lab Result'     ,ROW_NUMBER() OVER (PARTITION BY A.[Patient ID] ORDER BY [Lab Date] DESC) AS MostRecentINR  FROM #EligibleWarfarinPatients as A INNER JOIN [Lab Table] as B on A.[Patient ID] = B.[Patient ID] WHERE [Lab Name] = 'INR' and [Lab Date] &gt;= GETDATE() - 56days ) as A WHERE MostRecentINR = 1 </pre>	<p>Check for an INR occurring in patients that are in the Eligible Warfarin group. Want to make sure that patients had at least 1 INR in the last 56 days.</p>
<p><b><u>Combine Warfarin Cohort with INR Lab</u></b></p> <pre> SELECT DISTINCT     A.[Patient ID]     ,A.[Medication Name]     ,A.[Medication Filled Date] as LastFilledDate     ,A.[FirstFilledDate]     ,A.[Medication Status]     ,A.[Prescriber]     ,B.[INR Lab Name]     ,B.[INR Lab Date]     ,B.[INR Lab Result] INTO #Final Cohort FROM #EligibleWarfarinPatients as A LEFT JOIN #INR as B on A.[PatientID] = B.[PatientID] </pre>	

Pseudocode	Clinical Translation
<p><b><u>Define numerator and denominator</u></b></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] Where [INR Lab Date] is not null  SELECT COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT [Numerator] / [Denominator] * 100 % as Score </pre>	<p>Numerator is the total number of patients in the cohort that have had an INR done within each 56 day interval.</p> <p>Denominator is total # of warfarin patients that are currently active on warfarin</p> <p>Actionable will be the patients that still need to complete an INR.</p>

## Heart Failure (HF): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction (NQF 0081(e))

### Numerator

Total number of patients prescribed either an ACE-inhibitor or an ARB medication within a 12-month period when seen in the outpatient setting or at hospital discharge.

\*Prescribed may include:

Outpatient setting: prescription given to the patient for ACE inhibitor or ARB therapy at one or more visits in the measurement period OR patient already taking ACE inhibitor or ARB therapy as documented in current medication list

Inpatient setting: prescription given to the patient for ACE inhibitor or ARB therapy at discharge OR ACE inhibitor or ARB therapy to be continued after discharge as documented in the discharge medication list

### Denominator

All patients aged 18 years and older with a diagnosis of heart failure with a current or prior Left Ventricular Ejection Fraction (LVEF) < 40%

### Exclusions

Documentation of medical reason(s) for not prescribing ACE inhibitor or ARB therapy (eg, hypotensive patients who are at immediate risk of cardiogenic shock, hospitalized patients who have experienced marked azotemia, allergy, intolerance, other medical reasons)

Documentation of patient reason(s) for not prescribing ACE inhibitor or ARB therapy (eg, patient declined, other patient reasons)

Documentation of system reason(s) for not prescribing ACE inhibitor or ARB therapy (eg, other system reasons)

Pseudocode	Clinical Translation
<p><b><u>Identify patients with left ventricular systolic dysfunction</u></b></p> <pre> SELECT   A.[Patient ID]   A.[Age]   ,B.[CHF ICD Diagnosis]   ,B.[CHF Diagnosis Date]   ,C.[Ejection Fraction] INTO #Diagnosis FROM [Patient Demographics] as A INNER JOIN [Diagnosis Table] as B on A.Patient ID = B.Patient ID LEFT JOIN [Ejection Fraction] as C on A.Patient ID = C.Patient ID WHERE A.[Age] &gt;= 18 and ((B.[ICD9 codes] in (CHF* ) or B.[ICD10 codes] in (CHF*)) OR C.[Ejection Fraction] &lt; 40) </pre>	<p>Identify patients with a diagnosis of heart failure. IF ejection fraction data is available include that and narrow down cohort to those with an ejection fraction &lt;40%</p> <p>*Refer to index for CHF ICD 9 and 10 codes.</p>

Pseudocode	Clinical Translation
<p><b>Identify prescriptions for ACE- inhibitors and ARBs</b></p> <pre> SELECT * --All Columns INTO #Medications FROM( SELECT     B.[Patient ID]     ,A.[Medication Name]     ,A.[Medication Filled Date]     ,A.[Medication Status]     ,A.[Prescriber] FROM [Outpatient Medications] as A INNER JOIN #Diagnosis as B on A.[Patient ID] = B.[Patient ID] WHERE [Medication Category] like '%ACE%' OR [Medication Category] like '%ARB%'  UNION  SELECT     B.[Patient ID]     ,A.[Discharge Medication] as 'Medication Name'     ,A.[Discharge Date] as 'Medication Filled Date'     ,A.[Medication Status] as 'Discharge Med'     ,A.[Prescriber] FROM [Discharge Medications] as A INNER JOIN #Diagnosis as B on A.[Patient ID] = B.[Patient ID] WHERE [Discharge Medication Category] like '%ACE%' OR [Discharge Medication Category] like '%ARB%' ) as A </pre>	<p>Identify prescriptions for either ACE-inhibitors or ARBs in the targeted population by inner joining the first query from above. Look for prescriptions both noted on the discharge medication list (if this is a standardized data field) or in the outpatient prescriptions.</p> <p>It's best to UNION these queries together to get one uniform list of all patients on the qualifying medication. You may need to ROW_NUMBER ordered in ASC order to get the first Rx prescribed if patients have multiple rows.</p> <p>*Refer to the index for complete list of medications.</p>

Pseudocode	Clinical Translation
<p><u>Calculate 12-month period and make final cohort</u></p> <pre> SELECT     A.[Patient ID]     A.[Age]     ,A.[CHF ICD Diagnosis]     ,A.[CHF Diagnosis Date]     ,A.[Ejection Fraction]     ,B.[Medication Name]     ,B.[Medication Filled Date]     ,B.[Medication Status]     ,B.[Prescriber]     ,CASE WHEN [Medication Filled Date] is &lt;= DATE(m, 12[CHF Diagnosis Date])         THEN 1         ELSE 0 END as 'Metric Met'  INTO [Final Cohort] FROM #Diagnosis as A LEFT JOIN #Medications as B on A.[Patient ID] = B.[Patient ID] </pre>	<p>Need to compare the diagnosis date of left ventricular systolic dysfunction and the date the medication was first filled to determine if the patient was prescribed an ACE-inhibitor or an ARB within 12 months of being diagnosed.</p>
<p><u>Define numerator and denominator</u></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] WHERE [Metric Met] = 1  SELECT     COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT [Numerator] / [Denominator] * 100 % as Score </pre>	<p>Numerator is the total number of patients that had an ACE-inhibitor or ARB prescribed within 12 months of LVSD diagnosis.</p> <p>Denominator is total count of patients with LVSD diagnosis.</p> <p>Actionable would be all of the patients still not on an ACE-inhibitor or an ARB.</p> <p>*Consider making a separate measure for patients that it has been more than 12 months already since their LVSD diagnosis and they are still not on appropriate medication.</p>

## Heart Failure (HF): Beta Blocker Therapy for LVSD (NQF 0083(e))

### Numerator

Patients who were prescribed\* beta-blocker therapy\*\* either within a 12 month period when seen in the outpatient setting or at hospital discharge

\*Prescribed may include:

Outpatient setting: prescription given to the patient for beta-blocker therapy at one or more visits in the measurement period OR patient already taking beta-blocker therapy as documented in current medication list

Inpatient setting: prescription given to the patient for beta-blocker therapy at discharge OR beta-blocker therapy to be continued after discharge as documented in the discharge medication list

\*\*Beta-blocker therapy should include bisoprolol, carvedilol, or sustained release metoprolol succinate. (see technical specifications for additional information on medications)

### Denominator

All patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40%

LVEF < 40% corresponds to qualitative documentation of moderate dysfunction or severe dysfunction

### Exclusions

Documentation of medical reason(s) for not prescribing beta-blocker therapy (eg, low blood pressure, fluid overload, asthma, patients recently treated with an intravenous positive inotropic agent, allergy, intolerance, other medical reasons)

Documentation of patient reason(s) for not prescribing beta-blocker therapy (eg, patient declined, other patient reasons)

Documentation of system reason(s) for not prescribing beta-blocker therapy (eg, other reasons attributable to the healthcare system)

Pseudocode	Clinical Translation
<p><b><u>Identify patients with left ventricular systolic dysfunction</u></b></p> <pre> SELECT   A.[Patient ID]   A.[Age]   ,B.[CHF ICD Diagnosis]   ,B.[CHF Diagnosis Date]   ,C.[Ejection Fraction] INTO #Diagnosis FROM [Patient Demographics] as A INNER JOIN [Diagnosis Table] as B on A.Patient ID = B.Patient ID LEFT JOIN [Ejection Fraction] as C on A.Patient ID = C.Patient ID WHERE A.[Age] &gt;= 18 and ((B.[ICD9 codes] in (CHF* ) or B.[ICD10 codes] in (CHF*)) OR C.[Ejection Fraction] &lt; 40) </pre>	<p>Identify patients with a diagnosis of heart failure. IF ejection fraction data is available include that and narrow down cohort to those with an ejection fraction &lt;40%</p> <p>*Refer to index for CHF ICD 9 and 10 codes.</p>

Pseudocode	Clinical Translation
<p><b><u>Identify prescriptions for beta blockers</u></b></p> <pre> SELECT * --All Columns INTO #Medications FROM( SELECT     B.[Patient ID]     ,A.[Medication Name]     ,A.[Medication Filled Date]     ,A.[Medication Status]     ,A.[Prescriber] FROM [Outpatient Medications] as A INNER JOIN #Diagnosis as B on A.[Patient ID] = B.[Patient ID] WHERE [Medication Name] in (Bisoprolol, Carvedilol, Metoprolol SR)  UNION  SELECT     B.[Patient ID]     ,A.[Discharge Medication] as 'Medication Name'     ,A.[Discharge Date] as 'Medication Filled Date'     ,A.[Medication Status] as 'Discharge Med'     ,A.[Prescriber] FROM [Discharge Medications] as A INNER JOIN #Diagnosis as B on A.[Patient ID] = B.[Patient ID] WHERE [Discharge Medication] in (Bisoprolol, Carvedilol, Metoprolol SR) ) as A </pre>	<p>Identify prescriptions for beta blockers in the targeted population by inner joining the first query from above. Look for prescriptions both noted on the discharge medication list (if this is a standardized data field) or in the outpatient prescriptions.</p> <p>It's best to UNION these queries together to get one uniform list of all patients on the qualifying medication. You may need to ROW_NUMBER ordered in ASC order to get the first Rx prescribed if patients have multiple rows.</p> <p>*Refer to the index for complete list of medications.</p>

Pseudocode	Clinical Translation
<p><u>Calculate 12-month period and make final cohort</u></p> <pre> SELECT     A.[Patient ID]     A.[Age]     ,A.[CHF ICD Diagnosis]     ,A.[CHF Diagnosis Date]     ,A.[Ejection Fraction]     ,B.[Medication Name]     ,B.[Medication Filled Date]     ,B.[Medication Status]     ,B.[Prescriber]     ,CASE WHEN [Medication Filled Date] is &lt;= DATE(m, 12[CHF Diagnosis Date])         THEN 1         ELSE 0 END as 'Metric Met'  INTO [Final Cohort] FROM #Diagnosis as A LEFT JOIN #Medications as B on A.[Patient ID] = B.[Patient ID] </pre>	<p>Need to compare the diagnosis date of left ventricular systolic dysfunction and the date the medication was first filled to determine if the patient was prescribed beta blocker 12 months of being diagnosed.</p>
<p><u>Define numerator and denominator</u></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] WHERE [Metric Met] = 1  SELECT     COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT [Numerator] / [Denominator] * 100 % as Score </pre>	<p>Numerator is the total number of patients that had beta blocker prescribed within 12 months of LVSD diagnosis.</p> <p>Denominator is total count of patients with LVSD diagnosis.</p> <p>Actionable would be all the patients still not on a beta blocker.</p> <p>*Consider making a separate measure for patients that it has been more than 12 months already since their LVSD diagnosis and they are still not on appropriate medication.</p>

## Statin Use in Persons with Diabetes (NQF 2712)

### Numerator

The number of patients in the denominator who received a prescription fill for a statin or statin combination during the measurement year

### Denominator

The denominator includes subjects aged 41 years – 75 years as of the last day of the measurement year who are continuously enrolled during the measurement period. Subjects include patients who were dispensed two or more prescription fills for a hypoglycemic agent during the measurement year

### Exclusions

Those persons receiving hospice care at any point during the measurement year.

2017 - added the exclusion:

Patients with ESRD. Patients with ESRD can be identified using:

RxHCC 121 - Dialysis Status (for Payment Year 2015) or

RxHCC 261 - Dialysis Status (for Payment Year 2016 or 2017) or by using the ICD-9 and/or ICD-10 codes

Identify patients on two or more hypoglycemic agents during the measurement year and are between 41 years and 75 years old

```

SELECT Distinct
      [Patient ID]
      ,[Patient Age]
INTO #DiabetesCohort
FROM(
SELECT DISTINCT *
,ROW_NUMBER () OVER (PARTITION BY [Patient ID] ORDER
BY [Medication Filled Date] DESC) AS NumberOfRxs
FROM(
SELECT
      A.[Patient ID]
      ,B.[Patient Age]
      ,A.[Medication Name]
      ,A.[Medication Filled Date]
      ,A.[Medication Status]
      ,A.[Prescriber]
FROM [Outpatient Medications] as A
INNER JOIN [Patient Demographics] as B on A.[Patient ID] =
B.[Patient ID]
WHERE [Medication Category] like '%Hypoglycemic
Agent%'
and [Medication Filled Date] BETWEEN [Measurement Year
Start] and [Measurement Year End]
([Patient Age] >= 41years or [Patient Age] <= 75years)
UNION

SELECT
      A.[Patient ID]
      ,B.[Patient Age]
      ,A.[Discharge Medication] as 'Medication Name'
      ,A.[Discharge Date] as 'Medication Filled Date'
      ,A.[Medication Status] as 'Discharge Med'
      ,A.[Prescriber]
FROM [Discharge Medications] as A
INNER JOIN [Patient Demographics] as B on A.[Patient ID] =
B.[Patient ID]
WHERE [Discharge Medication Category] '%Hypoglycemic
Agent%'
and [Discharge Date] BETWEEN [Measurement Year Start]
and [Measurement Year End]
and ([Patient Age] >= 41years or [Patient Age] <= 75years)
) as A

```

Look at both outpatient and discharge medications for hypoglycemic agents and determine if a patient received at least two fills for a medication in this category within the measurement year. Measurement year can be defined locally.

\*Refer to index for list of hypoglycemic agents

Also inner join to the patient demographics to ensure the patients you are capturing are between ages 41 to 75.

<p>)as B WHERE NumberOfRxs &gt;1</p>	
<p><b><u>Identify patients receiving a statin</u></b></p> <pre> SELECT DISTINCT     [Patient ID]     ,[Medication Name]     ,[Medication Filled Date]     ,[Medication Status]     ,[Prescriber] INTO #Statin FROM( SELECT DISTINCT * ,ROW_NUMBER () OVER (PARTITION BY [Patient ID] ORDER BY [Medication Filled Date] DESC) AS MostRecentStatin FROM( SELECT     B.[Patient ID]     ,A.[Medication Name]     ,A.[Medication Filled Date]     ,A.[Medication Status]     ,A.[Prescriber] FROM [Outpatient Medications] as A INNER JOIN #DiabetesCohort as B on A.[Patient ID] = B.[Patient ID] WHERE [Medication Category] like '%Statin%' and [Medication Filled Date] BETWEEN [Measurement Year Start] and [Measurement Year End]  UNION  SELECT     B.[Patient ID]     ,A.[Discharge Medication] as 'Medication Name'     ,A.[Discharge Date] as 'Medication Filled Date'     ,A.[Medication Status] as 'Discharge Med'     ,A.[Prescriber] FROM [Discharge Medications] as A INNER JOIN #DiabetesCohort as B on A.[Patient ID] = B.[Patient ID] WHERE [Discharge Medication Category] like '%Statin%%' and [Discharge Date] BETWEEN [Measurement Year Start] and [Measurement Year End] ) as A </pre>	<p>Check in both outpatient prescription data and discharge prescription data for patients receiving a statin medication during the measurement year that are also in the diabetes cohort.</p>

<p><b><u>Create final cohort</u></b></p> <pre> SELECT Distinct   A.[Patient ID]  ,A.[Patient Age]  ,B.[Medication Name]  ,B.[Medication Filled Date]  ,B.[Medication Status]  ,B.[Prescriber] INTO #Final Cohort FROM #DiabetesCohort as A LEFT JOIN #Statin as B on A.[PatientID] = B.[PatientID] </pre>	<p>Combine the patient information with that of who received a statin</p>
<p><b><u>Define numerator and denominator</u></b></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] WHERE [Medication Name] is not null  SELECT       COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT [Numerator] / [Denominator] * 100 % as Score </pre>	<p>Numerator is the total number of patients that have a statin</p> <p>Denominator is total count of patients in the diabetes cohort</p> <p>Actionable would be all the patients still not on a statin medication for the measurement year</p>

## Comprehensive Diabetes Care: HbA1c Poor Control (>9%) (NQF 0059)

### Numerator

Patients whose most recent HbA1c level is greater than 9.0% or is missing a result, or for whom an HbA1c test was not done during the measurement year. The outcome is an out of range result of an HbA1c test, indicating poor control of diabetes. Poor control puts the individual at risk for complications including renal failure, blindness, and neurologic damage. There is no need for risk adjustment for this intermediate outcome measure.

### Denominator

Patients 18-75 years of age by the end of the measurement year who had a diagnosis of diabetes (type 1 or type 2) during the measurement year or the year prior to the measurement year.

### Exclusions

Exclude patients who use hospice services or elect to use a hospice benefit any time during the measurement year, regardless of when the services began.

Exclude patients who did not have a diagnosis of diabetes, in any setting, during the measurement year or the year prior to the measurement year and who had a diagnosis of gestational diabetes or steroid-induced diabetes in any setting, during the measurement year or the year prior to the measurement year.

Pseudocode	Clinical Translation
<p><b><u>Identify patients with for diabetes denominator cohort</u></b></p> <pre> SELECT   A.[Patient ID]   ,A.[Age]   ,B.[Diabetes ICD Diagnosis]   ,B.[Diabetes Diagnosis Date] INTO #Cohort FROM [Patient Demographics] as A INNER JOIN [Diagnosis Table] as B on A.Patient ID = B.Patient ID WHERE ([Age] &gt;= 18years or [Age] &lt;= 75years and ((B.[ICD9 codes] in (Diabetes* ) or B.[ICD10 codes] in (Diabetes*)))           </pre>	<p>*Please refer to index for ICD9 and ICD 10 codes included to define Type 1 and 2 Diabetes.</p>

Pseudocode	Clinical Translation
<p><b><u>Identify most recent A1C captured for patients within Measurement year</u></b></p> <pre> SELECT * INTO #A1c FROM( SELECT     A.[Patient ID]     ,B.[Lab Name] as 'A1c Lab Name'     ,B.[Lab Date] as 'A1c Date'     ,B.[Lab Result] as 'A1c Lab Result'     ,ROW_NUMBER() OVER (PARTITION BY A.[Patient ID] ORDER BY [Lab Date] DESC) AS MostRecentA1c  FROM #Cohort as A INNER JOIN [Lab Table] as B on A.[Patient ID] = B.[Patient ID] WHERE [Lab Name] = 'A1c' and [Lab Date] BETWEEN [Measurement Year Start] and [Measurement Year End] ) Where MostRecentA1c = 1 </pre>	<p>Find the most recent A1c that occurred in our cohort of interest during the measurement year.</p>
<p><b><u>Join the identified lab information to the patient cohort and set business rules for meeting the metric</u></b></p> <pre> SELECT DISTINCT     A.[Patient ID]     ,A.[Age]     ,A.[Diabetes ICD Diagnosis]     ,A.[Diabetes Diagnosis Date]     ,B.[A1c Lab Name]     ,B.[A1c Date]     ,B.[A1c Lab Result]     ,CASE WHEN [A1c Lab Result] &gt; 9 or B.[Patient ID] Is Null then 1     ELSE 0     END AS Numerator INTO [Final Cohort] FROM #Cohort as A INNER JOIN #A1c as B on A.[Patient ID] = B.[Patient ID] </pre>	<p>Using case statements, flag whether or not patients have met the metric. If patients have an A1c greater than 9.0% or if they have not had an A1c done at all in the measurement year (this is where the [Patient ID] from the A1c lab table would be null) they are not meeting the measure and would fall into the numerator cohort.</p>

Pseudocode	Clinical Translation
<p><b><u>Define numerator and denominator</u></b></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] WHERE [Numerator] = 1  SELECT COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT [Numerator] / [Denominator] * 100 % as Score </pre>	<p>Numerator is the total number of patients that had an A1c &gt;9% or did not have an A1c at all in the measurement year</p> <p>Denominator is total count of patients in the cohort</p>

Use of Opioids from Multiple Providers and at High Dosage in Persons Without Cancer (NQF 2951)

<p><b>Numerator</b>  The proportion (XX out of 1,000) of individuals without cancer receiving prescriptions for opioids with a daily dosage greater than 120mg morphine equivalent dose (MED) for 90 consecutive days or longer, AND who received opioid prescriptions from four (4) or more prescribers AND four (4) or more pharmacies.</p> <p><b>Denominator</b>  Any member in the denominator with opioid prescription claims where the MED is greater than 120mg for 90 consecutive days or longer (MED calculation included in measure details) AND who received opioid prescriptions from 4 or more prescribers AND 4 or more pharmacies.</p> <p><b>Exclusions</b>  Any member with a diagnosis for Cancer or a Prescription Drug Hierarchical Condition Category (RxHCC) 8, 9, 10, or 11 for Payment Year 2015; or RxHCC 15, 16, 17, 18, or 19 for Payment Year 2016 (see list in S.11 and S.2b); or a hospice indicator (Medicare Part D) from the enrollment database.</p>
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Pseudocode	Clinical Translation
<p><b><u>Identify patients that are on opioids and receiving from multiple providers/pharmacies</u></b></p> <pre> SELECT DISTINCT * INTO # MedicationCohort FROM( SELECT       A.[Patient ID]       ,A.[Prescription ID]       ,A.[Medication Name]       ,B.[Morphine Equivalent]       ,A.[Medication Filled Date]       ,A.[Medication Status]       ,A.[Prescriber]       ,A.[Pharmacy]       ,SUM([Present Days Supply] as Total Days Supply Dispensed       ,[Morphine Equivalent] * ([Qty] / [Present Days Supply]))       END AS Daily Morphine       ,ROW_NUMBER () OVER (PARTITION BY [Patient ID], [Prescriber] ORDER BY [Medication Filled Date] DESC) AS CountOfPrescribers       ,ROW_NUMBER () OVER (PARTITION BY [Patient ID], [Pharmacy] ORDER BY [Medication Filled Date] DESC) AS CountOfPharmacies FROM [Outpatient Medications] as A INNER JOIN #[Crosswalk Pain Morphine Equivalent Table] as B on A.[Drug ID] = B.[Drug ID] WHERE [Medication Filled Date] &gt; getdate() - 120 ) AS A WHERE CountOfPrescribers &gt;= 4 and CountOfPharmacies &gt;= 4 and Daily Morphine &gt; 120 and Total Days Supply Dispensed &gt;= 90 </pre>	<p>Recommend looking back for prescriptions dispensed at least 120 days so you do not miss any prescriptions the patient may have been taking within the 90-day time frame.</p> <p>Need to SUM days supply of each prescription to get the “total days supply dispensed” and make sure patient has been on therapy for at least 90 days. Also need to make sure morphine equivalents for each prescription are over 120MED. You can Row_Number or count the number of pharmacies and prescribers by their ID’s to make sure there are 4 or greater of each to meet the metric criteria.</p> <p>*Refer to index for definitions of Morphine Equivalents</p>

Pseudocode	Clinical Translation
<p><b><u>Find patients that have a cancer diagnosis and create final cohort</u></b></p> <pre> SELECT DISTINCT     [Patient ID] INTO #CancerCohort     FROM Outpatient Diagnosis as A     INNER JOIN Crosswalk Diagnosis as B on A.ICD10ID = B.ICD10ID     INNER JOIN #MedicationCohort as C on A.Patient ID = C.Patient ID     WHERE VisitDateTime &gt; getdate() - 365 and Diagnosis = 'Cancer Diagnosis Cohort*'  SELECT DISTINCT A.[Patient ID] A.[Prescription ID] A.[Medication Name] A.[Morephine Equivalent] A.[Medication Filled Date] A.[Medication Status] A.[Prescriber] A.[Pharmacy] A.[Total Days Supply Dispensed] A.[Daily Morphine] ,CASE WHEN B.PatientID is not null then 1 ELSE 0 END As 'Cancer Diagnosis' INTO [Final Cohort] FROM #MedicationCohort as A LEFT JOIN #CancerCohort as B on A.Patient ID = B.Patient ID </pre>	<p>Use the above defined medication cohort to then search for patients that have had an ICD 10 encounter for a cancer diagnosis in the past year. *Refer to index sheet for ICD10 cancer diagnosis cohort definitions</p> <p>LEFT JOIN patients that have a cancer diagnosis onto the medication table so that you can have a flag to include them in the denominator still, but exclude them from the count with the numerator.</p>

Pseudocode	Clinical Translation
<p><b><u>Define numerator and denominator</u></b></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] Where [Cancer Diagnosis] = 0  SELECT COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT ([Numerator] / [Denominator]) * 1000 as Score </pre>	<p>Count the numerator where "Cancer Diagnosis" equals 0, meaning they do NOT have a cancer diagnosis.</p> <p>Multiple final score by 1000 to get Number of patients per 1000</p>

**Use of Opioids at High Dosage in Persons Without Cancer (NQF 2940)**

<p><b>Numerator</b>  The proportion (XX out of 1,000) of individuals without cancer receiving prescriptions for opioids with a daily dosage greater than 120mg morphine equivalent dose (MED) for 90 consecutive days or longer.</p> <p><b>Denominator</b>  Any member in the denominator with opioid prescription claims where the MED is greater than 120mg for 90 consecutive days or longer (MED calculation included in measure details).</p> <p><b>Exclusions</b>  Any member with a diagnosis for Cancer or a Prescription Drug Hierarchical Condition Category (RxHCC) 8, 9, 10, or 11 for Payment Year 2015; or RxHCC 15, 16, 17, 18, or 19 for Payment Year 2016 (see list in S.11 and S.2b); or a hospice indicator (Medicare Part D) from the enrollment database.</p>
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Pseudocode	Clinical Translation
<p><b><u>Identify patients that meet MED criteria for 90 consecutive days</u></b></p> <pre> SELECT DISTINCT * INTO # MedicationCohort FROM( SELECT     A.[Patient ID]     ,A.[Prescription ID]     ,A.[Medication Name]     ,B.[Morphine Equivalent]     ,A.[Medication Filled Date]     ,A.[Medication Status]     ,A.[Prescriber]     ,A.[Pharmacy]     ,SUM([Present Days Supply] as Total Days Supply Dispensed     ,[Morphine Equivalent] * ([Qty] / [Present Days Supply]))     END AS Daily Morphine FROM [Outpatient Medications] as A INNER JOIN #[Crosswalk Pain Morphine Equivalent Table] as B on A.[Drug ID] = B.[Drug ID] WHERE [Medication Filled Date] &gt; getdate() - 120 ) AS A WHERE Daily Morphine &gt; 120 and Total Days Supply Dispensed &gt;= 90 </pre>	<p>Same logic as previous measure, but can remove counts of pharmacies and prescribers.</p> <p>Need to SUM days supply of each prescription to get the “total days supply dispensed” and make sure patient has been on therapy for at least 90 days. Also need to make sure morphine equivalents for each prescription are over 120MED.</p> <p>*Refer to index for definitions of Morphine Equivalents</p>

Pseudocode	Clinical Translation
<p><b><u>Find patients that have a cancer diagnosis and create final cohort</u></b></p> <pre> SELECT DISTINCT     [Patient ID] INTO #CancerCohort     FROM Outpatient Diagnosis as A     INNER JOIN Crosswalk Diagnosis as B on A.ICD10ID = B.ICD10ID     INNER JOIN #MedicationCohort as C on A.Patient ID = C.Patient ID     WHERE VisitDateTime &gt; getdate() - 365 and Diagnosis = 'Cancer Diagnosis Cohort*'  SELECT DISTINCT A.[Patient ID] A.[Prescription ID] A.[Medication Name] A.[Morephine Equivalent] A.[Medication Filled Date] A.[Medication Status] A.[Prescriber] A.[Pharmacy] A.[Total Days Supply Dispensed] A.[Daily Morphine] ,CASE WHEN B.PatientID is not null then 1 ELSE 0 END As 'Cancer Diagnosis' INTO [Final Cohort] FROM #MedicationCohort as A LEFT JOIN #CancerCohort as B on A.Patient ID = B.Patient ID </pre>	<p>Use the above defined medication cohort to then search for patients that have had an ICD 10 encounter for a cancer diagnosis in the past year. *Refer to excel sheet for ICD10 definitions</p> <p>LEFT JOIN patients that have a cancer diagnosis onto the medication table so that you can have a flag to include them in the denominator still, but exclude them from the count with the numerator.</p>

Pseudocode	Clinical Translation
<p><b><u>Define numerator and denominator</u></b></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] Where [Cancer Diagnosis] = 0  SELECT COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT ([Numerator] / [Denominator]) * 1000 as Score </pre>	<p>Count the numerator where "Cancer Diagnosis" equals 0, meaning they do NOT have a cancer diagnosis.</p> <p>Multiple final score by 1000 to get Number of patients per 1000</p>

### Use of Opioids from Multiple Providers in Persons Without Cancer (NQF 2950)

#### Numerator

The proportion (XX out of 1,000) of individuals without cancer receiving prescriptions for opioids from four (4) or more prescribers AND four (4) or more pharmacies.

#### Denominator

Any member in the denominator who received opioid prescription claims from 4 or more prescribers AND 4 or more pharmacies.

#### Exclusions

Any member with a diagnosis for Cancer or a Prescription Drug Hierarchical Condition Category (RxHCC) 8, 9, 10, or 11 for Payment Year 2015; or RxHCC 15, 16, 17, 18, or 19 for Payment Year 2016; (see list in S.11 and S.2b); or a hospice indicator from the enrollment database.

Pseudocode	Clinical Translation
<p><b><u>Identify patients that have received prescriptions from 4 or more pharmacies and 4 or more providers</u></b></p> <pre> SELECT DISTINCT * INTO # MedicationCohort FROM( SELECT     A.[Patient ID]     ,A.[Prescription ID]     ,A.[Medication Name]     ,B.[Morphine Equivalent]     ,A.[Medication Filled Date]     ,A.[Medication Status]     ,A.[Prescriber]     ,A.[Pharmacy]     ,SUM([Present Days Supply] as Total Days Supply Dispensed     ,[Morphine Equivalent] * ([Qty] / [Present Days Supply])     END AS Daily Morphine     ,ROW_NUMBER () OVER (PARTITION BY [Patient ID], [Prescriber] ORDER BY [Medication Filled Date] DESC) AS CountOfPrescribers     ,ROW_NUMBER () OVER (PARTITION BY [Patient ID], [Pharmacy] ORDER BY [Medication Filled Date] DESC) AS CountOfPharmacies FROM [Outpatient Medications] as A INNER JOIN #[Crosswalk Pain Morphine Equivalent Table] as B on A.[Drug ID] = B.[Drug ID] WHERE [Medication Filled Date] &gt; getdate() - 365 ) AS A WHERE CountOfPrescribers &gt;= 4 and CountOfPharmacies &gt;= 4 </pre>	<p>Code is similar to first pain management metric. A date was not specified in the metric, so arbitrarily chose to look at patients dispensed an opioid within the last year.</p>

Pseudocode	Clinical Translation
<p><b><u>Find patients that have a cancer diagnosis and create final cohort</u></b></p> <pre> SELECT DISTINCT     [Patient ID] INTO #CancerCohort     FROM Outpatient Diagnosis as A     INNER JOIN Crosswalk Diagnosis as B on A.ICD10ID = B.ICD10ID     INNER JOIN #MedicationCohort as C on A.Patient ID = C.Patient ID     WHERE VisitDateTime &gt; getdate() - 365 and Diagnosis = 'Cancer Diagnosis Cohort*'  SELECT DISTINCT A.[Patient ID] A.[Prescription ID] A.[Medication Name] A.[Morephine Equivalent] A.[Medication Filled Date] A.[Medication Status] A.[Prescriber] A.[Pharmacy] A.[Total Days Supply Dispensed] A.[Daily Morphine] ,CASE WHEN B.PatientID is not null then 1 ELSE 0 END As 'Cancer Diagnosis' INTO [Final Cohort] FROM #MedicationCohort as A LEFT JOIN #CancerCohort as B on A.Patient ID = B.Patient ID </pre>	<p>Use the above defined medication cohort to then search for patients that have had an ICD 10 encounter for a cancer diagnosis in the past year.</p> <p>*Refer to index for ICD10 definitions</p> <p>LEFT JOIN patients that have a cancer diagnosis onto the medication table so that you can have a flag to include them in the denominator still, but exclude them from the count with the numerator.</p>

Pseudocode	Clinical Translation
<p><u>Define numerator and denominator</u></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] Where [Cancer Diagnosis] = 0  SELECT COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT ([Numerator] / [Denominator]) * 1000 as Score </pre>	<p>Count the numerator where "Cancer Diagnosis" equals 0, meaning they do NOT have a cancer diagnosis.</p> <p>Multiple final score by 1000 to get Number of patients per 1000</p>

### Continuity of Pharmacotherapy for Opioid Use Disorder (NQF 3175)

#### Numerator

Percentage of adults 18-64 years of age with pharmacotherapy for opioid use disorder (OUD) who have at least 180 days of continuous treatment.

#### Denominator

Individuals in the denominator who have at least 180 days of continuous pharmacotherapy with a medication prescribed for OUD without a gap of more than seven days

#### Exclusions

None

Pseudocode	Clinical Translation
<p><b>Identify patients in the Denominator</b></p> <pre> SELECT DISTINCT * INTO Denominator FROM( SELECT DISTINCT * FROM( SELECT     A.[Patient ID]     ,A.[Prescription ID]     ,A.[Medication ID]     ,A.[Medication Name]     ,A.[Medication Filled Date]     ,A.[Medication Status]     ,A.[Prescriber]     ,A.[Pharmacy]     ,A.[Days Supply]     ,SUM([Days Supply] as TotalDaysSupplyDispensed     ,DATEDIFF(dd,LAG(DATEADD(dd,[Days Supply],[Medication Filled Date])) over (partition by [Patient ID],[Medication ID] ORDER BY DATEADD(dd,[Days Supply],[Medication Filled Date])),[Medication Filled Date]) as DaysToNewFill FROM [Outpatient Medications] as A INNER JOIN [Patient Demographics] as B on A.[Patient ID] = B.[Patient ID] WHERE Medication Name in ('Methadone', 'Buprenorphine', 'Buprenorphine Naloxone', 'Naltrexone') and [Medication Filled Date] &gt; getdate() - 210 and (B.[Age] &gt;= 18years or B.[Age] &lt;= 64years) ) AS A WHERE DaysToNewFill &lt;= 7 )AS B WHERE TotalDaysSupplyDispensed &gt;= 180 </pre>	<p>For the denominator cohort, need to identify patients that have received OUD pharmacotherapy that have been on treatment for at least 180 days and had no more than a 7 day break in therapy.</p> <p>Using a LAG function we can find the difference between the date of the end of treatment for each prescription and the next date a prescription was filled to find out how many day were in between each fill [DaysToNewFill]. This will help us to calculate if there was more than a 7 day gap in therapy.</p> <p>We then can look at the sum of [TotalDaysSupplyDispensed] to see if at least 180 days was given to the patient.</p>

Pseudocode	Clinical Translation
<p><b><u>Identify patients in the Numerator</u></b></p> <pre> SELECT DISTINCT *   INTO Numerator FROM( SELECT       A.[Patient ID]     ,A.[Prescription ID]     ,A.[Medication ID]     ,A.[Medication Name]     ,A.[Medication Filled Date]     ,A.[Medication Status]     ,A.[Prescriber]     ,A.[Pharmacy]     ,A.[Days Supply]     ,SUM([Days Supply] as TotalDaysSupplyDispensed     ,DATEADD(dd,[Days Supply],[Medication Filled Date]) as EndOfTx     ,DATEDIFF(dd,LAG(DATEADD(dd,[Days Supply],[Medication Filled Date])) over (partition by [Patient ID],[Medication ID]     ORDER BY DATEADD(dd,[Days Supply],[Medication Filled Date])),[Medication Filled Date]) as DaysToNewFill FROM [Outpatient Medications] as A INNER JOIN [Patient Demographics] as B on A.[Patient ID] = B.[Patient ID] WHERE Medication Name in ('Methadone', 'Buprenorphine', 'Buprenorphine Naloxone', 'Naltrexone') and [Medication Filled Date] &gt; getdate() - 210 and (B.[Age] &gt;= 18years or B.[Age] &lt;= 64years) ) AS A WHERE TotalDaysSupplyDispensed &gt;= 180 </pre>	<p>This step is very similar to the first except we are now looking for any patient that had at least 180 days of therapy dispensed, regardless of the gaps in therapy.</p>

Pseudocode	Clinical Translation
<p><u>Define numerator and denominator</u></p> <pre>SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Numerator]</pre> <pre>SELECT COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Denominator]</pre> <pre>SELECT [Numerator] / [Denominator] * 100 % as Score</pre>	<p>Numerator is a count of all the patients that had at least 180 days of therapy.</p> <p>Denominator is a count of all the patients with at least 180 days of therapy and no breaks between prescriptions greater than 7 days.</p>

**Diabetes Screening for People With Schizophrenia or Bipolar Disorder Who Are Using Antipsychotic Medications (SSD) (NQF 1932)**

<p><b>Numerator</b> Among patients 18-64 years old with schizophrenia or bipolar disorder, those who were dispensed an antipsychotic medication and had a diabetes screening testing during the measurement year</p> <p><b>Denominator</b> Patients ages 18 to 64 years of age as of the end of the measurement year (e.g., December 31) with a schizophrenia or bipolar disorder diagnosis and who were prescribed an antipsychotic medication.</p> <p><b>Exclusions</b> Exclude members who use hospice services or elect to use a hospice benefit any time during the measurement year, regardless of when the services began.</p> <p>Exclude patients with diabetes during the measurement year or the year prior to the measurement year.</p> <p>Exclude patients who had no antipsychotic medications dispensed during the measurement year.</p>
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Pseudocode	Clinical Translation
<p><b><u>Identify patients with Schizophrenia or Bipolar disorder that also met age cutoffs and had an antipsychotic dispensed</u></b></p> <pre> SELECT * INTO #Cohort FROM(  SELECT     A.[Patient ID]     A.[Age]     ,B.[Schizophrenia_Bipolar ICD Diagnosis]     ,B.[Schizophrenia_Bipolar Diagnosis Date]     ,C.[Medication Name]     ,C.[Medication Filled Date]     ,C.[Medication Status]     ,C.[Prescriber]     ,ROW_NUMBER () OVER (PARTITION BY A.[Patient ID] ORDER BY C.[Medication Filled Date] DESC) AS MostRecentAntipsychotic  FROM [Patient Demographics] as A INNER JOIN [Diagnosis Table] as B on A.Patient ID = B.Patient ID INNER JOIN [Outpatient Medications] as C on A.Patient ID = C.Patient ID Where ((([Age] &gt;= 18years or [Age] &lt;= 64years) and (B.[ICD9 codes] in (Schizophrenia_Bipolar* ) or B.[ICD10 codes] in (Schizophrenia_Bipolar*)) and C.[Medication Category] = 'Antipsychotic' and [Medication Filled Date] BETWEEN [Measurement Year Start] and [Measurement Year End]) ) As A Where MostRecentAntipsychotic = 1 </pre>	<p>Use diagnosis ICD code information to identify patients that should be in the denominator.</p> <p>Join that information with prescription information identifying patients that were dispensed an antipsychotic medication during the measurement year.</p> <p>*Refer to index for Schizophrenia and Bipolar ICD Code definitions</p>



Pseudocode	Clinical Translation
<p><u>Define numerator and denominator</u></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] Where [Diabetes Monitoring Lab Result] is not null  SELECT COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT [Numerator] / [Denominator] * 100 % as Score </pre>	<p>Numerator is a count of the total number of patients that have had a Diabetes Monitoring Lab done</p> <p>Denominator is total count of patients in the Final Cohort</p> <p>Actionable would be all the patients without a diabetes monitoring lab completed (where [Diabetes Monitoring Lab Result] is null)</p>

### Patients taking lithium with no recent monitoring (Not NQF Endorsed)

<p><b>Numerator</b> Percent of patients prescribed lithium without lithium level in past 6 months or serum creatinine in past 12 months.</p> <p><b>Denominator</b> Patients with an active prescription for lithium.</p> <p><b>Exclusions</b></p>
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Pseudocode	Clinical Translation
<p><u>Identify patients on lithium</u></p> <pre> SELECT * INTO #Cohort FROM( SELECT A.[Patient ID] ,A.[Medication Name] ,A.[Medication Filled Date] ,A.[Medication Status] ,A.[Prescriber] ,ROW_NUMBER() OVER (PARTITION BY [Patient ID] ORDER BY [Medication Filled Date] DESC) AS MostRecentRx  FROM [Medications Table] as A WHERE [Medication Name] = 'Lithium' and [Medication Status] = 'Active' ) WHERE MostRecentRx = 1 </pre>	<p>Identify all patients that are actively prescribed lithium. Pull out the most recent prescription information.</p>



Pseudocode	Clinical Translation
<p><u>Calculate if they met the metric and create final cohort</u></p> <pre> SELECT     A.[Patient ID]     ,A.[Medication Name]     ,A.[Medication Filled Date]     ,A.[Medication Status]     ,A.[Prescriber]     ,B.[Scr Lab Name]     ,B.[Scr Lab Date]     ,B.[Scr Lab Result]     ,C.[Lithium Lab Name]     ,C.[Lithium Lab Date]     ,C.[Lithium Lab Result]     ,CASE WHEN B.[Scr Lab Date] is null or [Lithium Lab Date] is null         THEN 0         ELSE 1 END as 'MetricMet' INTO [Final Cohort] FROM #Cohort as A LEFT JOIN #Scr as B on A.[Patient ID] = B.[Patient ID] LEFT JOIN #Lithium as C on A.[Patient ID] = C.[Patient ID] </pre>	<p>Patients that are missing a serum creatinine lab OR missing a lithium lab did NOT meet the metric and are still actionable.</p>
<p><u>Define numerator and denominator</u></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] Where [Metric Met] = 0  SELECT     COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT [Numerator] / [Denominator] * 100 % as Score </pre>	<p>Numerator is the total number of patients that are still missing either a serum creatinine lab or a lithium lab.</p> <p>Denominator is total count of patients on lithium.</p> <p>Lower is better for the score</p>

## Avoidance of Antibiotic Treatment in Adults With Acute Bronchitis (AAB) (NQF 0058)

### Numerator

Patients who were dispensed antibiotic medication on or three days after the index episode start date (a higher rate is better). The measure is reported as an inverted rate (i.e. 1- numerator/denominator) to reflect the number of people that were not dispensed an antibiotic.

### Denominator

All patients 18 years of age as of January 1 of the year prior to the measurement year to 64 years as of December 31 of the measurement year with an outpatient or ED visit with any diagnosis of acute bronchitis during the Intake Period (January 1–December 24 of the measurement year).

### Exclusions

All patients 18 years of age as of January 1 of the year prior to the measurement year to 64 years as of December 31 of the measurement year with an outpatient or ED visit with any diagnosis of acute bronchitis during the Intake Period (January 1–December 24 of the measurement year).

Pseudocode	Clinical Translation
<p><b><u>Identify patients meeting denominator criteria</u></b></p> <pre> SELECT Distinct * INTO #Cohort FROM( SELECT     A.[Patient ID]     ,B.[Age]     ,A.[Visit Date]     ,A.[Diagnosis]     ,A.[Provider] FROM [Outpatient Visit] as A INNER JOIN [Patient Demographics] as B on A.[Patient ID] = B.[Patient ID] WHERE [Diagnosis] = 'Acute Bronchitis'* and [Visit Date] BETWEEN [January 1] and [December 24] and ([Age] &gt;= 18years or [Age] &lt;= 64years)  UNION  SELECT     A.[Patient ID]     ,B.[Age]     ,A.[Visit Date]     ,A.[Diagnosis]     ,A.[Provider] FROM [Emergency Department Visit] as A INNER JOIN [Patient Demographics] as B on A.[Patient ID] = B.[Patient ID] WHERE [Diagnosis] = 'Acute Bronchitis'* and [Visit Date] BETWEEN [January 1] and [December 24] and ([Age] &gt;= 18years or [Age] &lt;= 64years)  ) as A </pre>	<p>Identify patients during the intake period that had an Acute Bronchitis diagnosis in either the Emergency department or Outpatient Setting.</p> <p>*Refer to index for Acute Bronchitis ICD code definitions)</p>

Pseudocode	Clinical Translation
<p><b><u>Identify patients started on an antibiotic for the numerator</u></b></p> <pre> SELECT Distinct   [Patient ID]   ,[Medication Name]   ,[Medication Filled Date]   ,[Medication Status]   ,[Prescriber] INTO #Antibiotics FROM( SELECT Distinct * ,ROW_NUMBER () OVER (PARTITION BY [Patient ID] ORDER BY [Medication Filled Date] DESC) AS MostRecentStatin FROM( SELECT   B.[Patient ID]   ,A.[Medication Name]   ,A.[Medication Filled Date]   ,A.[Medication Status]   ,A.[Prescriber] FROM [Outpatient Medications] as A INNER JOIN #Cohort as B on A.[Patient ID] = B.[Patient ID] WHERE [Medication Category] like '%Antibiotic%' and [Medication Dispensed Date] &gt;= [Visit Date] + 3days  UNION  SELECT   B.[Patient ID]   ,A.[Discharge Medication] as 'Medication Name'   ,A.[Medication Filled Date]   ,A.[Medication Status] as 'ED Discharge Med'   ,A.[Prescriber] FROM [ED Discharge Medications] as A INNER JOIN #Cohort as B on A.[Patient ID] = B.[Patient ID] WHERE [Discharge Medication Category] like '%Antibiotic%' and [Medication Dispensed Date] &gt;= [Visit Date] + 3days ) as A </pre>	<p>Look in both the outpatient prescriptions and ED discharge prescriptions (if you have 2 separate processes at your facility) for antibiotic prescriptions filled either on the index date or up to 3 days later.</p> <p>*Refer to index for list of antibiotic medications</p>

Pseudocode	Clinical Translation
<p><u>Create final cohort table</u></p> <pre> SELECT Distinct   A.[Patient ID]  ,A.[Age]  ,A.[Visit Date]  ,A.[Diagnosis]  ,A.[Provider]  ,B.[Medication Name]  ,B.[Medication Filled Date]  ,B.[Medication Status]  ,B.[Prescriber] INTO [Final Cohort] FROM #Cohort as A LEFT JOIN #Antibiotics as B on A.[Patient ID] = B.[Patient ID] </pre>	<p>LEFT join the antibiotic table onto the cohort table to get both patients that did and did not receive an antibiotic.</p>
<p><u>Define numerator and denominator</u></p> <pre> SELECT COUNT DISTINCT [Patient ID] as 'Numerator' FROM [Final Cohort] WHERE [Medication Name] is not NULL  SELECT       COUNT DISTINCT [Patient ID] as 'Denominator' FROM [Final Cohort]  SELECT (1-[Numerator]) / [Denominator] * 100 % as Score </pre>	<p>Numerator is the total number of patients that had an antibiotic dispensed</p> <p>Denominator is total count of patients in the cohort</p> <p>Subtracting 1 – [Numerator] for the score will tell us a percentage of how many patients did NOT have an antibiotic dispensed.</p>