eCQM Title	Coronary Artery Disease (CAD): Beta-Blocker Therapy-Prior Myocardial Infarction (MI) or Left Ventricular Systolic Dysfunction (LVSD) for Which Use of Agents Is Indicated
eCQM Version Number	11.0.000
CMS eCQM Version Number	CMS
NQF Number	0070
GUID	3B79A4E2-0A65-4519-A710-5B5D3A8B0625
Measure Steward	American Heart Association
Measure Developer	American Heart Association
Endorsed By	NQF-Consensus Based Entity
Description	Percentage of patients aged 18 years and older with a diagnosis of coronary artery disease seen within a 12-month period who also have a prior myocardial infarction (MI) or a current or prior left ventricular systolic dysfunction (LVSD) who were prescribed beta-blocker therapy
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Measure Scoring	Proportion
Measure Type	Process
Stratification	None
Risk Adjustment	None
Rate Aggregation	This measure is intended to have one reporting rate, which aggregates the following populations into a single performance rate for accountability purposes: - Population 1: Patients with left ventricular systolic dysfunction (LVSD) - Population 2: Patients with a prior (within the past 2 years) myocardial infarction
Rationale	For the purposes of this measure, a "current or prior LVSD" is defined as: - Current LVSD = Ejection Fraction/Ejection Fraction Quantification (EF/EFQ) < 40% within 12 months prior to the measurement period - Prior LVSD = Documentation of moderate or severe LVSD (EF/EFQ < 40%) at any time prior to the measurement period Beta-blocker therapy for patients with coronary artery disease (CAD) seen within a 12-month period who have a prior myocardial infarction (MI) or a current or prior left ventricular systolic dysfunction (LVSD) has been shown to reduce the risk of death, a combined endpoint of death/reinfarction for patients with CAD and LV systolic dysfunction. These agents have proven efficacy in reducing mortality and in preventing reinfarction. Clinical trials have demonstrated that the greatest benefit is derived from beta-blockers that are cardioselective and have intrinsic sympathomimetic activity. Nonadherence to cardioprotective medications in patients with CAD and can be associated with a broad range of factors including patient, provider, health plan and healthcare-system variables. Lack of adherence to evidence-based medications is associated with increased mortality. This measure is intended to promote beta-blocker usage in select patients with CAD. Beta-blocker therapy should be started and continued for 2 years in patients with normal LV function after MI at acute coronary syndrome presentation (ACC/AHA Class I, Level of Evidence: A).
Clinical Recommendation Statement	Beta-blocker therapy should be started and continued for 2 years in patients with normal LV function after MI at acute coronary syndrome presentation (ACC/AHA Class I, Level of Evidence: A) (Fihn et al., 2012). Beta-blocker therapy should be started and continued indefinitely in patients with LV systolic dysfunction (EF <= 40%) with heart failure or prior MI, unless contraindicated due to severe reactive airway disease, symptomatic bradycardia, or hypotension (ACC/AHA Class I, Level of Evidence: A) (Fihn et al., 2012). Beta-blocker therapy should be started and continued indefinitely in patients with LV systolic dysfunction (EF <= 40%) with heart failure or prior MI, regardless of symptoms (ACC/AHA Class I, Level of Evidence: A) (Fihn et al., 2012).
Improvement Notation	Higher score indicates better quality
Reference	Reference Type: CITATION Reference Text: Fihn, S. D., Gardin, J. M., Abrams, J., Berra, K., Blankenship, J. C., Dallas, A. P., ... Williams, S. V. (2012). 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease. Circulation, 125(25), e654-e871. doi: 10.1161/cir.0b013e318256f1e5
Reference	Reference Type: CITATION Reference Text: Dobrilovic, R. Z., Alcantra, J., Chatterjee, K., Dake, J., Dembinska, R.A., Douglas, J.S., ... Smith Jr., S.C. (2002). ACC/AHA 2002 guideline update for the management of patients with chronic stable angina--summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for the Management of Patients With Chronic Stable Angina). Journal of the American College of Cardiology, 40(8), 1339-1352.
Reference	Reference Type: TRIAL or META-ANALYSIS Reference Text: Yusuf, S., Peto, R., Lewis, J.A., Arnold, S.V., Bittner, V., Brown, J.C., Cornhoe, S.H., ... Shaw, D.L. (2013). BETA BLOCKADE DURING AND AFTER MYOCARDIAL INFARCTION: An overview of the randomized trials. Progress in Cardiovascular Diseases, 27(4), 335-371. doi: 10.1016/S0033-0620(85)80003-7
Definition	Prescribed may include prescription given to the patient for beta-blocker therapy at one or more visits to the measurement period OR documentation of medication reconciliation that beta-blocker therapy is ordered. Prior Myocardial Infarction (MI): Documented MI for assessment 1 in 3 tiered-lists occurring within the past 2 years. LVEF <= 40% corresponds to qualitative documentation of moderate dysfunction or severe dysfunction (LVSD). The LVSD may be assessed by quantitative or qualitative measures such as ejection fraction (EF), ejection fraction quantification (EFQ), or ventriculography. Documentation that LVSD is moderate or severe is sufficient to meet the numerator criteria. Documentation that LVSD is mild or normal is not sufficient to meet the numerator criteria. Beta-blocker therapy: - For patients with prior MI, beta-blocker therapy includes any agent within the beta-blocker drug class. As of 2013, six beta-blockers have been approved by the FDA for the treatment of patients with prior MI: bisoprolol, carvedilol, metoprolol, nebivolol, propranolol, and timolol. Other beta-blockers may be prescribed for other indications, such as hypertension, arrhythmia, or sustained release metoprolol succinate. The requirement of two or more visits is to establish that the eligible clinician has an existing relationship with the patient. A longer look-back-period may be more appropriate for Ejection Fraction' as long as the target determination value clearly meets the beta-blocker drug class requirement for the Ejection Fraction' measure look-back-period. For a given Ejection Fraction' value, the longer the look-back-period, the more likely it is that the patient is receiving beta-blocker therapy. In order for the Ejection Fraction value result pathway to be recognized as below 40%, the result must be reported as a number with an '<' sign, or as a range with the upper value below 40%. For example, '<40%' or '30-39%' would be acceptable, but '30-40%' would not be acceptable. Although this criteria will not be met by using the 'Diagnosis pathway' if specified as 'Moderate or Severe'.
Guidance	If a patient has had a myocardial infarction (MI) within the past 2 years and a current or prior LVEF <=40% (or moderate or severe LVSD), the patient should be on beta-blocker therapy. The eCQM is a patient based measure. Example: A 60 year old male patient with a prior MI 1.5 years ago and a current LVEF of 35%
Transmission Format	TBD
Initial Population	All patients aged 18 years and older with two qualifying encounters during the measurement period and a diagnosis of coronary artery disease
Denominator	Equals Initial Population who also have prior (within the past 2 years) MI or a current or prior LVEF <=40%
Denominator Exclusions	None
Numerator	Patients who were prescribed beta-blocker therapy
Numerator Exclusions	None
Denominator Exceptions	Documentation of medical reason(s) for not prescribing beta-blocker therapy (e.g., arrhythmia, asthma, bradycardia, hypotension, hypersensitivity to beta-blockers, severe reactive airway disease, documentation of concurrent heart rates <50, allergy, intolerance, other medical reasons)
Supplemental Data Elements	Documentation of patient reason(s) for not prescribing beta-blocker therapy (e.g., patient declined, other patient reasons)
Test Deck	For every patient evaluated by the measure also identify payer, race, ethnicity and sex

Table of Contents

- Definitions
- Guidance
- Transmission Format
- Populations
- Data Criteria (QDM Data Elements)
- Supplemental Data Elements
- Risk Adjustment Variables

Population Criteria

- **Population Criteria 1**
  - **Initial Population**

```
AgeInYearsAt(date from start of "Measurement Period") >= 18
and exists ( "Qualifying Encounter During Measurement Period" Encounter )
and exists ( "Diagnosis of Coronary Artery Disease" Diagnosis )
    starts before end of "Measurement Period"
and exists "Qualifying CAD Encounter and History of Moderate or Severe LVSD"
```

  - **Denominator**

```
"Initial Population"
and exists "Qualifying CAD Encounter and History of Moderate or Severe LVSD"
```

  - **Denominator Exceptions**

```
None
```

  - **Numerator**

```
"Beta-Blocker Therapy for LVSD Ordered"
  or "Currently Taking Beta-Blocker Therapy for LVSD"
```

  - **Numerator Exclusions**

```
None
```

  - **Denominator Exceptions**

```
"Prior Myocardial Infarction (MI) Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Asthma with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Bradycardia with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Hypersensitivity to Beta-Blocker Therapy with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Hypotension with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Reactive Airway Disease with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Documentation of Medical Reason(s) with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Beta-Blocker Intolerance with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Severe Asthma with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Atrioventricular Block with Qualifying CAD Encounter and History of Moderate or Severe LVSD without Cardiac Pacer"
```

  - **Stratification**

```
None
```

- **Population Criteria 2**
  - **Initial Population**

```
AgeInYearsAt(date from start of "Measurement Period") >= 18
and exists ( "Qualifying Encounter During Measurement Period" Encounter )
and exists ( "Qualifying Encounter During Measurement Period" Encounter )
and exists "Prior Myocardial Infarction (MI)"
```

  - **Denominator**

```
"Initial Population"
and exists "Qualifying CAD Encounter and Prior MI"
```

  - **Denominator Exceptions**

```
None
```

  - **Numerator**

```
"Beta-Blocker Therapy" 
  or "Currently Taking Beta-Blocker Therapy"
```

  - **Numerator Exclusions**

```
None
```

  - **Denominator Exceptions**

```
"Prior Asthma with Qualifying CAD Encounter and Prior MI"
  or "Prior Asthma with Qualifying CAD Encounter and Prior MI"
  or "Prior Bradycardia with Qualifying CAD Encounter and Prior MI"
  or "Prior Hypersensitivity to Beta-Blocker Therapy with Qualifying CAD Encounter and Prior MI"
  or "Prior Allergy or Intolerance to Beta-Blocker Therapy Ingredient with Qualifying CAD Encounter and Prior MI"
  or "Prior Hypotension with Qualifying CAD Encounter and Prior MI"
  or "Prior Reactive Airway Disease with Qualifying CAD Encounter and Prior MI"
  or "Prior Documentation of Medical Reason(s) with Qualifying CAD Encounter and Prior MI"
  or "Prior Severe Asthma with Qualifying CAD Encounter and Prior MI without Cardiac Pacer"
```

  - **Stratification**

```
None
```

Definitions

- **Coronary Artery Disease Encounter**

```
"Outpatient Encounter During Measurement Period" HasDuringEncounter
  with ["Diagnosis": "Coronary Artery Disease No MI" ] CoronaryArteryDisease
    such that "CoronaryArteryDisease".prevalenceInterval overlaps day of "Outpatient Encounter During Measurement Period"
```

- **Denominator 1**

```
"Initial Population"
and exists "Qualifying CAD Encounter and History of Moderate or Severe LVSD"
```

- **Denominator 2**

```
"Initial Population"
and exists "Qualifying CAD Encounter and Prior MI"
```

- **Denominator Exceptions 1**

```
"Prior Asthma with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Bradycardia with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Hypersensitivity to Beta-Blocker Therapy with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Hypotension with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Reactive Airway Disease with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Documentation of Medical Reason(s) with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Beta-Blocker Intolerance with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  or "Prior Severe Asthma with Qualifying CAD Encounter and History of Moderate or Severe LVSD without Cardiac Pacer"
```

- **Denominator Exceptions 2**

```
"Prior Asthma with Qualifying CAD Encounter and Prior MI"
  or "Prior Bradycardia with Qualifying CAD Encounter and Prior MI"
  or "Prior Hypersensitivity to Beta-Blocker Therapy with Qualifying CAD Encounter and Prior MI"
  or "Prior Hypotension with Qualifying CAD Encounter and Prior MI"
  or "Prior Reactive Airway Disease with Qualifying CAD Encounter and Prior MI"
  or "Prior Documentation of Medical Reason(s) with Qualifying CAD Encounter and Prior MI"
  or "Prior Beta-Blocker Intolerance with Qualifying CAD Encounter and Prior MI"
  or "Prior Severe Asthma with Qualifying CAD Encounter and Prior MI without Cardiac Pacer"
```

- **Has Allergy or Intolerance to Beta-Blocker Therapy Ingredient with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Allergy/Intolerance": "Beta-Blocker Therapy Ingredient"]
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that "Qualifying CAD Encounter and History of Moderate or Severe LVSD".prevalenceInterval overlaps day of
      "Beta-Blocker Therapy Ingredient".allergyIntoleranceOnsetPrevalenceInterval
```

- **Has Allergy or Intolerance to Beta-Blocker Therapy Ingredient with Qualifying CAD Encounter and Prior MI**

```
exists ["Allergy/Intolerance": "Beta-Blocker Therapy Ingredient"]
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that "Qualifying CAD Encounter and Prior MI".prevalenceInterval overlaps day of
      "Beta-Blocker Therapy Ingredient".allergyIntoleranceOnsetPrevalenceInterval
```

- **Has Arrhythmia with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Diagnosis": "Arrhythmia"] ArrhythmiaDiagnosis
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that ArrhythmiaDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Arrhythmia with Qualifying CAD Encounter and Prior MI**

```
exists ["Diagnosis": "Arrhythmia"] ArrhythmiaDiagnosis
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that ArrhythmiaDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Asthma with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Diagnosis": "Asthma"] AsthmaDiagnosis
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that AsthmaDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Asthma with Qualifying CAD Encounter and Prior MI**

```
exists ["Diagnosis": "Asthma"] AsthmaDiagnosis
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that AsthmaDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Atrioventricular Block with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Diagnosis": "Atrioventricular Block"] AtrioventricularBlockDiagnosis
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that AtrioventricularBlockDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Atrioventricular Block with Qualifying CAD Encounter and History of Moderate or Severe LVSD without Cardiac Pacer**

```
"Has Atrioventricular Block with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
  and not "Has Cardiac Pacer Device Implanted with Qualifying CAD Encounter and History of Moderate or Severe LVSD"
```

- **Has Atrioventricular Block with Qualifying CAD Encounter and Prior MI**

```
exists ["Diagnosis": "Atrioventricular Block"] AtrioventricularBlockDiagnosis
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that AtrioventricularBlockDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Atrioventricular Block with Qualifying CAD Encounter and Prior MI without Cardiac Pacer**

```
"Has Atrioventricular Block with Qualifying CAD Encounter and Prior MI"
  and not "Has Diagnosis of Cardiac Pacer in Site with Qualifying CAD Encounter and Prior MI"
  and not "Has Cardiac Pacer Device Implanted with Qualifying CAD Encounter and Prior MI"
```

- **Has Beta-Blocker Therapy Ordered**

```
exists ["Medications, Order": "Beta-Blocker Therapy"] BetaBlockerForLVSDOrdered
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that BetaBlockerForLVSDOrdered.authorDatetime during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Bradycardia with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Diagnosis": "Bradycardia"] BradycardiaDiagnosis
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that BradycardiaDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Bradycardia with Qualifying CAD Encounter and Prior MI**

```
exists ["Diagnosis": "Bradycardia"] BradycardiaDiagnosis
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that BradycardiaDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Cardiac Pacer Device Implanted with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Procedure, Performed": "Cardiac Pacemaker Device"]
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that "Cardiac Pacemaker Device".relevantPeriod starts before or during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
      and "Cardiac Pacemaker Device".relevantPeriod ends after day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Cardiac Pacer Device Implanted with Qualifying CAD Encounter and Prior MI**

```
exists ["Procedure, Performed": "Cardiac Pacemaker Device"]
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that "Cardiac Pacemaker Device".relevantPeriod starts before or during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
      and "Cardiac Pacemaker Device".relevantPeriod ends after day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Consecutive Heart Rates Less than 50 with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists (
  from
    "Heart Rate" Low_Performed,
    "Heart Rate" Low_Physical_Exam_Performed,
    "Heart Rate" MinimalNormalHeartRateEncounterDiagnosis,
    "Heart Rate" MinimalNormalHeartRateEncounterDiagnosis,
    "Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD
  where Low_Performed.resultDatetime same day as CADEncounterModerateOrSevereLVSD.relevantPeriod
    and Low_Physical_Exam_Performed.resultDatetime same day as CADEncounterModerateOrSevereLVSD.relevantPeriod
    and Low_Performed.result < 50
    and Low_Physical_Exam_Performed.result < 50
    and MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval starts during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
    and MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval starts during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
    and MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval starts 1 day after day of MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval
    and Low_Performed.resultDatetime same day as MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval
    and Low_Physical_Exam_Performed.resultDatetime same day as MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval
  return all
)
```

- **Has Consecutive Heart Rates Less than 50 with Qualifying CAD Encounter and Prior MI**

```
exists (
  from
    "Heart Rate" Low_Performed,
    "Heart Rate" Low_Physical_Exam_Performed,
    "Heart Rate" MinimalNormalHeartRateEncounterDiagnosis,
    "Heart Rate" MinimalNormalHeartRateEncounterDiagnosis,
    "Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD
  where Low_Performed.resultDatetime same day as CADEncounterModerateOrSevereLVSD.relevantPeriod
    and Low_Physical_Exam_Performed.resultDatetime same day as CADEncounterModerateOrSevereLVSD.relevantPeriod
    and Low_Performed.result < 50
    and Low_Physical_Exam_Performed.result < 50
    and MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval starts during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
    and MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval starts during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
    and MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval starts 1 day after day of MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval
    and Low_Performed.resultDatetime same day as MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval
    and Low_Physical_Exam_Performed.resultDatetime same day as MinimalNormalHeartRateEncounterDiagnosis.prevalenceInterval
  return all
)
```

- **Has Diagnosis of Allergy or Intolerance to Beta-Blocker Therapy with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Diagnosis": "Allergy to Beta-Blocker Therapy"] BetaBlockerAllergyOrIntoleranceDiagnosis
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that BetaBlockerAllergyOrIntoleranceDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Diagnosis of Allergy or Intolerance to Beta-Blocker Therapy with Qualifying CAD Encounter and Prior MI**

```
exists ["Diagnosis": "Allergy to Beta-Blocker Therapy"] BetaBlockerAllergyOrIntoleranceDiagnosis
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that BetaBlockerAllergyOrIntoleranceDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Diagnosis of Cardiac Pacer in Site with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Diagnosis": "Cardiac Pacer in Site"] CardiacPacerDiagnosis
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that CardiacPacerDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Diagnosis of Cardiac Pacer in Site with Qualifying CAD Encounter and Prior MI**

```
exists ["Diagnosis": "Cardiac Pacer in Site"] CardiacPacerDiagnosis
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that CardiacPacerDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Hypotension with Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
exists ["Diagnosis": "Hypotension"] HypotensionDiagnosis
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that HypotensionDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Hypotension with Qualifying CAD Encounter and Prior MI**

```
exists ["Diagnosis": "Hypotension"] HypotensionDiagnosis
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that HypotensionDiagnosis.prevalenceInterval overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Has Medical or Patient Reason for Not Ordering Beta-Blocker for LVSD**

```
exists ["Medications, Not Ordered": "Beta-Blocker Therapy for LVSD"] NotBetaBlockerForLVSDOrdered
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that NotBetaBlockerForLVSDOrdered.authorDatetime during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
      and NotBetaBlockerForLVSDOrdered.negationRationale in "Medical Reason"
```

- **Has Medical or Patient Reason for Not Ordering Beta-Blocker Therapy**

```
exists ["Medications, Not Ordered": "Beta-Blocker Therapy"] NotBetaBlockerOrdered
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that NotBetaBlockerOrdered.authorDatetime during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
      and NotBetaBlockerOrdered.negationRationale in "Medical Reason"
```

- **History of Cardiac Surgery Prior to Encounter**

```
["Outpatient Encounter During Measurement Period": "Qualifying Encounter"]
  with [ "Procedure, Performed": "Cardiac Surgery" ] CardiacSurgeryProcedure
    such that CardiacSurgeryProcedure.relevantPeriod starts before day of end of
      "Qualifying Encounter During Measurement Period".relevantPeriod
```

- **Initial Population**

```
AgeInYearsAt(date from start of "Measurement Period") >= 18
and exists ( "Qualifying Encounter During Measurement Period" Encounter )
and exists ( "Qualifying Encounter During Measurement Period" Encounter )
and exists "Prior Myocardial Infarction (MI)"
```

- **Is Currently Taking Beta-Blocker Therapy**

```
exists ["Medications, Active": "Beta-Blocker Therapy"] ActiveBetaBlocker
  with ["Qualifying CAD Encounter and Prior MI":CADEncounterModerateOrSevereLVSD]
    such that ActiveBetaBlocker.activeDatetime during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Is Currently Taking Beta-Blocker Therapy for LVSD**

```
exists ["Medications, Active": "Beta-Blocker Therapy for LVSD"] ActiveBetaBlockerForLVSD
  with ["Qualifying CAD Encounter and History of Moderate or Severe LVSD":CADEncounterModerateOrSevereLVSD]
    such that ActiveBetaBlockerForLVSD.activeDatetime during day of CADEncounterModerateOrSevereLVSD.relevantPeriod
```

- **Moderate or Severe LVSD Findings**

```
exists ["Diagnosis": "Ejection Fraction/Ejection Fraction Quantification"]
  where ( EjectionFractionResult.result >= 30 to 39 )
    or ( EjectionFractionResult.result < 30 )

or exists ["Diagnosis": "Moderate or Severe LVSD"]
  with ["Ejection Fraction/Ejection Fraction Quantification (Inverted)":LVSD]
    where LVSD.severity in "Moderate or Severe"
```

- **Numerator 1**

```
"Beta-Blocker Therapy for LVSD Ordered"
  or "Currently Taking Beta-Blocker Therapy for LVSD"
```

- **Numerator 2**

```
"Beta-Blocker Therapy Ordered"
  or "Is Currently Taking Beta-Blocker Therapy"
```

- **Outpatient Encounter During Measurement Period**

```
( Encounter, Performed: "Office Visit"
  or Encounter, Performed: "Annual Wellness Visit"
  or Encounter, Performed: "Care Services in Long Term Residential Facility"
  or Encounter, Performed: "Home Healthcare Services"
  or Encounter, Performed: "Nursing Facility Visit" ) QualifyingEncounter
    such that QualifyingEncounter.relevantPeriod during day of "Measurement Period"
```

- **Qualifying CAD Encounter**

```
"Coronary Artery Disease Encounter"
  with [ "Diagnosis": "Coronary Artery Disease" ] CADDiagnosis
    such that CADDiagnosis.prevalenceInterval starts before end of "Measurement Period"
```

- **Qualifying CAD Encounter and History of Moderate or Severe LVSD**

```
"Qualifying CAD Encounter" EncounterWithCADDiagnosis
  with "Moderate or Severe LVSD Findings" LVSDFinding
    such that EncounterWithCADDiagnosis.relevantPeriod starts before start of LVSDFinding.relevantDatetime, LVSDFindings.relevantDatetime starts before end of EncounterWithCADDiagnosis.relevantPeriod
```

- **Qualifying CAD Encounter and Prior MI**

```
"Qualifying CAD Encounter" EncounterWithCADDiagnosis
  with "Prior Myocardial Infarction (MI)" PriorMIDiagnosis
    such that EncounterWithCADDiagnosis.relevantPeriod starts before day of end of EncounterWithCADDiagnosis.relevantPeriod
      and PriorMIDiagnosis.prevalenceInterval starts before day of end of EncounterWithCADDiagnosis.relevantPeriod
```

- **Qualifying Encounter During Measurement Period**

```
( Encounter, Performed: "Office Visit"
  or Encounter, Performed: "Annual Wellness Visit"
  or Encounter, Performed: "Care Services in Long Term Residential Facility"
  or Encounter, Performed: "Home Healthcare Services"
  or Encounter, Performed: "Nursing Facility Visit"
  or Encounter, Performed: "Patient Provider Interaction" ) MedEncounter
    where MedEncounter.relevantPeriod during day of "Measurement Period"
```

- **SDE Ethnicity**

```
None
```

- **SDE Payer**

```
["Patient Characteristic Payer": "Payer Type"]
```

- **SDE Race**

```
["Patient Characteristic Race": "Race"]
```

- **SDE Sex**

```
["Patient Characteristic Sex": "Federal Administrative Sex"]
```

Risk Adjustment Variables

None

Supplemental Data Elements

- **SDE Ethnicity**

```
["Patient Characteristic Ethnicity": "Ethnicity"]
```

- **SDE Payer**

```
["Patient Characteristic Payer": "Payer Type"]
```

- **SDE Race**

```
["Patient Characteristic Race": "Race"]
```

- **SDE Sex**

```
["Patient Characteristic Sex": "Federal Administrative Sex"]
```

Functions

- **Global.NormalizeIntervalAppointmentTime.DateTime, period IntervalOrDateTime()**

```
A period that is not an interval returned from a DateTime.
Else if a period is not an interval
then null as an interval period returned.
```

Terminology

- code "Left ventricular systolic dysfunction (disorder)" ('704248007') from 2.16.840.1.113883.6.96
- valueset "Allergy to Beta-Blocker Therapy" (2.16.840.1.113883.3.526.3.1177)
- valueset "Allergy to Beta-Blocker Therapy" (2.16.840.1.113883.3.526.3.1177)
- valueset "Arrhythmia" (2.16.840.1.113883.3.526.3.1139)
- valueset "Asthma" (2.16.840.1.113883.3.526.3.1141)
- valueset "Atrioventricular Block" (2.16.840.1.113883.3.526.3.1148)
- valueset "Beta-Blocker Therapy" (2.16.840.1.113883.3.526.3.1177)
- valueset "Beta-Blocker Therapy for LVSD" (2.16.840.1.113883.3.526.3.1178)
- valueset "Bradycardia" (2.16.840.1.113883.3.526.3.1181)
- valueset "Cardiac Pacer" (2.16.840.1.113883.3.526.3.1211)
- valueset "Cardiac Pacemaker Device" (2.16.840.1.113883.3.526.3.1212)
- valueset "Care Services in Long Term Residential Facility" (2.16.840.1.113883.3.464.1003.101.12.1014)
- valueset "Coronary Artery Disease" (2.16.840.1.113883.3.526.3.1189)
- valueset "Ejection Fraction" (2.16.840.1.113883.3.526.3.1234)
- valueset "Ejection Fraction Quantification" (2.16.840.1.113883.3.526.3.1235)
- valueset "Home Healthcare Services" (2.16.840.1.113883.3.464.1003.101.12.1016)
- valueset "Hypersensitivity to Beta-Blocker Therapy" (2.16.840.1.113883.3.526.3.1177)
- valueset "Hypotension" (2.16.840.1.113883.3.526.3.1246)
- valueset "Inpatient Encounter" (2.16.840.1.113883.3.666.5.307)
- valueset "Medical Reason" (2.16.840.1.113883.3.526.3.1007)
- valueset "Nursing Facility Visit" (2.16.840.1.113883.3.464.1003.101.12.1018)
- valueset "Office Visit" (2.16.840.1.113883.3.464.1003.101.12.1001)
- valueset "Outpatient Consultation" (2.16.840.1.113883.3.464.1003.101.12.1008)
- valueset "Patient Provider Interaction" (2.16.840.1.113883.3.464.1003.101.12.1090)
- valueset "Payer Type" (2.16.840.1.114222.4.11.3591)
- valueset "Reactive Airway Disease" (2.16.840.1.113883.3.526.3.1284)

Data Criteria (QDM Data Elements)

- "Allergy/Intolerance: Beta-Blocker Therapy Ingredient" using "Beta-Blocker Therapy Ingredient" (2.16.840.1.113883.3.526.3.1492)
- "Allergy/Intolerance: Beta-Blocker Therapy Ingredient" using "Beta-Blocker Therapy Ingredient" (2.16.840.1.113883.3.526.3.1492) does allergy/intolerance: recorded assigned allergy/intolerance: Beta-Blocker Therapy Ingredient
- "Diagnosis: Allergy to