Coronary Artery Disease (CAD): Beta-Blocker Therapy-Prior Myocardial Infarction (MI) or Left Ventricular Systolic Dysfunction (LVEF less than or equal to 40%) eCQM Title eCQM Identifier (Measure 145 13.3.000 **eCQM Version Number Authoring Tool)** GUID 80744ae2-de81-4b16-a71d-69522eb865c5 **CBE Number** 0070e **Measurement Period** January 1, 20XX through December 31, 20XX **Measure Steward** American Heart Association Measure Developer American Medical Association (AMA) **Measure Developer** PCPI(R) Foundation (PCPI[R]) Measure Developer American Heart Association **Endorsed By** CMS Consensus Based Entity Percentage of patients aged 18 years and older with a diagnosis of coronary artery disease seen within a 12-month period who also Description have a prior MI or a current or prior left ventricular ejection fraction (LVEF) <=40% who were prescribed beta-blocker therapy Copyright 2024 American College of Cardiology and American Heart Association. All Rights Reserved. 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Due to technical limitations, registered trademarks are indicated by (R) or [R]. Measure Scoring Proportion **Measure Type Process** Stratification None **Risk Adjustment** None This measure is intended to have one reporting rate, which aggregates the following populations into a single performance rate for reporting purposes: - Population 1: Patients with left ventricular systolic dysfunction (LVEF <=40%) - Population 2: Patients with a prior (within the past 3 years) myocardial infarction **Rate Aggregation** For the purposes of this measure, a single performance rate can be calculated as follows: Performance Rate = (Numerator 1 + Numerator 2)/ [(Denominator 1 - Denominator Exceptions 1) + (Denominator 2 - Denominator Exceptions 2)] For patients with coronary artery disease (CAD), beta-blockers are recommended for 3 years after myocardial infarction or acute coronary syndrome. Beta-blockers, particularly carvedilol, metoprolol succinate, or bisoprolol which have been shown to reduce risk of death, are recommended indefinitely for patients with CAD and LV systolic dysfunction. These agents have proven efficacy in reducing angina onset and improving the ischemic threshold during exercise. In patients who have suffered an MI, beta-blockers significantly reduce deaths and recurrent MIs (Fihn et al., 2012). Rationale Nonadherence to cardioprotective medications is prevalent among outpatients with CAD and can be associated with a broad range of adverse outcomes, including all-cause and cardiovascular mortality, cardiovascular hospitalizations, and the need for revascularization procedures (Gibbons et al., 2002). This measure is intended to promote beta-blocker usage in select patients with CAD. Beta-blocker therapy should be started and continued for 3 years in all patients with normal LV function after MI or acute coronary syndrome (ACS) (Class I, Level of Evidence: B) (Fihn et al., 2012). Beta-blocker therapy should be used in all patients with LV systolic dysfunction (EF <= 40%) with heart failure or prior MI, unless **Clinical Recommendation** contraindicated. (Use should be limited to carvedilol, metoprolol succinate, or bisoprolol, which have been shown to reduce risk of Statement death.) (Class I, Level of Evidence: A) (Fihn et al., 2012). In patients with chronic coronary disease (CCD) and LVEF ≤40% with or without previous MI, the use of beta-blocker therapy is recommended to reduce the risk of future Major Adverse Cardiac Events (MACE), including cardiovascular death. (Class 1, Level of Evidence: A) (Virani et al., 2023) **Improvement Notation** Higher score indicates better quality Reference Type: CITATION Reference 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, 126(25), e354-e471. doi: 10.1161/cir.0b013e318277d6a0' Reference Type: CITATION Reference Text: 'Gibbons, R. J., Abrams, J., Chatterjee, K., Daley, J., Deedwania, P.K, Douglas J.S., ... Smith Jr., S.C. (2002). Reference ACC/AHA 2002 Guideline update for the management of patients with chronic stable angina: 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). Circulation, 107(1), 149-158. doi:10.1161/01.CIR.0000047041.66447.29 Reference Type: CITATION Reference Text: 'Virani, S.S., Newby, L.K., Arnold, S.V., Bittner, V., Brewer, L.C., Demeter, S.H., ... Dixon, D.L. (2023). 2023 Reference AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the management for patients with chronic coronary disease: A report of the American Heart Association/American College of Cardiology Joint Committee on Practice Guidelines. Circulation, 148, e9-e119. doi: 10.1161/CIR.0000000000001168' Prescribed may include 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. Prior Myocardial Infarction (MI) for denominator 2 is limited to those occurring within the past 3 years. Definition LVEF <= 40% corresponds to qualitative documentation of moderate dysfunction or severe dysfunction (LVSD). The LVSD may be determined by quantitative or qualitative assessment, which may be current or historical. Examples of a quantitative or qualitative assessment may include an echocardiogram: 1) that provides a numerical value of LVSD or 2) that uses descriptive terms such as moderately or severely depressed left ventricular systolic function. Any current or prior ejection fraction study documenting LVSD can be used to identify patients. Beta-blocker therapy: - For patients with prior MI, beta-blocker therapy includes any agent within the beta-blocker drug class. As of 2015, no recommendations or evidence are cited in current stable ischemic heart disease guidelines for preferential use of specific agents. - For patients with prior LVEF <=40%, beta-blocker therapy includes the following: bisoprolol, carvedilol, or sustained release metoprolol The requirement of two or more visits is to establish that the eligible clinician has an existing relationship with the patient. A range value should satisfy the logic requirement for 'Ejection Fraction' as long as the ranged observation value clearly meets the less than or equal to 40% threshold noted in the denominator logic. A range that is greater than 40% would not meet the measure requirement. Guidance In order for the Ejection Fraction result pathway to be recognized as below 40%, the result must be reported as a number with unit of %. A text string of "below 40%" or "ejection fraction between 35 and 40%" will not be recognized through electronic data capture. Although, this criteria can also be met using the Diagnosis pathway if specified as "Moderate or Severe." If a patient has had a myocardial infarction (MI) within the past 3 years and a current or prior LVEF <=40% (or moderate or severe LVSD), the patient should only be counted in Population Criteria 1. This eCQM is a patient-based measure. This version of the eCQM uses QDM version 5.6. Please refer to the eCQI resource center (https://ecqi.healthit.gov/qdm) for more information on the QDM. **Transmission Format** TBD All patients aged 18 years and older with two qualifying encounters during the measurement period and a diagnosis of coronary artery **Initial Population** Denominator Equals Initial Population who also have prior (within the past 3 years) MI or a current or prior LVEF <=40% **Denominator Exclusions** Numerator Patients who were prescribed beta-blocker therapy Numerator Exclusions Not Applicable Documentation of medical reason(s) for not prescribing beta-blocker therapy (e.g., arrhythmia, asthma, bradycardia, hypotension, patients with atrioventricular block without cardiac pacer, observation of consecutive heart rates <50, allergy, intolerance, other medical **Denominator Exceptions** Documentation of patient reason(s) for not prescribing beta-blocker therapy (e.g., patient declined, other patient reasons). **Supplemental Data Elements** For every patient evaluated by this measure also identify payer, race, ethnicity and sex **Table of Contents Population Criteria Definitions** Functions Terminology Data Criteria (QDM Data Elements) Supplemental Data Elements **Population Criteria** ▲ Population Criteria 1 **▲** Initial Population AgeInYearsAt(date from start of "Measurement Period") >= 18 and exists ("Qualifying Encounter During Measurement Period" Encounter1 with "Qualifying Encounter During Measurement Period" Encounter2 such that Encounter2.id !~ Encounter1.id and exists "Qualifying CAD Encounter" ▲ Denominator "Initial Population" and exists "Qualifying CAD Encounter and History of Moderate or Severe LVSD" **▲ Denominator Exclusions** None ▲ Numerator "Has Beta Blocker Therapy for LVSD Ordered" or "Is Currently Taking Beta Blocker Therapy for LVSD" **▲ Numerator Exclusions** None ▲ Denominator Exceptions "Has Arrhythmia with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Asthma with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Bradycardia with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Hypotension with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Consecutive Heart Rates Less than 50 with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Allergy or Intolerance to Beta Blocker Therapy Ingredient with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Diagnosis of Allergy or Intolerance to Beta Blocker Therapy with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Medical or Patient Reason for Not Ordering Beta Blocker for LVSD" or "Has 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" Encounter1 with "Qualifying Encounter During Measurement Period" Encounter2 such that Encounter2.id !~ Encounter1.id and exists "Qualifying CAD Encounter" **▲ Denominator** "Initial Population" and exists "Qualifying CAD Encounter and Prior MI" ▲ Denominator Exclusions None ▲ Numerator "Has Beta Blocker Therapy Ordered" or "Is Currently Taking Beta Blocker Therapy" ▲ Numerator Exclusions None ■ Denominator Exceptions "Has Arrhythmia with Qualifying CAD Encounter and Prior MI" or "Has Asthma with Qualifying CAD Encounter and Prior MI" or "Has Bradycardia with Qualifying CAD Encounter and Prior MI" or "Has Hypotension with Qualifying CAD Encounter and Prior MI" or "Has Consecutive Heart Rates Less than 50 with Qualifying CAD Encounter and Prior MI" or "Has Allergy or Intolerance to Beta Blocker Therapy Ingredient with Qualifying CAD Encounter and Prior MI" or "Has Diagnosis of Allergy or Intolerance to Beta Blocker Therapy with Qualifying CAD Encounter and Prior MI" or "Has Medical or Patient Reason for Not Ordering Beta Blocker Therapy" or "Has Atrioventricular Block with Qualifying CAD Encounter and Prior MI without Cardiac Pacer" ▲ Stratification None **Definitions** ▲ Coronary Artery Disease Encounter "Outpatient Encounter During Measurement Period" ValidQualifyingEncounter with ["Diagnosis": "Coronary Artery Disease No MI"] Coronary Artery Disease such that CoronaryArteryDisease.prevalencePeriod overlaps day of ValidQualifyingEncounter.relevantPeriod **▲** 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 "Has Arrhythmia with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Asthma with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Bradycardia with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Hypotension with Qualifying CAD Encounter and History of Moderate or Severe LVSD"

or "Has Consecutive Heart Rates Less than 50 with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Allergy or Intolerance to Beta Blocker Therapy Ingredient with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Diagnosis of Allergy or Intolerance to Beta Blocker Therapy with Qualifying CAD Encounter and History of Moderate or Severe LVSD" or "Has Medical or Patient Reason for Not Ordering Beta Blocker for LVSD" or "Has Atrioventricular Block with Qualifying CAD Encounter and History of Moderate or Severe LVSD without Cardiac Pacer" **▲** Denominator Exceptions 2 "Has Arrhythmia with Qualifying CAD Encounter and Prior MI" or "Has Asthma with Qualifying CAD Encounter and Prior MI" or "Has Bradycardia with Qualifying CAD Encounter and Prior MI" or "Has Hypotension with Qualifying CAD Encounter and Prior MI" or "Has Consecutive Heart Rates Less than 50 with Qualifying CAD Encounter and Prior MI" or "Has Allergy or Intolerance to Beta Blocker Therapy Ingredient with Qualifying CAD Encounter and Prior MI" or "Has Diagnosis of Allergy or Intolerance to Beta Blocker Therapy with Qualifying CAD Encounter and Prior MI" or "Has Medical or Patient Reason for Not Ordering Beta Blocker Therapy or "Has Atrioventricular Block 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"] union ["Allergy/Intolerance": "Substance with beta adrenergic receptor antagonist mechanism of action (substance)"]) BetaBlockerAllergyIntolerance with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that BetaBlockerAllergyIntolerance.prevalencePeriod overlaps after day of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Has Allergy or Intolerance to Beta Blocker Therapy Ingredient with Qualifying CAD Encounter and Prior MI exists (["Allergy/Intolerance": "Beta Blocker Therapy Ingredient"] union ["Allergy/Intolerance": "Substance with beta adrenergic receptor antagonist mechanism of action (substance)"]) BetaBlockerAllergyIntolerance with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that BetaBlockerAllergyIntolerance.prevalencePeriod overlaps after day of CADEncounterMI.relevantPeriod ▲ Has Arrhythmia with Qualifying CAD Encounter and History of Moderate or Severe LVSD exists ["Diagnosis": "Arrhythmia"] Arrhythmia with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that Arrhythmia.prevalencePeriod overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Has Arrhythmia with Qualifying CAD Encounter and Prior MI exists ["Diagnosis": "Arrhythmia"] Arrhythmia with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that Arrhythmia.prevalencePeriod overlaps day of CADEncounterMI.relevantPeriod ▲ Has Asthma with Qualifying CAD Encounter and History of Moderate or Severe LVSD exists ["Diagnosis": "Asthma"] Asthma with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that Asthma.prevalencePeriod overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Has Asthma with Qualifying CAD Encounter and Prior MI exists ["Diagnosis": "Asthma"] Asthma with "Qualifying CAD Encounter and Prior MI" CADEncounterMI $such that Asthma. prevalence Period\ overlaps\ day\ of\ CADEncounter MI. relevant Period$ ▲ Has Atrioventricular Block with Qualifying CAD Encounter and History of Moderate or Severe LVSD exists ["Diagnosis": "Atrioventricular Block"] AtrioventricularBlock with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that AtrioventricularBlock.prevalencePeriod 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 Diagnosis of Cardiac Pacer in Situ 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"] AtrioventricularBlock with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that AtrioventricularBlock.prevalencePeriod overlaps day of CADEncounterMI.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 Situ 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 for LVSD Ordered exists ["Medication, Order": "Beta Blocker Therapy for LVSD"] BetaBlockerForLVSDOrdered with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that BetaBlockerForLVSDOrdered.authorDatetime during day of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Has Beta Blocker Therapy Ordered exists ["Medication, Order": "Beta Blocker Therapy"] BetaBlockerOrdered with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that BetaBlockerOrdered.authorDatetime during day of CADEncounterMl.relevantPeriod ▲ Has Bradycardia with Qualifying CAD Encounter and History of Moderate or Severe LVSD exists ["Diagnosis": "Bradycardia"] Bradycardia with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that Bradycardia.prevalencePeriod overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Has Bradycardia with Qualifying CAD Encounter and Prior MI exists ["Diagnosis": "Bradycardia"] Bradycardia with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that Bradycardia.prevalencePeriod overlaps day of CADEncounterMI.relevantPeriod ▲ Has Cardiac Pacer Device Implanted with Qualifying CAD Encounter and History of Moderate or Severe LVSD exists ["Procedure, Performed": "Cardiac Pacer"] ImplantedCardiacPacer with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that (Global."NormalizeInterval" (ImplantedCardiacPacer.relevantDatetime, ImplantedCardiacPacer.relevantPeriod)) starts before end of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Has Cardiac Pacer Device Implanted with Qualifying CAD Encounter and Prior MI exists ["Procedure, Performed": "Cardiac Pacer"] ImplantedCardiacPacer with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that (Global."NormalizeInterval" (ImplantedCardiacPacer.relevantDatetime, ImplantedCardiacPacer.relevantPeriod)) starts before end of CADEncounterMI.relevantPeriod ▲ Has Consecutive Heart Rates Less than 50 with Qualifying CAD Encounter and History of Moderate or Severe LVSD exists from ["Physical Exam, Performed": "Heart Rate"] HeartRate, Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD let PriorHeartRate: Last(["Physical Exam, Performed": "Heart Rate"] MostRecentPriorHeartRate where Global."NormalizeInterval" (MostRecentPriorHeartRate.relevantDatetime, MostRecentPriorHeartRate.relevantPeriod) during CADEncounterModerateOrSevereLVSD.relevantPeriod and Global."NormalizeInterval"(MostRecentPriorHeartRate.relevantDatetime, MostRecentPriorHeartRate.relevantPeriod) before Global."NormalizeInterval"(HeartRate.relevantDatetime, MostRecentPriorHeartRate.relevantPeriod) HeartRate.relevantPeriod) sort by start of Global."NormalizeInterval"(relevantDatetime, relevantPeriod) where Global."NormalizeInterval" (HeartRate.relevantDatetime, HeartRate.relevantPeriod) during CADEncounterModerateOrSevereLVSD.relevantPeriod and HeartRate.result < 50 '{beats}/min' and PriorHeartRate.result < 50 '{beats}/min' ▲ Has Consecutive Heart Rates Less than 50 with Qualifying CAD Encounter and Prior MI exists from "["Physical Exam, Performed": "Heart Rate"] HeartRate,
"Qualifying CAD Encounter and Prior MI" CADEncounterMI
let PriorHeartRate: Last(["Physical Exam, Performed": "Heart Rate"] MostRecentPriorHeartRate $where \ Global. "Normalize Interval" (Most Recent Prior Heart Rate. relevant Date time, \ Most Recent Prior Heart Rate. relevant Period) \ during \ CADE in counter MI. relevant Period \ during \ during$ and Global."NormalizeInterval" (MostRecentPriorHeartRate.relevantDatetime, MostRecentPriorHeartRate.relevantPeriod) before Global."NormalizeInterval" (HeartRate.relevantDatetime, MostRecentPriorHeartRate.relevantPeriod) HeartRate.relevantPeriod) sort by start of Global."NormalizeInterval"(relevantDatetime, relevantPeriod) where Global."NormalizeInterval" (HeartRate.relevantDatetime, HeartRate.relevantPeriod) during CADEncounterMI.relevantPeriod and HeartRate.result < 50 '{beats}/min' and PriorHeartRate.result < 50 '{beats}/min' ▲ 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"] union ["Diagnosis": "Intolerance to Beta Blocker Therapy"]) BetaBlockerAllergyOrIntoleranceDiagnosis with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that BetaBlockerAllergyOrIntoleranceDiagnosis.prevalencePeriod overlaps after 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"] union ["Diagnosis": "Intolerance to Beta Blocker Therapy"]) BetaBlockerAllergyOrIntoleranceDiagnosis with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that BetaBlockerAllergyOrIntoleranceDiagnosis.prevalencePeriod overlaps after day of CADEncounterMI.relevantPeriod ▲ Has Diagnosis of Cardiac Pacer in Situ with Qualifying CAD Encounter and History of Moderate or Severe LVSD exists ["Diagnosis": "Cardiac Pacer in Situ"] Cardiac Pacer Diagnosis with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that CardiacPacerDiagnosis.prevalencePeriod overlaps after day of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Has Diagnosis of Cardiac Pacer in Situ with Qualifying CAD Encounter and Prior MI exists ["Diagnosis": "Cardiac Pacer in Situ"] CardiacPacerDiagnosis with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that CardiacPacerDiagnosis.prevalencePeriod overlaps after day of CADEncounterMI.relevantPeriod ▲ Has Hypotension with Qualifying CAD Encounter and History of Moderate or Severe LVSD exists ["Diagnosis": "Hypotension"] Hypotension with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that Hypotension.prevalencePeriod overlaps day of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Has Hypotension with Qualifying CAD Encounter and Prior MI exists ["Diagnosis": "Hypotension"] Hypotension with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that Hypotension.prevalencePeriod overlaps day of CADEncounterMI.relevantPeriod ▲ Has Medical or Patient Reason for Not Ordering Beta Blocker for LVSD exists ["Medication, Not Ordered": "Beta Blocker Therapy for LVSD"] NoBetaBlockerForLVSDOrdered with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that NoBetaBlockerForLVSDOrdered.authorDatetime during day of CADEncounterModerateOrSevereLVSD.relevantPeriod where (NoBetaBlockerForLVSDOrdered.negationRationale in "Medical Reason" or NoBetaBlockerForLVSDOrdered.negationRationale in "Patient Reason" ▲ Has Medical or Patient Reason for Not Ordering Beta Blocker Therapy exists ["Medication, Not Ordered": "Beta Blocker Therapy"] NoBetaBlockerOrdered with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that NoBetaBlockerOrdered.authorDatetime during day of CADEncounterMI.relevantPeriod where (NoBetaBlockerOrdered.negationRationale in "Medical Reason" or NoBetaBlockerOrdered.negationRationale in "Patient Reason" ▲ History of Cardiac Surgery Prior to Encounter "Outpatient Encounter During Measurement Period" ValidQualifyingEncounter with ["Procedure, Performed": "Cardiac Surgery"] CardiacSurgery such that Global."NormalizeInterval" (CardiacSurgery.relevantDatetime, CardiacSurgery.relevantPeriod) starts before end of ValidQualifyingEncounter.relevantPeriod ▲ Initial Population AgeInYearsAt(date from start of "Measurement Period") >= 18 and exists ("Qualifying Encounter During Measurement Period" Encounter1 with "Qualifying Encounter During Measurement Period" Encounter2 such that Encounter2.id !~ Encounter1.id and exists "Qualifying CAD Encounter" ▲ Is Currently Taking Beta Blocker Therapy exists ["Medication, Active": "Beta Blocker Therapy"] ActiveBetaBlocker with "Qualifying CAD Encounter and Prior MI" CADEncounterMI such that ActiveBetaBlocker.relevantPeriod overlaps after day of CADEncounterMI.relevantPeriod ▲ Is Currently Taking Beta Blocker Therapy for LVSD exists ["Medication, Active": "Beta Blocker Therapy for LVSD"] ActiveBetaBlockerForLVSD with "Qualifying CAD Encounter and History of Moderate or Severe LVSD" CADEncounterModerateOrSevereLVSD such that ActiveBetaBlockerForLVSD.relevantPeriod overlaps after day of CADEncounterModerateOrSevereLVSD.relevantPeriod ▲ Moderate or Severe LVSD Findings (["Diagnostic Study, Performed": "Ejection Fraction"] EjectionFraction where EjectionFraction.result <= 40 '%' union ["Diagnosis": "Moderate or Severe LVSD"]
union (["Diagnosis": "Left ventricular systolic dysfunction (disorder)"] LVSD
where LVSD.severity in "Moderate or Severe" ▲ Numerator 1 "Has Beta Blocker Therapy for LVSD Ordered" or "Is Currently Taking Beta Blocker Therapy for LVSD" ▲ Numerator 2 "Has Beta Blocker Therapy Ordered" or "Is Currently Taking Beta Blocker Therapy" ▲ Outpatient Encounter During Measurement Period (["Encounter, Performed": "Office Visit"] union ["Encounter, Performed": "Outpatient Consultation"] union ["Encounter, Performed": "Care Services in Long Term Residential Facility"] union ["Encounter, Performed": "Home Healthcare Services"] union ["Encounter, Performed": "Nursing Facility Visit"]) QualifyingEncounter where QualifyingEncounter.relevantPeriod during day of "Measurement Period" ■ Qualifying CAD Encounter "Coronary Artery Disease Encounter" union "History of Cardiac Surgery Prior to Encounter" ■ Qualifying CAD Encounter and History of Moderate or Severe LVSD "Qualifying CAD Encounter" EncounterWithCADProxy with "Moderate or Severe LVSD Findings" LVSDFindings such that Coalesce(LVSDFindings.prevalencePeriod, Global."NormalizeInterval"(LVSDFindings.relevantDatetime, LVSDFindings.relevantPeriod)) starts before end of EncounterWithCADProxy.relevantPeriod ■ Qualifying CAD Encounter and Prior MI "Qualifying CAD Encounter" EncounterWithCADProxy with ["Diagnosis": "Initial Myocardial Infarction"] MyocardialInfarction such that MyocardialInfarction.prevalencePeriod starts 3 years or less before day of start of EncounterWithCADProxy.relevantPeriod and not exists "Moderate or Severe LVSD Findings" ■ Qualifying Encounter During Measurement Period (["Encounter, Performed": "Office Visit"] union ["Encounter, Performed": "Outpatient Consultation"]
union ["Encounter, Performed": "Nursing Facility Visit"]
union ["Encounter, Performed": "Care Services in Long Term Residential Facility"]
union ["Encounter, Performed": "Home Healthcare Services"]
union ["Encounter, Performed": "Patient Provider Interaction"]) ValidEncounter
where ValidEncounter relevant Period during day of "Measurement Period" where ValidEncounter.relevantPeriod during day of "Measurement Period" ▲ SDE Ethnicity ["Patient Characteristic Ethnicity": "Ethnicity"] ▲ SDE Payer ["Patient Characteristic Payer": "Payer Type"] ▲ SDE Race ["Patient Characteristic Race": "Race"] ▲ SDE Sex ["Patient Characteristic Sex": "ONC Administrative Sex"] **Functions** ▲ Global.NormalizeInterval(pointInTime DateTime, period Interval<DateTime>) if pointInTime is not null then Interval[pointInTime, pointInTime] else if period is not null then period else null as Interval<DateTime> **Terminology** code "Left ventricular systolic dysfunction (disorder)" ("SNOMEDCT Code (134401001)")
code "Substance with beta adrenergic receptor antagonist mechanism of action (substance)" ("SNOMEDCT Code (373254001)")
valueset "Allergy to Beta Blocker Therapy" (2.16.840.1.113883.3.526.3.366)
valueset "Asthmin" (2.16.840.1.113883.3.526.3.366)
valueset "Asthmin" (2.16.840.1.113883.3.526.3.366)
valueset "Asthmin" (2.16.840.1.113883.3.526.3.367)
valueset "Beta Blocker Therapy for LVSD" (2.16.840.1.113883.3.526.3.1174)
valueset "Beta Blocker Therapy for LVSD" (2.16.840.1.113883.3.526.3.1184)
valueset "Beta Blocker Therapy Ingredient" (2.16.840.1.113883.3.526.3.1184)
valueset "Bradycardia" (2.16.840.1.113883.3.526.3.1184)
valueset "Cardiac Pacer" (2.16.840.1.113883.3.526.3.119)
valueset "Cardiac Pacer in Situ" (2.16.840.1.113883.3.526.3.371)
valueset "Cardiac Pacer in Situ" (2.16.840.1.113883.3.526.3.371)
valueset "Cardiac Services in Long Term Residential Facility" (2.16.840.1.113883.3.464.1003.101.12.1014)
valueset "Coronary Artery Disease No MI" (2.16.840.1.113883.3.526.3.369)
valueset "Ejection Fraction" (2.16.840.1.113883.3.526.3.1134)
valueset "Ethnicity" (2.16.840.1.113883.3.526.3.1176)
valueset "Home Healthcare Services" (2.16.840.1.113883.3.526.3.176)
valueset "Home Healthcare Services" (2.16.840.1.113883.3.526.3.176)
valueset "Intilal Myocardial Infarction" (2.16.840.1.113883.3.526.3.170)
valueset "Intilal Myocardial Infarction" (2.16.840.1.113883.3.526.3.1007)
valueset "Moderate or Severe" (2.16.840.1.113883.3.526.3.1009)
valueset "Outpatient Consultation" (2.16.840.1.113883.3.526.3.1009)
valueset "Outpatient Consultation" (2.16.840.1.113883.3.526 code "Left ventricular systolic dysfunction (disorder)" ("SNOMEDCT Code (134401001)") valueset "Patient Reason" (2.16.840.1.113883.3.526.3.1008) valueset "Payer Type" (2.16.840.1.114222.4.11.3591) valueset "Race" (2.16.840.1.114222.4.11.836) **Data Criteria (QDM Data Elements)** "Allergy/Intolerance: Beta Blocker Therapy Ingredient" using "Beta Blocker Therapy Ingredient (2.16.840.1.113883.3.526.3.1493)" "Allergy/Intolerance: Substance with beta adrenergic receptor antagonist mechanism of action (substance)" using "Substance with beta adrenergic receptor antagonist mechanism of action (substance) (SNOMEDCT Code 373254001)" "Diagnosis: Allergy to Beta Blocker Therapy" using "Allergy to Beta Blocker Therapy (2.16.840.1.113883.3.526.3.1177)" "Diagnosis: Arrhythmia" using "Arrhythmia (2.16.840.1.113883.3.526.3.366)" "Diagnosis: Asthma" using "Asthma (2.16.840.1.113883.3.526.3.362)"
"Diagnosis: Atrioventricular Block" using "Atrioventricular Block (2.16.840.1.113883.3.526.3.367)"

"Diagnosis: Bradycardia" using "Bradycardia (2.16.840.1.113883.3.526.3.412)"

"Diagnosis: Cardiac Pacer in Situ" using "Cardiac Pacer in Situ (2.16.840.1.113883.3.526.3.368)"
"Diagnosis: Coronary Artery Disease No MI" using "Coronary Artery Disease No MI (2.16.840.1.113883.3.526.3.369)"
"Diagnosis: Hypotension" using "Hypotension (2.16.840.1.113883.3.526.3.370)"

"Encounter, Performed: Nursing Facility Visit" using "Nursing Facility Visit (2.16.840.1.113883.3.464.1003.101.12.1012)" "Encounter, Performed: Office Visit" using "Office Visit (2.16.840.1.113883.3.464.1003.101.12.1001)" "Encounter, Performed: Outpatient Consultation" using "Outpatient Consultation (2.16.840.1.113883.3.464.1003.101.12.1008)" "Encounter, Performed: Patient Provider Interaction" using "Patient Provider Interaction (2.16.840.1.113883.3.526.3.1012)"

"Patient Characteristic Sex: ONC Administrative Sex" using "ONC Administrative Sex (2.16.840.1.113762.1.4.1)"

"Physical Exam, Performed: Heart Rate" using "Heart Rate (2.16.840.1.113883.3.526.3.1176)" "Procedure, Performed: Cardiac Pacer" using "Cardiac Pacer (2.16.840.1.113762.1.4.1178.53)" "Procedure, Performed: Cardiac Surgery" using "Cardiac Surgery (2.16.840.1.113883.3.526.3.371)"

Supplemental Data Elements

["Patient Characteristic Ethnicity": "Ethnicity"]

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

["Patient Characteristic Sex": "ONC Administrative Sex"]

None

["Patient Characteristic Race": "Race"]

▲ SDE Ethnicity

▲ SDE Race

Risk Adjustment Variables

None

Measure Set

"Diagnosis: Intolerance to Beta Blocker Therapy" using "Intolerance to Beta Blocker Therapy (2.16.840.1.113883.3.526.3.1178)"

"Encounter, Performed: Patient Provider Interaction" using "Patient Provider Interaction (2.16.840.1.113883.3.526.3.1012)"

"Medication, Active: Beta Blocker Therapy" using "Beta Blocker Therapy (2.16.840.1.113883.3.526.3.1174)"

"Medication, Active: Beta Blocker Therapy for LVSD" using "Beta Blocker Therapy for LVSD (2.16.840.1.113883.3.526.3.1184)"

"Medication, Not Ordered: Beta Blocker Therapy" using "Beta Blocker Therapy for LVSD (2.16.840.1.113883.3.526.3.1174)"

"Medication, Not Ordered: Beta Blocker Therapy for LVSD" using "Beta Blocker Therapy for LVSD (2.16.840.1.113883.3.526.3.1174)"

"Medication, Order: Beta Blocker Therapy" using "Beta Blocker Therapy (2.16.840.1.113883.3.526.3.1174)"

"Medication, Order: Beta Blocker Therapy for LVSD" using "Beta Blocker Therapy for LVSD (2.16.840.1.113883.3.526.3.1184)"

"Patient Characteristic Ethnicity: Ethnicity" using "Ethnicity (2.16.840.1.114222.4.11.837)"

"Patient Characteristic Payer: Payer Type" using "Payer Type (2.16.840.1.114222.4.11.3591)"

"Patient Characteristic Race: Race" using "Race (2.16.840.1.114222.4.11.836)"

"Patient Characteristic Sex: ONC Administrative Sex" using "ONC Administrative Sex (2.16.840.1.113762.1.4.1)"

"Diagnosis: Left ventricular systolic dysfunction (disorder)" using "Left ventricular systolic dysfunction (disorder) (SNOMEDCT Ćode 134401001)"

"Encounter, Performed: Care Services in Long Term Residential Facility" using "Care Services in Long Term Residential Facility (2.16.840.1.113883.3.464.1003.101.12.1014)" "Encounter, Performed: Home Healthcare Services" using "Home Healthcare Services (2.16.840.1.113883.3.464.1003.101.12.1016)"

"Diagnosis: Initial Myocardial Infarction" using "Initial Myocardial Infarction (2.16.840.1.113883.3.526.3.403)"

"Diagnosis: Moderate or Severe LVSD" using "Moderate or Severe LVSD (2.16.840.1.113883.3.526.3.1090)" "Diagnostic Study, Performed: Ejection Fraction" using "Ejection Fraction (2.16.840.1.113883.3.526.3.1134)"