NATIONAL QUALITY FORUM

Measure Evaluation 4.1
December 2009

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The subcriteria and most of the footnotes from the evaluation criteria are provided in Word comments within the form and will appear if your cursor is over the highlighted area. Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized)**:** Complete all yellow highlighted areas of the form. Evaluate the extent to which each subcriterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: *If there is no TAP or workgroup, the SC also evaluates the subcriteria (yellow highlighted areas).*

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the subcriteria, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met
C = Completely (unquestionably demonstrated to meet the criterion)
P = Partially (demonstrated to partially meet the criterion)
M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)
N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)
NA = Not applicable (only an option for a few subcriteria as indicated)

(for NQF staff use) **NQF Review #:** 0077 **NQF Project:** Cardiovascular Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Heart Failure: Symptom and Activity Assessment
De.2 **Brief description of measure**: Percentage of patient visits for those patients aged 18 years and older with a diagnosis of heart failure with quantitative results of an evaluation of both current level of activity and clinical symptoms documented
1.1-2 **Type of Measure:** Process De.3 **If included in a composite or paired with another measure, please identify composite or paired measure**
De.4 **National Priority Partners Priority Area:** Patient and family engagement De.5 **IOM Quality Domain**: Effectiveness, Patient-centered, Equity De.6 **Consumer Care Need:** Living with illness

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	**NQF Staff**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.* A.1 **Do you attest that the measure steward holds intellectual property rights to the measure and the right to use aspects of the measure owned by another entity (e.g., risk model, code set)?** Yes A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:**	**A** **Y☐** **N☐**
B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and	**B**

update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section	Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement Accountability	C Y☐ N☐
D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is provided. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement. D.1**Testing:** Yes, fully developed and tested D.2 **Have NQF-endorsed measures been reviewed to identify if there are similar or related measures?** Yes	D Y☐ N☐
(for NQF staff use**) Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. *Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.* (evaluation criteria) **1a. High Impact**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Affects large numbers, Leading cause of morbidity/mortality, High resource use, Severity of illness, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Heart failure is a chronic condition that poses a major and growing threat to the public's health. Improving the effectiveness of care and optimizing patient outcomes will become increasingly important as the population of the United States ages. •Currently, approximately 5.7 million Americans are living with heart failure. •Heart failure incidence approaches 10 per 1000 population after 65 years of age. •A person aged 40 years or older has a 1 in 5 chance of developing heart failure. •Hospital discharges for heart failure rose from 877,000 in 1996 to 1,106,000 in 2006. •80% percent of men and 70% of women less than 65 years of age who have heart failure will die within 8 years. •In 2005, 1 in 8 death certificates (292,214 deaths) in the United States mentioned heart failure. •For 2009, the estimated direct and indirect cost of heart failure in the United States is $37.2 billion, representing a portion of the estimated $475.3 billion for all cardiovascular diseases. 1a.4 **Citations for Evidence of High Impact:** Lloyd-Jones D, Adams RJ, Brown TM, et al., American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics–2010 update: a report from the American Heart Association. Circulation. 2010;126:e46-e215.	1a C☐ P☐ M☐ N☐

Comment [KP1]: 1a. The measure focus addresses:
•a specific national health goal/priority identified by NQF's National Priorities Partners; OR
•a demonstrated high impact aspect of healthcare (e.g., affects large numbers, leading cause of morbidity/mortality, high resource use (current and/or future), severity of illness, and patient/societal consequences of poor quality).

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: This measure is aimed at improving the number of patients with heart failure who receive a quantitative assessment of their symptom and activity level. Assessment of a patient´s symptoms and activity should be an integral component of all initial and ongoing evaluations for patients with heart failure. Symptom and activity level is an important patient-centered outcome critical to guide treatment decisions.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Using baseline data from the Registry to Improve the Use of Evidence-Based Heart Failure Therapies in the Outpatient Setting (IMPROVE HF), Fonarow and colleagues assessed contemporary care patterns for heart failure in the outpatient setting among 167 outpatient cardiology practices in the United States. NYHA functional class was found to be qualitatively documented by symptoms and functional limitations in 27.0% of medical records and quantitatively documented in 31.5% (58.5% total).(1)

(1)Fonarow GC, Yancy CW, Albert NM, et al. Heart failure care in the outpatient cardiology practice setting: findings from IMPROVE HF. Circ Heart Fail. 2008; 1: 98-106.

Please see additional performance data in section 1 of the attached Measure Testing Summary.

1b.3 Citations for data on performance gap:
Please see additional performance data in section 1 and project descriptions at the end of the attached Measure Testing Summary.

1b.4 Summary of Data on disparities by population group:
We are not aware of any publications/evidence outlining disparities in the area of symptom and activity assessment for heart failure patients.

1b.5 Citations for data on Disparities:

1b
C☐
P☐
M☐
N☐

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** Initial and ongoing evaluations of patients with heart failure should include an assessment of symptoms and their functional consequences. These assessments serve as the basis for making treatment decisions, monitoring the effects of treatment, and modifying treatment as appropriate. The results of this assessment have also been shown to have prognostic significance. Decreasing symptoms and improving function are two of the primary goals of heart failure treatment and represent important patient-centric outcomes for heart failure care.(1)

(1) Radford M, Arnold JMO, Bennett SJ. ACC/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with chronic heart failure: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Heart Failure Clinical Data Standards): Developed in Collaboration With the American College of Chest Physicians and the International Society for Heart and Lung Transplantation: Endorsed by the Heart Failure Society of America. Circulation. 2005;112:1888-1916.

1c.2-3. Type of Evidence: Evidence-based guideline

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
"During the initial and subsequent visits, healthcare providers should inquire about the type, severity, and duration of symptoms that occur during activities of daily living and that may impair the patient's functional capacity. A variety of approaches have been used to quantify the degree of functional limitation imposed by [heart failure]." (1)

These assessments serve as the basis for making treatment decisions, monitoring the effects of treatment,

1c
C☐
P☐
M☐
N☐

Comment [KP2]: 1b. Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating considerable variation, or overall poor performance, in the quality of care across providers and/or population groups (disparities in care).

Comment [k3]: 1 Examples of data on opportunity for improvement include, but are not limited to: prior studies, epidemiologic data, measure data from pilot testing or implementation. If data are not available, the measure focus is systematically assessed (e.g., expert panel rating) and judged to be a quality problem.

Comment [k4]: 1c. The measure focus is:
•an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed;
OR
•if an intermediate outcome, process, structure, etc., there is **evidence** that supports the specific measure focus as follows:
oIntermediate outcome – evidence that the measured intermediate outcome (e.g., blood pressure, Hba1c) leads to improved health/avoidance of harm or cost/benefit.
oProcess – evidence that the measured clinical or administrative process leads to improved health/avoidance of harm and
if the measure focus is on one step in a multi-step care process, it measures the step that has the greatest effect on improving the specified desired outcome(s).
oStructure – evidence that the measured structure supports the consistent delivery of effective processes or access that lead to improved health/avoidance of harm or cost/benefit.
oPatient experience – evidence that an association exists between the measure of patient experience of health care and the outcomes, values and preferences of individuals/ the public.
oAccess – evidence that an association exists between access to a health service and the outcomes of, or experience with, care.
oEfficiency – demonstration of an association between the measured resource use and level of performance with respect to one or more of the other five IOM aims of quality.

Comment [k5]: 4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., … [1]

and modifying treatment as appropriate. The results of this assessment have also been shown to have prognostic significance. Decreasing symptoms and improving function are two of the primary goals of heart failure treatment and represent important patient-centric outcomes for heart failure care.

Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343–82.

1c.5 **Rating of strength/quality of evidence (***also provide narrative description of the rating and by whom***):**
Level of Evidence: C (Only consensus opinion of experts, case studies, or standard-of-care as noted by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines)

1c.6 **Method for rating evidence:** ACCF/AHA Levels of Evidence are classified as follows:
-Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses
-Level of Evidence B: Data derived from a single randomized trial or nonrandomized studies
-Level of Evidence C: Only consensus opinion of experts, case studies, or standard-of-care

Methodologies and policies from the ACC/AHA Task Force on Practice Guidelines state that "assigning a Level of Evidence B or C should not be construed as implying that the recommendation is weak. Many important clinical questions addressed in the guidelines either do not lend themselves to experimentation or have not yet been addressed by high quality investigations. Even though randomized controlled trials may not be available, the clinical question may be so relevant that it would be delinquent to not include it in the guideline."

HFSA Levels of Evidence are classified as follows:
Level A : Randomized, Controlled, Clinical Trials
May be assigned based on results of a single Trials
Level B: Cohort and Case-Control Studies
Post hoc, subgroup analysis, and meta-analysis
Prospective observational studies or registries
Level C: Expert Opinion
Observational studies-epidemiologic findings
Safety Reporting from large-scale use in practice

1c.7 **Summary of Controversy/Contradictory Evidence:**

1c.8 **Citations for Evidence (***other than guidelines***):**

1c.9 **Quote the Specific guideline recommendation (***including guideline number and/or page number***):**
In patients presenting with [heart failure], initial assessment should be made of a patient's ability to perform routine and desired activities of daily living. (Class I, Level of Evidence: C)(1) (p.e9 in web publication)

Assessment should be made at each visit of the ability of a patient with [heart failure] to perform routine and desired activities of daily living. (Class I, Level of Evidence: C) (ACCF/AHA, 2009)(1) (p.e10 in web publication)

During the initial and subsequent visits, healthcare providers should inquire about the type, severity, and duration of symptoms that occur during activities of daily living and that may impair the patient's functional capacity. A variety of approaches have been used to quantify the degree of functional limitation imposed by [heart failure]. The most widely used scale is the NYHA functional classification, but this system is subject to considerable interobserver variability and is insensitive to important changes in exercise capacity. These limitations may be overcome by formal tests of exercise tolerance. (ACCF/AHA, 2009) (1) (p.e14 in web publication)

Comment [k6]: 3 The strength of the body of evidence for the specific measure focus should be systematically assessed and rated (e.g., USPSTF grading system http://www.ahrq.gov/clinic/uspstf07/methods/benefit.htm). If the USPSTF grading system was not used, the grading system is explained including how it relates to the USPSTF grades or why it does not. However, evidence is not limited to quantitative studies and the best type of evidence depends upon the question being studied (e.g., randomized controlled trials appropriate for studying drug efficacy are not well suited for complex system changes). When qualitative studies are used, appropriate qualitative research criteria are used to judge the strength of the evidence.

The evaluation of patients with an established diagnosis of [heart failure] is undertaken to identify the etiology, assess symptom nature and severity, determine functional impairment, and establish a prognosis. Follow-up of patients with [heart failure] or cardiac dysfunction involves continuing reassessment of symptoms, functional capacity, prognosis, and therapeutic effectiveness. (HFSA, 2010) (2) (p. e44 in web publication)

It is recommended that the severity of clinical disease and functional limitation be evaluated and recorded and the ability to perform typical daily activities be determined. This evaluation may be graded by metrics such as New York Heart Association (NYHA) functional class (Strength of Evidence = A) or by the 6-minute walk test. (Strength of Evidence = C) (HFSA, 2010) (2) (e47 in web publication)

1c.10 **Clinical Practice Guideline Citation:** (1) Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343–82.

Lindenfeld J, Albert NM, Boehmer JP, et al. HFSA 2010 Comprehensive Heart Failure Practice Guideline. J Card Fail. 2010;16:e1-e194.

1c.11 **National Guideline Clearinghouse or other URL:** ACCF/AHA - http://content.onlinejacc.org/cgi/reprint/53/15/e1.pdf; HFSA - http://www.heartfailureguideline.org/

1c.12 **Rating of strength of recommendation (***also provide narrative description of the rating and by whom***):**
Class I (Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines)

1c.13 **Method for rating strength of recommendation** (*If different from USPSTF system, also describe rating and how it relates to USPSTF)***:**
ACCF/AHA Classifications of Recommendations are classified as follows:
Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective.
Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment.
Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.
Class IIb: Usefulness/efficacy is less well established by evidence/opinion.
Class III: Conditions for which there is evidence and/or general agreement that a procedure/treatment is not useful/effective and in some cases may be harmful.

1c.14 **Rationale for using this guideline over others:**
It is the PCPI policy to use guidelines, which are evidence-based, applicable to physicians and other healthcare providers, and developed by a national specialty organization or government agency. In addition, the PCPI has now expanded what is acceptable as the evidence base for measures to included documented quality improvement (QI) initiatives or implementation projects that have demonstrated improvement in the quality of care.

Comment [k7]: USPSTF grading system **http://www.ahrq.gov/clinic/uspstf/grades.htm**: **A -** The USPSTF recommends the service. There is high certainty that the net benefit is substantial. **B -** The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. **C -** The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is at least moderate certainty that the net benefit is small. Offer or provide this service only if other considerations support the offering or providing the service in an individual patient. **D -** The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. **I -** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report***, met?** **Rationale:**	**1** **Y☐** **N☐**
2. SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES	
Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about	**Eval**

the quality of care when implemented. (evaluation criteria)	Rating
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** Patient visits with quantitative results of an evaluation of both current level of activity and clinical symptoms documented* *Evaluation and quantitative results documented should include: - documentation of New York Heart Association (NYHA) Class OR - documentation of completion of a valid, reliable, disease-specific instrument (eg, Kansas City Cardiomyopathy Questionnaire, Minnesota Living with Heart Failure Questionnaire, Chronic Heart Failure Questionnaire) **2a.2 Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** every visit during the measurement period **2a.3 Numerator Details (***All information required to collect/calculate the numerator, including all codes, logic, and definitions***):** Numerator Definitions/Instructions: The NYHA functional classification reflects a subjective assessment by a healthcare provider of the severity of a patient's symptoms. Patients are assigned to one of the following 4 classes: - Class I: patients with cardiac disease but without resulting limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain. - Class II: patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain. - Class III: patients with marked limitation of physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnea, or anginal pain. - Class IV: patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of heart failure or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased. Patient-reported health status as assessed by a structured survey/questionnaire instrument offers another, more patient-centric approach to assessing and summarizing the patient's overall heart failure symptom burden. These instruments serve as important constructs for delivering and evaluating heart failure care. See attached for EHR Specifications. For Claims/Administrative: Report CPT Category II Code (in development) XXXXF: Quantitative results of evaluation of both level of activity AND clinical symptoms documented	
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):** All patient visits for those patients aged 18 years and older with a diagnosis of heart failure **2a.5 Target population gender:** Female, Male **2a.6 Target population age range:** 18 years of age and older **2a.7 Denominator Time Window (***The time period in which cases are eligible for inclusion in the denominator***):** 12 consecutive months **2a.8 Denominator Details (***All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**	**2a-specs** **C**☐ **P**☐ **M**☐ **N**☐

Comment [KP8]: **2a.** The measure is well defined and precisely specified so that it can be implemented consistently within and across organizations and allow for comparability. The required data elements are of high quality as defined by NQF's Health Information Technology Expert Panel (HITEP) .

See attached for EHR Specifications.
For Claims/Administrative: See coding tables attached for coding (ICD-9-CM, ICD-10-CM, SNOMED, CPT)

2a.9 **Denominator Exclusions (***Brief text description of exclusions from the target population***):**
Documentation of medical reason(s) for not evaluating both current level of activity and clinical symptoms (eg, severe cognitive or functional impairment)

2a.10 **Denominator Exclusion Details (***All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
For Claims/Administrative: See coding tables attached for examples of medical reason exclusions.
Report CPT Category II Code (in development) XXXXF-1P

2a.11 **Stratification Details/Variables (***All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**

2a.12-13 **Risk Adjustment Type:** No risk adjustment necessary

2a.14 **Risk Adjustment Methodology/Variables (***List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**

2a.15-17 **Detailed risk model available Web page URL or attachment:**

2a.18-19 **Type of Score:** Rate/proportion
2a.20 **Interpretation of Score:** Better quality = Higher score
2a.21 **Calculation Algorithm (***Describe the calculation of the measure as a flowchart or series of steps***):**
See attached for calculation algorithm

2a.22 **Describe the method for discriminating performance** *(e.g., significance testing)***:**

2a.23 **Sampling (Survey) Methodology** *If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate)*:

2a.24 **Data Source (***Check the source(s) for which the measure is specified and tested)*
Paper medical record/flow-sheet, Electronic administrative data/claims, Electronic clinical data, Electronic Health/Medical Record, Registry data

2a.25 **Data source/data collection instrument (***Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.***):**
This measure, in its previous specifications, is currently being used in the ACCF PINNACLE registry for the outpatient office setting.

2a.26-28 **Data source/data collection instrument reference web page URL or attachment:** URL www.pinnacleregistry.org

2a.29-31 **Data dictionary/code table web page URL or attachment:** Attachment NQF 0077_PCPI_HF-3_Symptom and Activity Assessment.pdf

2a.32-35 **Level of Measurement/Analysis** (*Check the level(s) for which the measure is specified and tested)*
Clinicians: Individual, Clinicians: Group

2a.36-37 **Care Settings (***Check the setting(s) for which the measure is specified and tested)*
Home, Ambulatory Care: Office, Ambulatory Care: Clinic, Nursing home (NH) /Skilled Nursing Facility (SNF), Ambulatory Care: Hospital Outpatient, Assisted Living, Group homes

2a.38-41 **Clinical Services** (*Healthcare services being measured, check all that apply*)
Clinicians: PA/NP/Advanced Practice Nurse, Clinicians: Physicians (MD/DO)

Comment [k9]: 11 Risk factors that influence outcomes should not be specified as exclusions.
12 Patient preference is not a clinical exception to eligibility and can be influenced by provider interventions.

TESTING/ANALYSIS	
2b. Reliability testing 2b.1 **Data/sample** *(description of data/sample and size)*: Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary. 2b.2 **Analytic Method** *(type of reliability & rationale, method for testing)*: Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary. 2b.3 **Testing Results** *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*: Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary.	**2b** C☐ P☐ M☐ N☐
2c. Validity testing 2c.1 **Data/sample** *(description of data/sample and size)*: 2c.2 **Analytic Method** *(type of validity & rationale, method for testing)*: All PCPI performance measures are assessed for content validity by expert work group members during the development process. Additional input on the content validity of draft measures is obtained through a 30-day public comment period and by also soliciting comments from a panel of consumer, purchaser, and patient representatives convened by the PCPI specifically for this purpose. All comments received are reviewed by the expert work group and the measures adjusted as needed. Other external review groups (eg, focus groups) may be convened if there are any remaining concerns related to the content validity of the measures. 2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:	**2c** C☐ P☐ M☐ N☐
2d. Exclusions Justified 2d.1 **Summary of Evidence supporting exclusion(s):** The PCPI support the consideration of exceptions or exclusions on a measure by measure basis. There must be clear rationale to permit an exception for a medical, patient, or system reason based on whether or not that reason is significant and occurs frequently enough. The PCPI also supports systematic review and analysis of each physician´s exceptions data to identify practice patterns and opportunities for quality improvement. The Heart Failure Work Group agreed to include a medical reason exception so that clinicians can exclude patients for whom as assessment of symptom and activity may not be appropriate or feasible (eg, patients with severe cognitive or functional impairment). 2d.2 **Citations for Evidence:** 2d.3 **Data/sample** *(description of data/sample and size)*: Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary. 2d.4 **Analytic Method** *(type analysis & rationale)*: Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary. 2d.5 **Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary.	**2d** C☐ P☐ M☐ N☐ NA☐
2e. Risk Adjustment for Outcomes/ Resource Use Measures 2e.1 **Data/sample** *(description of data/sample and size)*:	**2e** C☐ P☐ M☐

Rating: C=Completely; P=Partially; M=Minimally; N=Not at all; NA=Not applicable

Comment [KP10]: 2b. Reliability testing demonstrates the measure results are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period.

Comment [k11]: 8 Examples of reliability testing include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing may address the data items or final measure score.

Comment [KP12]: 2c. Validity testing demonstrates that the measure reflects the quality of care provided, adequately distinguishing good and poor quality. If face validity is the only validity addressed, it is systematically assessed.

Comment [k13]: 9 Examples of validity testing include, but are not limited to: determining if measure scores adequately distinguish between providers known to have good or poor quality assessed by another valid method; correlation of measure scores with another valid indicator of quality for the specific topic; ability of measure scores to predict scores on some other related valid measure; content validity for multi-item scales/tests. Face validity is a subjective assessment by experts of whether the measure reflects the quality of care (e.g., whether the proportion of patients with BP < 140/90 is a marker of quality). If face validity is the only validity addressed, it is systematically assessed (e.g., ratings by relevant stakeholders) and the measure is judged to represent quality care for the specific topic and that the measure focus is the most important aspect of quality for the specific topic.

Comment [KP14]: 2d. Clinically necessary measure exclusions are identified and must be:
•supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;
AND
•a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;
AND
•precisely defined and specified:
–if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of ca ... [2]

Comment [k15]: 10 Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, sensitivity analyses with and without the exclusion, and variability of exclusions across providers.

Comment [KP16]: 2e. For outcome measures and other measures (e.g., resource use) when indicated:
•an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care;Error! Bookmark not defined. OR ... [3]

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)*: This is a process measure; risk adjustment is not indicated. **2e.3 Testing Results** *(risk model performance metrics)*: **2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:**	N☐ NA☐
2f. Identification of Meaningful Differences in Performance **2f.1 Data/sample from Testing or Current Use** *(description of data/sample and size)*: Please see additional information in section 1 of the attached Measure Testing Summary. **2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*: Please see additional information in section 1 of the attached Measure Testing Summary. **2f.3 Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*: Please see additional information in section 1 of the attached Measure Testing Summary.	**2f** C☐ P☐ M☐ N☐
2g. Comparability of Multiple Data Sources/Methods **2g.1 Data/sample** *(description of data/sample and size)*: Please see additional information in section 4 of the attached Measure Testing Summary. **2g.2 Analytic Method** *(type of analysis & rationale)*: Please see additional information in section 4 of the attached Measure Testing Summary. **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*: Please see additional information in section 4 of the attached Measure Testing Summary.	**2g** C☐ P☐ M☐ N☐ NA☐
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: The measure is not stratified by patient groups or cohorts that could potentially be affected by disparities in care, nor are we aware of any existing research identifying disparities in care that may be relevant to this measure. **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** We are not aware of any relevant disparities that have been identified.	**2h** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, **met?** **Rationale:**	*2* C☐ P☐ M☐ N☐
3. USABILITY	
Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)	**Eval Rating**
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use **3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large)** (*If used*	**3a** C☐ P☐ M☐ N☐

Comment [k17]: 13 Risk models should not obscure disparities in care for populations by including factors that are associated with differences/inequalities in care such as race, socioeconomic status, gender (e.g., poorer treatment outcomes of African American men with prostate cancer, inequalities in treatment for CVD risk factors between men and women). It is preferable to stratify measures by race and socioeconomic status rather than adjusting out differences.

Comment [KP18]: 2f. Data analysis demonstrates that methods for scoring and analysis of the specified measure allow for identification of statistically significant and practically/clinically meaningful differences in performance.

Comment [k19]: 14 With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74% v. 75%) is clinically meaningful; or whether a statistically significant difference of $25 in cost for an episode of care (e.g., $5,000 v. $5,025) is practically meaningful. Measures with overall poor performance may not demonstrate much variability across providers.

Comment [KP20]: 2g. If multiple data sources/methods are allowed, there is demonstration they produce comparable results.

Comment [KP21]: 2h. If disparities in care have been identified, measure specifications, scoring, and analysis allow for identification of disparities through stratification of results (e.g., by race, ethnicity, socioeconomic status, gender);OR rationale/data justifies why stratification is not necessary or not feasible.

Comment [KP22]: 3a. Demonstration that information produced by the measure is meaningful, understandable, and useful to the intended audience(s) for both public reporting (e.g., focus group, cognitive testing) and informing quality improvement (e.g., quality improvement initiatives). An important outcome that may not have an identified improvement strategy still can be useful for informing quality improvement by identifying the need for and stimulating new approaches to improvement.

in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years)**:**
This measure is not yet used in any public reporting initiative. The measure will, however, be eligible for inclusion in the CMS PQRS and other government programs in 2012 and would thus provide information about clinician participation to the public. The ACCF, AHA, and PCPI believe that the reporting of such participation information is a beneficial first step on a trajectory toward the public reporting of performance results, which is most appropriate after the measures are thoroughly tested and the reliability of the performance data has been validated. Continued NQF endorsement will facilitate our ongoing progress toward this public reporting objective.

3a.3 **If used in other programs/initiatives (***If used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years*)**:**
All PCPI measures are suitable for use in quality improvement initiatives and are made freely available on the PCPI website and through the implementation efforts of medical specialty societies and other PCPI members. The PCPI strongly encourages the use of its measures in QI initiatives and seeks to provide information on such initiatives to PCPI members.

The American Heart Association's Get With The Guidelines®-Outpatient (GWTG-O) is a virtual performance improvement program that will improve adherence to evidence-based care in the outpatient setting, including specialist practices, general healthcare practices and health clinics. GWTG-Outpatient has had a long history of quality improvement for cardiovascular care. They have published 65 publications over the past 10 years. This program is designed to assist healthcare professionals in the outpatient setting to provide the best possible care to patients. This program collects a number of clinical measures for primary and secondary prevention. Clinical measure sets include those developed by American Heart Association, including those co-developed with other organizations, such as the American College of Cardiology Foundation and the American Medical Association, as well as other National Quality Forum endorsed measures.

Through this program, data is collected on clinical measures affecting a number of cardiovascular related conditions including, atrial fibrillation, coronary artery disease, heart failure, hypertension, diabetes, and preventative care. The primary analytical system used is Duke Clinical Research Institute. Get With The Guidelines®-Outpatient is a quality improvement program that can be utilized for Maintenance of Certification (MOC) with groups like American Board of Internal Medicine (ABIM) and American Board of Family Medicine (ABFM). ABIM has confirmed that the reports received from Get With The Guidelines-Outpatient can be utilized in completion of their Self-Directed Practice Improvement Module (PIM). The Self-Directed PIM provides one pathway for earning practice performance credit in ABIM's MOC program. This program includes several integral components: A preliminary Continuing Education (CE) course for the care team, data submission and reporting that is integrated with existing Electronic Health Records (EHRs)/health technology platforms, corresponding professional and provider education including webinars, online tools and resources, digital access to reference materials and videos through the Get With The Guidelines®-Outpatient website (http://outpatient.heart.org). The free continuing education activity titled, Outpatient Quality Improvement Focus, addresses the quality chasm and treatment gap, presents the benefits of quality improvement and identifies the steps necessary for implementation in the practice setting. This continuing education activity is certified for physicians, nurses and pharmacists.

The American College of Cardiology Foundation's Cardiology Practice Improvement Pathway (CPIP) uses clinical measure sets that are developed and specified by the American College of Cardiology Foundation with the American Heart Association and the American Medical Association's Physician Consortium for Performance Improvement for Hypertension, Stable Coronary Artery Disease, Heart Failure, and Atrial Fibrillation/Atrial Flutter. This program is intended as an approved quality improvement product that can be applied toward ABIM's Part IV practice performance requirement for Maintenance of Certification (ABIM AQI application submitted). They are in the process of creating a homepage on the Cardiosource.org homepage. The URL will be cardiosource.org/cpip. The web-based tool will be available after spring 2011. Through an online webinar hosted in November 2010, CPIP anticipates enrolling 50 - 100 practices during 2011 which will provide data from about 500-1,000 cardiologists. This ACCF initiative has contracted with the NY QIO: IPRO to analyze and scores based on thresholds. Of the 100 points needed to achieve recognition in the program, 70 come directly from clinical points such as the Heart Failure measures that

are being submitted to NQF for consideration. IPRO will audit 5% of practices who submit their data for recognition evaluation.

The American College of Cardiology Foundation's has an Performance Improvement program entitled "A New Era" which is an educational format approved for credit by the American Medical Association (AMA) and the American Nursing Credentialing Center. This continuing medical education program blends both quality improvement and educational methodologies to provide a high quality learning experience that impacts changes to practice. These activities are structured, long-term processes in which a healthcare professional learns about the heart failure specific performance metrics, uses metrics to retrospectively assess his practice, applies these metrics prospectively over a useful interval, and reevaluates his performance. As part of this process, clinicians set goals for change and engage in structured learning activities to improve their performance. As of December 6th, 2010:
- 425 clinicians have enrolled in A New ERA
- The data is generated from all but four states (Montana, New Hampshire, South Dakota, and Wyoming)
- 82% are physicians
- 90% agreed or strongly agreed that performance metric data were valuable
- 80% agreed or strongly agreed that performance metric data review would help them improve their practice
- No one has finished the program, as it takes several months to do so

In 2008, the American College of Cardiology Foundation launched the PINNACLE program (formerly known as the Improving Continuous Cardiac Care or IC3). This was the first, national, prospective, outpatient based cardiac QI registry in the US. While participation is voluntary, this registry collects a variety of longituditional patient data at the point of service, including patients' symptoms, vital signs, medication, and recent hospitalizations. Jointly developed ACCF/AHA/PCPI measures for Coronary Artery Disease, Heart Failure, and Atrial Fibrillation. Data collection is achieved in 2 ways for the practices: paper forms or practice's electronic medical record data collection systems. The primary analytical system used is St. Luke's Mid America Heart Institute. The ACCF registry, PINNACLE, pulls data from outpatient facilities via paper flowsheets or 14 EHR vendors. As of December 10, 2010, there are 47 practices collecting data at 200 sites with 276,000 unique patients representing 1 million documented encounters.

Testing of Interpretability (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*)
3a.4 **Data/sample** *(description of data/sample and size)*:

3a.5 **Methods** *(e.g., focus group, survey, QI project)*:

3a.6 **Results** *(qualitative and/or quantitative results and conclusions)*:

3b/3c. Relation to other NQF-endorsed measures

3b.1 **NQF # and Title of similar or related measures:**

(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**

3b. Harmonization
If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source or different topic but same target population):
3b.2 **Are the measure specifications harmonized? If not, why?**

3b
C☐
P☐
M☐
N☐
NA☐

3c. Distinctive or Additive Value
3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:**

3c
C☐
P☐
M☐
N☐

Rating: C=Completely; P=Partially; M=Minimally; N=Not at all; NA=Not applicable

Comment [KP23]: 3b. The measure specifications are harmonized with other measures, and are applicable to multiple levels and settings.

Comment [k24]: 16 Measure harmonization refers to the standardization of specifications for similar measures on the same topic (e.g., *influenza immunization* of patients in hospitals or nursing homes), or related measures for the same target population (e.g., eye exam and HbA1c for *patients with diabetes*), or definitions applicable to many measures (e.g., age designation for children) so that they are uniform or compatible, unless differences are dictated by the evidence. The dimensions of harmonization can include numerator, denominator, exclusions, and data source and collection instructions. The extent of harmonization depends on the relationship of the measures, the evidence for the specific measure focus, and differences in data sources.

Comment [KP25]: 3c. Review of existing endorsed measures and measure sets demonstrates that the measure provides a distinctive or additive value to existing NQF-endorsed measures (e.g., provides a more complete picture of quality for a particular condition or aspect of healthcare, is a more valid or efficient way to measure).

5.1 **If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the same target population), Describe why it is a more valid or efficient way to measure quality:**	**NA☐**
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, **met?** **Rationale:**	**3** **C☐** **P☐** **M☐** **N☐**
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**
4a. Data Generated as a Byproduct of Care Processes 4a.1-2 **How are the data elements that are needed to compute measure scores generated?** Data generated as byproduct of care processes during care delivery (Data are generated and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition), Coding/abstraction performed by someone other than person obtaining original information (E.g., DRG, ICD-9 codes on claims, chart abstraction for quality measure or registry)	**4a** **C☐** **P☐** **M☐** **N☐**
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** **C☐** **P☐** **M☐** **N☐**
4c. Exclusions 4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No 4c.2 **If yes, provide justification.**	**4c** **C☐** **P☐** **M☐** **N☐** **NA☐**
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences 4d.1 **Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results.** Although we are not currently aware of any unintended consequences related to this measure, we plan through an active redesign of the PCPI website to facilitate the collection of information on unintended consequences from the users of PCPI measures.	**4d** **C☐** **P☐** **M☐** **N☐**
4e. Data Collection Strategy/Implementation 4e.1 **Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data/missing data, timing/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/ implementation issues:** Please see additional information in section 3 of the attached Measure Testing Summary. 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** Costs to implement the measure have not been calculated.	**4e** **C☐** **P☐** **M☐** **N☐**

Comment [KP26]: 4a. For clinical measures, required data elements are routinely generated concurrent with and as a byproduct of care processes during care delivery. (e.g., BP recorded in the electronic record, not abstracted from the record later by other personnel; patient self-assessment tools, e.g., depression scale; lab values, meds, etc.)

Comment [KP27]: 4b. The required data elements are available in electronic sources. If the required data are not in existing electronic sources, a credible, near-term path to electronic collection by most providers is specified and clinical data elements are specified for transition to the electronic health record.

Comment [KP28]: 4c. Exclusions should not require additional data sources beyond what is required for scoring the measure (e.g., numerator and denominator) unless justified as supporting measure validity.

Comment [KP29]: 4d. Susceptibility to inaccuracies, errors, or unintended consequences and the ability to audit the data items to detect such problems are identified.

Comment [KP30]: 4e. Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, etc.) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use).

4e.3 Evidence for costs: **4e.4 Business case documentation:**	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility*?	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** **C☐** **P☐** **M☐** **N☐**
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited ☐**
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y☐** **N☐** **A☐**

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 Organization
American Medical Association, 515 N State St, Chicago, Illinois, 60654

Co.2 Point of Contact
Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-5056-

Measure Developer If different from Measure Steward
Co.3 Organization
American Medical Association, 515 N State St, Chicago, Illinois, 60654

Co.4 Point of Contact
Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-4469-

Co.5 Submitter If different from Measure Steward POC
Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-5056-, American Medical Association

Co.6 Additional organizations that sponsored/participated in measure development
American College of Cardiology Foundation/American Heart Association

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.
Robert O. Bonow, MD, MACC, FAHA, FACP (Co-Chair) (cardiology)
Theodore G. Ganiats, MD (Co-Chair) (family medicine; measure methodology)
Craig T. Beam, CRE (patient representative)
Kathleen Blake, MD (cardiac electrophysiology)
Donald E. Casey, Jr., MD, MPH, MBA, FACP (internal medicine)
Sarah J. Goodlin, MD (geriatrics, palliative medicine)
Kathleen L. Grady, PhD, APN, FAAN, FAHA (cardiac surgery)
Randal F. Hundley, MD, FACC (cardiology, health plan representative)
Mariell Jessup, MD, FACC, FAHA, FESC (cardiology, heart failure)
Thomas E. Lynn, MD (family medicine, measure implementation)
Frederick A. Masoudi, MD, MSPH (cardiology)
David Nilasena MD, MSPH, MS (general preventive medicine, public health, measure implementation)

Paul D. Rockswold, MD, MPH (family medicine)
Ileana L. Piña, MD, FACC (cardiology, heart failure)
Lawrence B. Sadwin (patient representative)
Joanna D. Sikkema, MSN, ANP-BC, FAHA (cardiology)
Carrie A. Sincak, PharmD, BCPS (pharmacy)
John Spertus, MD, MPH (cardiology)
Patrick J. Torcson, MD, FACP, MMM (hospital medicine)
Elizabeth Torres, MD (internal medicine)
Mark V. Williams, MD, FHM (hospital medicine)
John B Wong, MD (internal medicine)

PCPI measures are developed through cross-specialty, multi-disciplinary work groups. All medical specialties and other health care professional disciplines participating in patient care for the clinical condition or topic under study must be equal contributors to the measure development process. In addition, the PCPI strives to include on its work groups individuals representing the perspectives of patients, consumers, private health plans, and employers. This broad-based approach to measure development ensures buy-in on the measures from all stakeholders and minimizes bias toward any individual specialty or stakeholder group. All work groups have at least two co-chairs who have relevant clinical and/or measure development expertise and who are responsible for ensuring that consensus is achieved and that all perspectives are voiced.

Ad.2 If adapted, provide name of original measure: Combination of two previously endorsed NQF measures - Heart Failure (HF): Assessment of Activity Level and Heart Failure (HF): Assessment of Clinical Symptoms of Volume Overload (Excess)
Ad.3-5 If adapted, provide original specifications URL or attachment

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 Year the measure was first released: 2003
Ad.7 Month and Year of most recent revision: 12, 2010
Ad.8 What is your frequency for review/update of this measure? Every 3 years or as new evidence becomes available that materially affects the measures.
Ad.9 When is the next scheduled review/update for this measure? 12, 2013

Ad.10 Copyright statement/disclaimers: This Physician Performance Measurement Set (PPMS) and related data specifications were developed by the Physician Consortium for Performance Improvement® (the Consortium) including the American College of Cardiology (ACC), the American Heart Association (AHA) and the American Medical Association (AMA) to facilitate quality improvement activities by physicians. The performance measures contained in this PPMS are not clinical guidelines and do not establish a standard of medical care, and have not been tested for all potential applications. While copyrighted, they can be reproduced and distributed, without modification, for noncommercial purposes, e.g., use by health care providers in connection with their practices. Commercial use is defined as the sale, license, or distribution of the performance measures for commercial gain, or incorporation of the performance measures into a product or service that is sold, licensed or distributed for commercial gain. Commercial uses of the PPMS require a license agreement between the user and the AMA, (on behalf of the Consortium) or the ACC or the AHA. Neither the AMA, ACC, AHA, the Consortium nor its members shall be responsible for any use of this PPMS.

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Limited proprietary coding is contained in the measure specifications for convenience. Users of the proprietary code sets should obtain all necessary licenses from the owners of these code sets. The AMA, the ACC, the AHA, the Consortium and its members disclaim all liability for use or accuracy of any Current Procedural Terminology (CPT®) or other coding contained in the specifications.

Ad.11 -13 Additional Information web page URL or attachment: Attachment Testing Summary HF NQF

Final_2_10_2011-634329406847201955.pdf
Date of Submission (*MM/DD/YY*)**:** 03/16/2011

Page 3: [1] Comment [k5] **Karen Pace** **10/5/2009 8:59:00 AM**

4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., mammography) or measures for multiple care processes that affect a single outcome.

Page 8: [2] Comment [KP14] **Karen Pace** **10/5/2009 8:59:00 AM**

2d. Clinically necessary measure exclusions are identified and must be:

- supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;

AND

- a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;

AND

- precisely defined and specified:
  - if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of cases excluded, exclusion rates by type of exclusion);

if patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately).

Page 8: [3] Comment [KP16] **Karen Pace** **10/5/2009 8:59:00 AM**

2e. For outcome measures and other measures (e.g., resource use) when indicated:

- an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care;**Error! Bookmark not defined.** OR

rationale/data support no risk adjustment.

PCPI Performance Measure Testing Results – Heart Failure

The PCPI Testing Protocol outlines the comprehensive set of tests that should be conducted in different practice settings, using different data sources, for each performance measurement set. The PCPI recognizes that multiple testing projects will be needed to achieve the required test results for each measurement set. Moreover, testing and surveillance should be part of continued evaluation and updating of the measures.

This document presents results for the American College of Cardiology (ACC)/American Heart Association (AHA)/ PCPI Heart Failure Physician Performance Measures from the CMS PQRI program, the DOQ program, a peer-reviewed study, and the Cardio-HIT project.

1. Where are the measures used and what are the documented performance rates ?

Performance rates for individual measures are found to vary across the measure reporting and testing programs. This is expected, in that the performance rates are derived from different data sources, different practice sites, and variation in both the program implementation of the measures and approaches to implementation of the measures at individual practices or by the physicians in the practice sites included in the testing project. Variation in performance rates across practice sites suggests that the measure is able to differentiate among practices. In addition, no single relatively high value of performance for a measure should be used as an indication of that measure being "topped out", and hence no longer important or meaningful to measure.

PCPI #	**NQF endorsed (#)**	**Measure**	**CMS PQRI[1]** (years, data source, performance 2007, 2008)	**Performance CMS DOQ-IT** (2008) (performance mean)	**Performance Baker[2] (EHR-only v. hybrid)** (2007) (performance)	**PCPI Cardio-HIT Incubator Group[3]** (EHRs) (2009) (performance)	**PINNACLE Registry Multi Month Comparison** (2010) (performance)[4]	**Performance Persell[5] Quality Improvement System** (surrogate testing) (2007-2009)
HF-1	0079	Left ventricular function assessment		**85.48%**		**23.3%**	**64.7%**	
HF-2	0085	Weight measurement		**97.85%**		**54.4%**		
HF-3		Blood pressure measurement		**98.92%**		**81.7%**		
HF-4	0078	Assessment of Clinical Symptoms of Volume Overload (Excess)					**50.17%**	
HF-5	0077	Assessment of Activity Level						
HF-8	0083	Beta-blocker therapy	PQRI# 8 2007: **52.29%** claims 2008: **48.66%** claims	**86.34%**	**90.9% - 92.8%**		**88.81%**	**81.4% - 90.2%**
HF-9	0081	ACEI/ARB therapy	PQRI# 5 2007: **49.26%** claims 2008: **37.20%** claims	**80.38%**	**93.9% - 98.7%**		**79.48**%	**84.9% - 89.3%**
HF-10	0084	Warfarin therapy – patients with afib	n/a	**67.03%**	**70.4% - 93.6%**	**77.8%**		**66.7% - 85.3%**

Performance ranges found in the PINNACLE project are as follows:

Measure	25th percentile	Median	75th percentile	90th percentile	Mean (St Dev)
LVEF HF-1	42.5%	74.2%	92.7%	99.5%	66.2% (+/– 31.4%)
ACE/ARB HF-9	73.9%	81.9%	90%	92.7%	81.8% (+/- 8.8%)
BB HF-8	77.3%	89.5%	94.4%	98.9%	85.5% (+/- 11.9%)
Assessment HF 4-5	0.3%	72.6%	93.3%	100%	53.7% (+/- 41.3%)

What are the reported exception rates? (# patients with valid exceptions / (# patients in denominator)

It is expected that reported exception rates will vary across measures and across the measure reporting and testing programs. This is primarily due to differences in the types of measure (eg, medications versus screening), data sources examined in testing, variation among the practice sites where the measures were implemented, and the types and number of reasons included in the measure specification (ie, medical reason, patient reason, and system reason). Any one value for a reported exception rate, in of itself, should not be interpreted as indication of gaming or patient selection behavior.

	CMS PQRI 2007	CMS PQRI 2008	PCPI Cardio-HIT Incubator Group 2009
Beta-blocker therapy	**2.82%**	**0.0%***	**5.39%**
ACEI/ARB therapy	**5.81%**	**4.15%**	**6.17%**
Warfarin therapy	na	na	**5.26%**

*Unable to calculate.

2. **Which tests have been carried out in which settings or data sources?** Tests of feasibility/ implementation, reliability, validity, and unintended consequences conducted in a variety of practice settings including (eg solo practices, large practices, academic practices, safety-net practices, single- and multi-specialty groups).

Setting / Data Source	Medical Record (Gold Standard) (Paper or Electronic)	EHR Reporting	Registry	Administrative Data (single source)	Administrative Data (multiple sources)	Administrative Data Plus Clinical Data
Solo Practice	• Feasibility • Inter-Rater Reliability	• Feasibility • Parallel forms Reliability				
Specialty Practice	• Feasibility • Inter-Rater Reliability		• Feasibility • Parallel-forms Reliability			
Safety-net practice						
Academic Setting						
Community Setting						

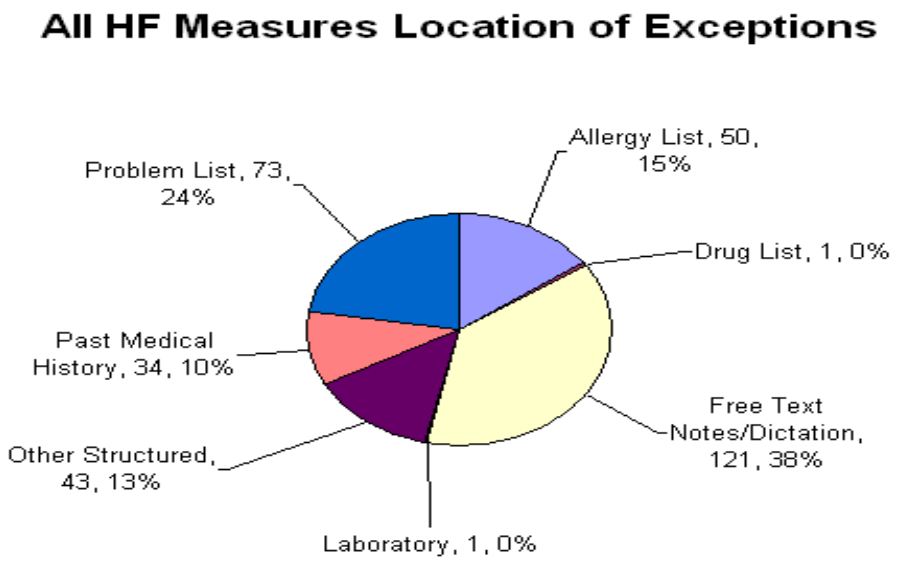
Feasibility Testing	**3. How confident are we that practices can accurately collect and report these measures in a sustainable fashion?** These measures have been tested and found to be generally feasible in EHR, paper, and claims data sources. Results from a study published by Persell, the AMA-sponsored Cardio-HIT project, and the CMS Doctors' Office Quality (DOQ) IT Project, as well as use in CMS's PGP Demonstration project and EHR demonstration project revealed that the heart failure measures are feasible to collect, as currently specified. The feasibility of a PCPI performance measure/measure set refers to: • Whether or not data are stored in a codified field • Which clinical codes sets are utilized/available • Where in the record the data are found • Necessary clarifications needed to implement the measure • Documentation of challenges to measure implementation • The extent to which clinical practices are able to interpret measure definitions and technical specifications, and a) integrate them into existing workflows and health information systems to collect, manage, and manipulate data elements; b) compute performance measures; and c) generate performance reports within a reasonable time frame and budget. **AMA PCPI Testing Project: Cardio-HIT** Data Source 5 physician offices with 5 different EHRS, in use for at least 4 years at time of project 13,985 eligible patients Methods Translated integrated measure specifications to data fields within practice EHRs Location of data (eg, problem list, medication summary) was recorded for data elements as well as whether or not the data was codified using a standard code set such as LOINC or SNOMED • Exported de-identified patient data to a warehouse for measure calculation -- successfully completed by all sites. • Location of exception data useful to inform EHR design, CDS design. Results • Each of the practice sites mapped the data elements required for each of the HF measures to their individual EHR and determined the additional system and work flow modifications required to integrate any additional data elements needed. • Since each practice had a unique set of data fields, individual mapping of the data elements at the practice level was required. Each EHR required the development of additional data fields in order to achieve the functionality required to query and report on all data elements for all measures. • An interface template was developed for each practice EHR which contains the unique set of data fields, validation requirements and acceptable values associated with ACC/AHA/PCPI measures. Using the interface template, each practice queried its EHR database to compile the data elements required for each measure. To assure consistent capture of data across a disperse set of EHR systems, the interface template identifies the submission of the prescribed coding system or standardized medical vocabulary as defined per the ACC/AHA/PCPI measure. • It was not required that each data element be sent to the data warehouse using a specific coding system or standardized coding language but rather that each site would determine what specificity of data was feasible based on the current structure of data in their EHR. The consensus of the Cardio-HIT team was to

provide industry accepted coded values (as identified by HITSP) if available. Examples include LOINC coding for lab tests, ICD for diagnoses and NDC for medications.

- In cases where the EHR was unable to support a medical vocabulary, an acceptable alternative was to substitute a "Y/N" value for those fields. For example, some sites were able to capture the prescription of a medication through the use of NDC codes but other sites determined that the use of Yes/No, medication prescribed (no CPT-II codes sent for medicaitons; CPT-II codes were sent for exceptions) was more feasible.

Percent of HF Exceptions Found in Codified Data

	Problem List	Past Medical History	Free Text Notes/ Dictation	Other Structured Text	Allergy List	Drug List	Laboratory
All 3 HF Measures: Beta Blocker, ACE/ARB, Warfarin	**24%**	**10%**	**38%**	**13%**	**15%**	**0%**	**0%**



Baker, et al. – EHRs

Observational study compared automated review of EHRs data with automated review followed by manual review of electronic notes for patients with apparent quality deficits (hybrid review).

- Performance based on automated review of EHRs data was similar to that based on hybrid review for the three drug-related measures studied, though performance was better in the hybrid review for all cases.
- For the warfarin measure, the hybrid review improved performance from 70.4% to 93.6%, primarily because contraindications to prescribing warfarin were not detected in the automated review.
- Failure to recognize contraindications to medications documented only in provider notes caused performance on medication-based quality measures to be underestimated.

Doctor's Office Quality (DOQ) Project

Data Source

National feasibility study, the CMS Doctors' Office Quality[6] (DOQ) Project

Methods

Reviewers assessed the feasibility of use of the ACC/AHA/PCPI measures in offices by performing retrospective audits of paper medical records and electronic health records

Results

The results revealed that 4 of the 6 measures studied from the HF set are feasible to collect, as currently specified. As part of the DOQ project, reviewers assessed the feasibility of use of the ACC/AHA/PCPI measures in offices by performing retrospective audits of paper medical records and electronic health records.

Limitations to feasibility were as follows:

DENOMINATOR IDENTIFICATION:

- ICD-9 coding was not sufficient in identifying patients with LVSD

NUMERATOR IDENTIFICATION:

- Left Ventricular Function Assessment, and Left Ventricular Function Testing
  - Site 1: Feasible with limitations.
    - LVSD data cannot be retrieved, but this functionality is expected with the new cardiology system being implemented
  - Site 2: Feasible
- Weight Measurement
  - Site 1: Feasible
  - Site 2: Feasible
- Blood Pressure Screening
  - Site 1: Feasible
  - Site 2: Feasible
- Beta Blocker Therapy
  - Site 1: Feasible with limitations.
    - The EHR currently stores results/interpretation as text only and not discrete values, and only indicates whether an order has been completed or not, but this additional functionality is expected with the new cardiology system being implemented
  - Site 2: not tested
- ACE inhibitor therapy
  - Site 1: Feasible with limitations.
    - The EHR currently stores results/interpretation as text only and not discrete values, and only indicates whether an order has been completed or not, but this additional functionality is expected with the new cardiology system being implemented
  - Site 2: not tested
- Warfarin Therapy for Patients with Afib
  - Site 1: Feasible
  - Site 2: Feasible

CMS PQRI –2008 –Claims

- Two HF measures, PQRI #5 and #8, were included in 2007 and 2008 PQRI..
- The rate of submissions accepted as appropriately coded were (2008):
  - Beta-blocker therapy for LVSD **77.30** %
    - **13.43** % of submissions were rejected due to an incorrect DX code
  - ACE inhibitor or ARB therapy for LVSD **67.57** %
    - **25.48** % of submissions were rejected due to an incorrect DX code
- Denominator mismatch rates (% rejected due to incorrect matching of quality code and denominator) were (2008):

- Beta-blocker therapy for LVSD **22.7** %
  - **13.43** % of submissions were rejected due to an incorrect DX code
- ACE inhibitor or ARB therapy for LVSD **32.43** %
  - **25.48** % of submissions were rejected due to an incorrect DX code

Pinnacle Registry Multi Month Comparison
Patient cohorts were created by analyzing one month of submissions to the PINNACLE registry. The first cohort is made up of encounters during October 2009 and the second cohort is made up of encounters during September 2010, made up of 22 and 23 practices, respectively, representing approximately 191 sites. There are 10,627 patient records in the first cohort and 11,692 patients in the second cohort, 83.9% of which are unique. Submissions to the registry are voluntary, and demonstrate feasibility by the number of records which were submitted.

Reliability Testing

4. How confident are we that the measures accurately and consistently assess the performance of physicians providing the care assessed in the measure?

Reliability is whether two abstractors, reviewing the same data from the same data source, would come to the same conclusion as to the patient meeting the measure, not meeting the measure, or qualifying as an exception.

Baker, et al. – EHRs
Inter-rater reliability was not conducted. Parallel forms reliability was conducted.
Baker, et al. did not calculate Kappa statistics for inter-rater reliability.

Cardio-HIT – Multi-site EHRs
Inter-rater reliability was not conducted. Parallel forms reliability was conducted.
Cardio-HIT did not calculate Kappa statistics for inter-rater reliability.

Doctor's Office Quality Pilot Project

Data Source:
2 practices sites with electronic health records
Methods
Abstractor responses were compared with "gold standard" responses determined by two abstractors familiar with the data definitions and who were responsible for abstractor training.
Results

Measure	Doctor's Office Quality (DOQ) Project (agreement %, Trial 1, Trial 2)
LVF Assessment Recorded	45 / 48 **94** % 4 / 4 **100** %
LVF Testing for Hospitalized Patients	30 / 48 **63** % 4 / 4 **100** %
Visits with Weights Recorded	449 / 464 **97** % 36 /455 **80** %
Visits with Blood Pressure Recorded	452 / 464 **97** % 36 / 45 **80** %
Beta-Blocker Therapy (with LVSD)	44 / 48 **92** % 4 / 4 **100** %
ACE Inhibitor Therapy (with LVSD)	45 / 48 **94** % 4 / 4 **100** %
Warfarin Therapy (with afib)	45 / 48 **94** % 4 / 4 **100** %

Measure reliability can also be tested by taking two comparable, independent samples from a set of data, and determining if the performance in both samples is not statistically different.

Pinnacle Registry Multi Month Comparison

Using these assumptions, then, PINNACLE analysts established two patient cohorts separated by eleven months. The first cohort is from October 2009 and the second patient cohort is from September 2010. Analysis of the two cohorts shows that 83.9% of the patients in the sample are primary cases and thus the cohorts contain sufficient uniqueness to assess the reliability of measures with a test-retest methodology. Furthermore, the HF population in each cohort presents consistently with near identical clinical descriptors, including the distribution of LVEF values [severely reduced (9.5%, 8.9%), moderately reduced (11.7%, 4.8%), mildly reduced (12.5%, 12.1%), normal (66.2%, 67.9%)] and New York Heart Association class [Class I (39.1%, 35.6%), Class II (41.8%, 43.3%), Class III (17.3%, 19.0%), Class IV (1.8%, 2.1%)].

Once the cohorts were defined, performance was calculated at the individual physician level and the practice level. These rates were then aggregated to calculate the mean and standard deviation by cohort. Means were compared using the independent sample t-test to demonstrate that it is not possible to reject the null hypothesis at the .05 level.

Note: A 2 tailed t-test was conducted. Because the p value is greater than the α level there is no significant difference between the measures of the two cohorts. Practice is the unit of measure for the t test. Some N's are unequal because a practice was missing one or more data elements needed to calculate the performance measure.

Measure	October 2009 Mean Performance (n, std dev)	September 2010 Mean Performance (n, std dev)	t	p	alpha	Statistically Different?
LVS Function Assessment	63.14% (22, 0.315)	64.70% (23, 0.316)	-0.166	0.869	0.05	No (p>alpha)
ACE or ARB for patients with LVSD	81.90% (21, 0.159)	79.48% (21, 0.210)	0.423	0.674	0.05	No (p>alpha)
Assessment of Clinical Symptoms of Volume Overload (Excess) AND Assessment of Activity Level	51.86% (22, 0.410)	50.17% (23, 0.431)	0.468	0.893	0.05	No (p>alpha)
Beta blocker therapy	83.86% (21, 0.156)	88.81% (21, 0.113)	1.180	0.245	0.05	No (p>alpha)

NOTE: n is measured at the level of practice sites

We interpret this finding to indicate the performance measure is reliable for the following reasons:

1. We have demonstrated that the two cohorts are largely unique, with 83.9% of the sample populations composed of non-overlapping patients.
2. We have also demonstrated that despite this uniqueness, the HF population attributes are highly consistent, as expected with large sample sizes and expected mean regression.
3. We have asserted based on experience and detailed registry analysis that absent major scientific change or aggressive PI or QI interventions, physician performance is both non-stochastic and consistent over time.
4. Thus, the fact that physician performance was statistically non-differentiable between the two cohorts indicates measure repeatability and hence reliability.

Measure Exceptions Validated

(and specific exception reasons documented to inform measure maintenance)

5. Are exceptions clinically appropriate and consistently documented?

Exceptions found for these measures were clinically appropriate.

AMA PCPI Testing Project: Cardio-HIT

Data Source

5 physician offices with 5 different EHRs, in use for at least 4 years at time of project
13,985 eligible patients

Methods

- Translated integrated measure specifications to data fields within practice EHRs
- Manual review of 5 EHRs compared to automated exporting of data to a data warehouse for measure calculation.
- Agreement was determined by comparing an exception that was reported to the data warehouse, which, upon manual abstraction of the EHRs, was confirmed to be appropriate when compared to an a priori list (predetermined list of medical, patient, or system reasons) developed by the clinical experts on the project team and review of clinical guidelines.

Results

- Reported exceptions were validated upon manual review of the medical record, against an a priori list generated by expert opinion. Measure exceptions were validated 95.32% of the time.
- Top medical exception reasons reported were:
  - Beta-blocker therapy: Lung/pulmonary contraindication was the exception reason for 31.04% of exceptions.
  - ACEI/ARB therapy: Renal contraindication was the medical exception reason for 66.36% of exceptions.
  - Warfarin therapy: Gastrointestinal tract contraindication was the exception reason for 20.41% of the exceptions.

All Exceptions – Weighted Data Abstraction Sample	Medical Reason	Clinical Contraindication	Drug Allergy	Drug Interaction	Drug Intolerance
Overall (n=306)	98.2%	85.23%	4.7%	0.0%	10.1%
Beta Blocker Therapy (n=118)	98.0%	74.7%	3.5%	0.0%	21.8%
ACE inhibitor/ARB Therapy (n=127)	99.5%	89.8%	5.9%	0.00%	4.2%
Warfarin Therapy (n=61)	96.1%	95.8%	4.2%	0.0%	0.0%

Beta Blocker Therapy Weighted Sample Data- All Exceptions		
Exceptions	Frequency (%) †	Frequency (n)
Adverse Reaction to Beta Blockers	5.66%	0.275
Doc. of bradycardia/< 50 bpm/correlation for NOT Rx beta-blockers	5.66%	0.275
End of Life Issues	6.47%	0.315
Fatigue	5.66%	0.275
Lung/Pulmonary	58.78%	2.860
Other doc. by pract. for not prescribing therapy	12.12%	0.590
Uncompensated CHF	5.66%	0.275

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure
Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

ACE Inhibitor or ARB Therapy Weighted Sample Data- All Exceptions

Exceptions	Frequency (%) †	Frequency (n)
Adverse reaction to ACE inhibitor or ARB therapy	3.61%	0.987
Allergy/intolerance (e.g., cough) to ACE inhibitor or ARB therapy	7.38%	2.018
End of Life Issues	3.72%	1.016
Hyperkalemia	3.72%	1.016
Hypotension	13.94%	3.811
Moderate or severe aortic stenosis subaortic stenosis	1.26%	0.343
Other doc. by pract. for not prescribing therapy	4.92%	1.345
Patient Refusal	9.02%	2.466
Renal	52.43%	14.331

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

Warfarin Therapy Weighted Sample Data- All Exceptions

Exceptions	Frequency (%) †	Frequency (n)
Bleeding Risk	6.54%	4.113
Dementia/advanced dementia	5.17%	3.248
End of life issues	6.76%	4.247
GI Tract	12.92%	8.123
Hematologic Abnormalities	5.82%	3.657
Hepatic/Liver	6.54%	4.113
Non-compliance with INR follow-up/medication management	0.50%	0.315
Other doc. by pract. for not prescribing therapy	23.62%	14.847
Other significant bleeding	8.54%	5.371
Patient Refusal	12.08%	7.596
Risk for Falls	11.51%	7.235

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

Location and Codification of Exceptions

	Allergy List		Drug List	
Measure	# Included	% Coded	# Included	% Coded
All HF Measures	46	4.35%	0	0.00%
Beta-blocker Therapy	14	7.14%	0	0.00%
ACE/ARB Therapy	19	5.26%	0	0.00%
Warfarin Therapy	13	0.00%	0	0.00%

	Free Text Notes/Dictation		Laboratory	
Measure	# Included	% Coded	# Included	% Coded
All HF Measures	126	11.11%	1	0.00%
Beta-blocker Therapy	39	12.82%	0	0.00%
ACE/ARB Therapy	46	6.52%	1	0.00%
Warfarin Therapy	41	14.63%	0	0.00%

Measure	Other Structured		Past Medical History	
	# Included	% Coded	# Included	% Coded
All HF Measures	45	17.78%	31	9.68%
Beta-blocker Therapy	15	20.00%	13	0.00%
ACE/ARB Therapy	17	11.76%	10	10.00%
Warfarin Therapy	13	23.08%	8	25.00%

Measure	Problem List		TOTAL
	# Included	% Coded	
All HF Measures	75	86.67%	324
Beta-blocker Therapy	23	91.30%	104
ACE/ARB Therapy	32	93.75%	125
Warfarin Therapy	20	70.00%	95

Top Medical Reasons for Exceptions –Beta Blocker Therapy (Weighted Sample Data)

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Adverse Reaction to Beta Blockers	5.13%	6.029		
Allergy List			6.029	0.00%
Doc. of bradycardia/< 50 bpm/correlation for NOT Rx beta-blockers	11.00%	12.931		
Allergy List			1.381	0.00%
Discharge Sumary			1.381	0.00%
Free Notes			5.522	0.00%
Past Medical History			2.761	0.00%
Problem List			1.887	100.00%
End of Life Issues	1.17%	1.381		
Free Text			1.381	0.00%
Fatigue	17.82%	20.947		
Allergy List			0.994	0.00%
Assessment List			2.761	0.00%
Free Text			8.403	0.00%
Past Medical History			2.761	0.00%
Problem List			4.648	70.30%
Stress Test			1.381	0.00%
History of 2nd or 3rd Degree AV block without permanent pacemaker	4.37%	5.135		
Consultation			0.994	0.00%
Free Text			1.381	100.00%
Problem List			2.761	100.00%
Hypotension	17.84%	20.967		
Allergy List			1.381	0.00%
ED notes			1.887	0.00%
Free Text			12.177	0.00%
Past Medical History			2.761	0.00%
Problem List			2.761	100.00%
Lung/Pulmonary	31.04%	36.490		
Allergy List			2.761	50.00%
Assessment List			3.368	59.01%
Free Text			8.642	34.72%

Past Medical History			9.277	0.00%
Problem List			12.443	88.90%
Other doc. by pract. for not prescribing therapy	10.03%	11.790		
Allergy List			5.135	0.00%
Assessment List			0.994	100.00%
Free Text			4.280	0.00%
Problem List			1.381	100.00%
Uncompensated CHF	1.61%	1.887		
Discharge Summary			0.506	0.00%
H&P			1.381	0.00%
† Frequencies are given as a percent of the total number of Medical Exceptions for this measure				

Top Medical Reasons for Exceptions – ACE Inhibitor or ARB Therapy (Weighted Sample Data)

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Adverse reaction to ACE inhibitor or ARB therapy	4.30%	5.483		
Allergy List			5.483	0.00%
Allergy/intolerance (e.g., cough) to ACE inhibitor or ARB therapy	3.58%	4.557		
Allergy List			4.139	0.00%
Free Text			0.418	0.00%
End of Life Issues	1.02%	1.302		
Free Text			1.302	0.00%
Hyperkalemia	9.61%	12.241		
Allergy List			1.995	0.00%
Discharge Summary			1.344	0.00%
Free Text			6.214	0.00%
Lab			1.344	0.00%
Problem List			1.344	100.00%
Hypotension	8.34%	10.622		
Discharge Summary			1.344	0.00%
Free Text			9.278	0.00%
Moderate or severe aortic stenosis subaortic stenosis	1.89%	2.413		
Past Medical History			0.418	0.00%
Problem List			1.995	67.38%
Other doc. by pract. for not prescribing therapy	4.90%	6.240		
Allergy List			2.795	0.00%
Free Text			3.445	0.00%
Renal	66.36%	84.542		
Allergy List			4.758	28.25%
Assessment List			11.172	0.00%
Discharge Summary			2.832	22.98%
Free Text			25.394	18.44%
H&P			0.418	0.00%
Past Medical History			10.167	13.22%
Problem List			29.801	97.82%
† Frequencies are given as a percent of the total number of Medical Exceptions for this measure				

Top Medical Reasons for Exceptions – ACE Inhibitor or Warfarin Therapy

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Allergy or intolerance	3.01%	1.850		
Allergy List			1.850	0.00%
Bleeding Risk	6.30%	3.871		
Free Text Notes/Dictation			3.255	0.00%
Problem List			0.617	0.00%
Dementia/advanced dementia	2.64%	1.624		
Free Text Notes/Dictation			1.173	61.60%
Problem List			0.451	0.00%
End of life issues	1.91%	1.173		
Free Text Notes/Dictation			1.173	0.00%
GI Tract	20.41%	12.534		
Allergy List			1.233	0.00%
Free Text Notes/Dictation			5.058	37.48%
H&P			0.451	0.00%
Past Medical History			2.598	32.66%
Problem List			3.195	73.44%
Hematologic Abnormalities	20.13%	12.362		
Assessment List			3.394	0.00%
Free Text Notes/Dictation			2.996	43.36%
H&P			0.451	0.00%
Past Medical History			0.451	0.00%
Problem List			5.070	91.11%
Hepatic/Liver	8.82%	5.416		
Assessment List			1.697	50.00%
Free Text Notes/Dictation			0.849	0.00%
Problem List			2.870	54.74%
Non-compliance with INR follow-up/medication management	1.38%	0.849		
Free Text Notes/Dictation			0.849	0.00%
Other doc. by pract. for not prescribing therapy	5.74%	3.527		
Allergy List			2.062	0.00%
Free Text Notes/Dictation			1.465	0.00%
Other significant bleeding	14.43%	8.863		
Free Text Notes/Dictation			7.239	6.22%
Past Medical History			0.901	50.00%
Problem List			0.723	100.00%
Risk for falls	15.22%	9.346		
Allergy List			2.466	0.00%
Assessment List			0.849	0.00%
Discharge Summary			0.451	0.00%
Free Text Notes/Dictation			5.130	16.54%
Past Medical History			0.451	0.00%

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Comparison of Data Sources *Note: in these projects it is recommended to always compare the secondary data source to the current gold standard of manual abstraction of the medical record.	**6. Is measure collection from different data sources comparable? How does automated measure calculation compare to manual measure abstraction?** **AMA PCPI Testing Project: Cardio-HIT** Data Source 5 physician offices with 5 different EHRs, in use for at least 4 years at time of project 13,985 eligible patients Methods • Translated integrated measure specifications to data fields within practice EHRs • Accuracy of heart failure data elements were verified by comparing automated measure abstraction and calculation against manual abstraction of an EHRs • For three samples of patients, researchers completed a manual review of each patient's electronic chart o Sample 1: patients who appeared to meet the numerator of the quality measure o Sample 2: patients who appeared to fail the quality measure (did not meet numerator nor have exception) o Sample 3: patients who appeared to not meet the numerator and have an exception to the quality measure Results Performance rates calculated automatically by the data warehouse compared to the rates of performance, opportunities for improvement and misclassification rates determined with manually abstracted data samples. • Automated review alone: Overall performance for the three measures was 76.84% and varied among the measures: ▪ Beta-blocker therapy: 86.34% ▪ ACEI/ARB therapy: 80.38% ▪ Warfarin therapy: 67.03% • Manual review alone: 22.35% of the cases were identified as failing to meet the measure (opportunities for improvement): ▪ Beta-blocker therapy: 9.30% ▪ ACEI/ARB therapy: 19.53% ▪ Warfarin therapy: 27.69% • Discrepancies between performance measures based on EHRs automated review alone and those based on automated review plus manual review were due to two types of misclassification: ▪ identify performance among true, eligible patients ▪ failure to correctly exclude patients • The overall rate of misclassification in the automatic calculation (identified from manual review) was 10.23% and varied across the measures: ▪ Beta-blocker therapy: 22.35% ▪ ACEI/ARB therapy: 14.34% ▪ Warfarin therapy: 4.54% **7. If automated reporting identifies a patient as meeting the measure, what likelihood is there that manual review will validate that finding?** Patient samples from populations identified by the automated reporting as Measure Mets, Opportunities for Improvement or Exceptions were validated upon manual review of the medical record for the six HF measures

Measure Mets

- Automated review: 89.90% of patients met the numerator
  - Left ventricular function: 85.48%
  - Weight measurement: 97.85%
  - Blood pressure screening: 98.92%
  - Beta-blocker therapy: 86.34%
  - ACEI/ARB therapy: 80.38%
  - Warfarin therapy: 67.03%
- Upon manual validation of the patient sample: 82.88% met the numerator
  - Left ventricular function: 59.57%
  - Weight measurement: 88.35%
  - Blood pressure screening: 98.53%
  - Beta-blocker therapy: 95.82%
  - ACEI/ARB therapy: 75.52%
  - Warfarin therapy: 80.21%

Opportunities for Improvement

- Automated review: 9.96% of patients were opportunities for improvement
  - Left ventricular function: 14.52%
  - Weight measurement: 2.15%
  - Blood pressure screening: 1.08%
  - Beta-blocker therapy: 12.93%
  - ACEI/ARB therapy: 18.41%
  - Warfarin therapy: 31.24%
- Upon manual validation of the patient sample 44.14% of the opportunities for improvement remained opportunities for improvement
  - Left ventricular function: 65.12%
  - Weight measurement: 77.85%
  - Blood pressure screening: 59.63%
  - Beta-blocker therapy: 9.30%
  - ACEI/ARB therapy: 19.53%
  - Warfarin therapy: 27.69%
- Upon manual validation of the above patient sample
  - 34.31% were found to meet the numerator of the measure
  - 16.37% were found to have an exception
  - 5.18% were found to meet the numerator and had an exception

Exceptions (only the 3 drug measures reported exceptions)

- Automated review: 5.57% of patients had an exception
  - Beta-blocker therapy: 5.39%
  - ACEI/ARB therapy: 6.17%
  - Warfarin therapy: 5.26%
- Upon manual validation of the exception patient sample, the overall agreement rate was 94.05%
  - Beta-blocker therapy: 84.20%
  - ACEI/ARB therapy: 100.00%
  - Warfarin therapy: 95.66%

8. Are the individual parts of the measure (numerator, denominator, exceptions) reliably calculated, as compared to the overall measure?

Over the 3 drug measures analyzed, the agreement rates were:

- Numerator: 76.84%
- Denominator: 94.43%
- Exception: 66.19%
- Overall: 72.18%

9. What proportion of patients that met the measure are correctly identified?

Sensitivity: 74.75%

10. What proportion of patients that do not meet the measure are correctly identified?

AMA PCPI Testing Project: Cardio-HIT

Specificity: 70.10%

Patients Automatically Identified as Exceptions	Agreement			
Measure	Mean Rate	S.E.	95% C.I.	N
All HF Measures	87.312%	2.026%	83.16%, 91.47%	270
Beta-blocker Therapy	76.221%	3.839%	68.29%, 84.15%	123
ACE/ARB Therapy	97.793%	1.506%	94.32%, 100%	95
Warfarin Therapy	94.384%	3.198%	87.15%, 100%	52

Patients Automatically Identified as Opportunities for Improvement	Agreement				
Measure	Mean Rate	S.E.	95 % C.I.	N - num	N - den
All HF Measures	44.14%	2.17%	39.80% ,48.48%	232	526
Left Ventricular Function	65.12%	3.32%	58.38% ,71.87%	134	206
Weight Measurement	77.85%	7.20%	62.25% ,93.46%	26	33
Blood Pressure Screening	59.63%	10.46%	36.87% ,82.40%	13	22
Beta-blocker Therapy	9.30%	4.13%	0.18% ,18.41%	5	49
ACE/ARB Therapy	19.53%	4.89%	9.18% ,29.87%	13	66
Warfarin Therapy	27.69%	3.66%	20.18% ,35.21%	41	149

False Positive Opportunities for Improvement - Numerator Actually Met					
Measure	Mean Rate	S.E.	95% C.I.	N - num	N - den
All HF Measures	34.31%	2.07%	30.16% ,38.46%	180	526
Left Ventricular Function	34.88%	3.32%	28.13% ,41.62%	72	206
Weight Measurement	7.53%	4.57%	0.00% ,18.00%	3	33
Blood Pressure Screening	40.37%	10.46 %	17.605% ,63.13%	9	22
Beta-blocker Therapy	59.06%	7.00%	44.34% ,73.79%	29	49
ACE/ARB Therapy	31.88%	5.75%	19.86% ,43.91%	21	66
Warfarin Therapy	31.47%	3.80%	23.68% ,39.26%	47	149
Left Ventricular Function	34.31%	2.07%	30.16% ,38.46%	180	526

Measure	Mean Rate	S.E.	95% C.I.	N - num	N - den
All HF Measures	16.37%	1.61%	13.12% ,19.63%	86	526
Left Ventricular Function	0.00%	0.00%	0.00%, 0.24%	0	206
Weight Measurement	14.62%	6.12%	1.12% ,28.11%	5	33
Blood Pressure Screening	0.00%	0.00%	0.00%, 2.27%	0	22
Beta-blocker Therapy	9.30%	4.13%	0.18% ,18.41%	5	49
ACE/ARB Therapy	34.25%	5.85%	22.02% ,46.49%	23	66
Warfarin Therapy	36.30%	3.94%	28.25% ,44.35%	54	149
Left Ventricular Function	16.37%	1.61%	13.12% ,19.63%	86	526

EHR "In Silo" Verification

Note: initially this may be of limited usefulness until EHR functionality and use progresses

11. Can EHR products reliably identify data elements and calculate these measures?

A "dummy" data set of patient data will be provided to several EHR vendors along with EHR measure specifications. The vendors will use this test file to determine if their system can reliably calculate the measures based on intended documentation patterns.

This test has not yet been performed for this measure set.

Predictive Validity

12. Does high performance on these measures lead to better patient outcomes?

If the scientific evidence regarding the process of care is strong and widely accepted in the field, no formal evaluation of predictive validity is necessary. If the evidence is less strong, however, it is desirable to show that high performance leads to better patient outcomes.

This test has not yet been performed for this measure set. It should be noted that the Persell study shows that targeted QI projects can improve performance on the process measures.

Unintended Consequences

13. Have monitoring and testing uncovered unexpected consequences of measurement?

Testing should be performed for anticipated unintended consequences. Unanticipated unintended consequences should be monitored for on a long term basis as they may only occur in later stages and widespread adoption.
This test has not yet been performed for this measure set.

Project Descriptions

Doctor's Office Quality Pilot Project

Data was captured at two large physician practice groups who use two distinct EHR systems. The study population of group 1 was their fee-for service Medicare patients. The study population was all non-Medicare patients for Group 2. Once the DOQ clinical measures were developed, the practices were given technical specifications to use to capture the quality measures from their EHR system. Feasibility was assessed for all measures, and some measures were implemented.

Baker, et al (EHRs-only v. hybrid)

The objective of the study was to evaluate the accuracy of an automated system that used EHRs data and specifications from national organizations to measure quality of care for outpatients with heart failure. The research was designed as an observational study comparing success rates on quality measures based on automated review of EHRs data compared to automated review followed by manual review of physician notes for apparent failures (hybrid review).
A single site setting at an academic general internal medicine clinic with several years experience using a commercial EHRs. The researchers measured the left ventricular ejection fraction (LVEF), prescription of a beta blocker and an angiotensin converting enzyme

inhibitor (ACEI) for patients with left ventricular systolic dysfunction (LVEF < 0.40), and prescription of warfarin for patients with comorbid atrial fibrillation.
Adult patients, 517 records, with a qualifying ICD-9 diagnosis of heart failure and two or more clinic visits over the last 18 months. Success rates based only on automated review of EHRs data versus hybrid review were similar for LVEF measurement (94.6% vs. 97.3%) and beta blocker prescription (90.9% vs. 92.8%). However, success rates based on automated review of EHRs data were substantially lower than hybrid review for prescription of ACEI (93.9% vs. 98.6%) and warfarin for atrial fibrillation (70.4% vs. 93.5%).
The studied concluded that using EHRs data alone to measure quality remains problematic because exclusion criteria are often documented only in physicians' notes. EHRs vendors and national quality organizations should collaboratively develop systems to facilitate collection of the data required to routinely assess quality of care.

Cardio-HIT Project
The AMA received funding for Phase II of the Cardio-HIT project from the Agency for Healthcare Research and Quality (AHRQ). The AMA in collaboration with five (5) physician practice sites, the Iowa Foundation for Medical Care, and the National Committee for Quality Assurance, conducted a 2-year, observational study of exception reporting, building on the prior work under Cardio-HIT, a research collaborative of six (6) EHRs-enabled independent group practices that collected data and reported on nationally recognized physician performance measures for coronary artery disease and heart failure.
In Cardio-HIT Phase II, we: (1) empirically documented the prevalence and patterns of exception reporting in these measures; (2) assessed the feasibility and accuracy of exception reporting by validating a sample of reported exceptions against manual EHRs record review; and (3) analyzed and addressed stakeholder perspectives on exception reporting to refine existing principles in the design of physician performance measures.

Pinnacle Registry Multi Month Comparison
Two cohorts of patient encounters for patients aged 18 years and older with a diagnosis of heart failure were created by analyzing two distinct months of data submissions to the PINNACLE Registry™. The first cohort is made up of encounters during October 2009 and the second cohort is made up of encounters during September 2010, made up of 22 and 23 practices, respectively, representing approximately 191 sites. There are 10,627 patient records in the first cohort and 11,692 patients in the second cohort, 83.9% of which are unique.
Overview
Assessing the reliability of measures in large scale electronic databases being sourced by disparate EHR systems requires the application of novel techniques. While we expect coding for commonly used data elements to become more standardized in the medium to long term, the proliferation of EHR vendors and the predisposition toward practice-level customization precipitated by stimulus funding has only exacerbated the variation in electronic documentation in the short term. As a result, registries like PINNACLE must rely on a layered normalization and data quality approach to ensure reliability. PINNACLE presently applies four layers of quality control: 1) custom data mapping with multi-iteration, multi-stakeholder validation, 2) a formal Data Quality Report utility and tight XSD schema, and 3) continuous aggregate data quality review. In addition, for the purposes of this application, PINNACLE analysts have applied statistical sampling techniques (described below) to replicate at scale (tens of thousands of records) more traditional, small scale chart audits.

Custom Data Mapping with Multi-Iteration, Multi-Stakeholder Validation
The System Integration technology employed by the PINNACLE Registry is partially automatic and partially manual. The automatic portions of the process rely on standard data maps that correspond with the data structure of individual EHR products and versions. Relatively straightforward data elements, such as date of birth and heart failure diagnosis, are

generally structured consistently across practices with similar EHRs and can thus be identified and mapped automatically with software. More complex or less common elements, NYHA class for example, must be identified and mapped manually. This process relies on clinical and technical experts from the practice working with PINNACLE project managers and engineers to locate, and potentially normalize, the relevant data element. While potentially time consuming, this process ensures that multiple, highly-trained stakeholders (providers, practice technologists, PINNACLE project managers, engineers, and clinical staff) are reviewing and concurring on the accuracy of the data maps.
Furthermore, at multiple stages during the integration process practices and providers are reviewing both raw data pulls and calculated performance measures on test data extracts, full data extracts, and production extracts. Only after mapping is completed and the practice and PINNACLE staff have signed off on the accuracy of the data maps is the system placed into production.

Data Quality Report utility and XSD Schema
Production-level data extraction occurs on a massive scale. Initial production data extracts to generate baseline performance in the registry for even a single large practice can number in the hundreds of thousands of patient encounters. More routine monthly and quarterly extracts can generate thousands, or even tens of thousands, of encounters per practice. At that volume, human validation of inbound data quality is impossible. Instead PINNACLE deploys a two layered automated data quality validation process. The first layer is a data quality utility, called the DQR, which applies 65 unique tests to inbound data. These tests include valid range checks, parent child relationships, data completeness, and coding accuracy. The utility then generates a report alerting PINNACLE engineers, EHR vendors, or sometimes the practices themselves, to data errors. Depending on the scale of error, files may either be rejected in their entirety for revision and re-submittal or individual records may be segregated from the data load. After the file clears the DQR it must then pass a final XSD validation before being loaded into the data warehouse for production reporting.

Continuous Aggregate Data Quality Review
Once data has been calculated and aggregated at the practice and national level it then becomes possible and appropriate to reapply human scrutiny to data quality and measure reliability management. PINNACLE employs highly skilled professional assets, including the former chief data quality analyst for the 2010 United States Census, to be continuously reviewing and evaluating the accuracy of PINNACLE's reporting. In addition to evaluating data completeness, PINNACLE data quality resources also monitor inter- and intra-practice and provider, as well as inter-temporal, performance variability. PINNACLE is now of sufficient maturity that patterns in provider and practice level performance can be quickly interpreted to indentify 1) failures in data mapping, 2) failures in physician documentation (especially exclusion documentation), and 3) accurate assessments of performance.

Statistical Sampling Techniques for Assessment of Measure Reliability
Due to the scale of the PINNACLE Registry, as well as a series of outstanding methodological questions as to the value of EHR chart audits for validating information that was extracted from the same electronic source data, PINNACLE has not conducted such analyses. Instead, PINNACLE analysts use the scale of the registry itself to create smaller sample cohorts to assess the reliability and stability of measures. This approach requires certain assumptions, which we believe have prima facie validity and are confirmed from large scale analysis of the registry. The assumptions are as follows:
1. Physician performance is non-stochastic over time
2. Physician performance is statistically stable over modest time intervals absent exogenous shocks (i.e. major new scientific findings or direct performance improvement interventions)
3. At large patient population sizes, independent AF populations present consistently and

	normally **Persell, et al (Quality Improvement System)** This study was a time series analysis at a large internal medicine practice using a commercial EHR. Subjects included all adult patients eligible for each measure (range approximately 100-7500 patients). Measures included were modified versions of the national measures, which were updated to allow for extraction from the EHR and local workflow patterns. During the year before the intervention, performance improved significantly for 14 measures. Implementation of a multifaceted QI intervention using EHR tools to improve quality measurement and the accuracy and timeliness of clinician feedback improved performance and/or accelerated the rate of improvement for multiple measures simultaneously. For some measures clinical care changed, and for others, documentation was improved.

AMA-PCPI Level I EHR Specifications

Clinical Topic	Heart Failure
Measure Title	**Symptom and Activity Assessment**
Measure #	**PCPI HF-3 / NQF 0077 /**
Measure Description	Percentage of patient visits for those patients aged 18 years and older with a diagnosis of heart failure with quantitative results of an evaluation of both current level of activity and clinical symptoms documented
Measurement Period	Twelve consecutive months
Initial Patient Population	Patient Age: Visits for patients aged 18 years and older before the start of the measurement period Diagnosis Active: Visits where patient has a diagnosis of Heart Failure before or simultaneously to encounter date Encounter: At least one visit with the physician, physician's assistant, or nurse practitioner during the measurement period
Denominator Statement	All patient visits for those patients aged 18 years and older with a diagnosis of heart failure
Numerator Statement	Patient visits with quantitative results of an evaluation of both current level of activity and clinical symptoms documented* *Evaluation and quantitative results documented should include: - documentation of New York Heart Association (NYHA) Class OR - documentation of completion of a valid, reliable, disease-specific instrument (eg, Kansas City Cardiomyopathy Questionnaire, Minnesota Living with Heart Failure Questionnaire, Chronic Heart Failure Questionnaire)
Denominator Exceptions	Documentation of medical reason(s) for not evaluating both current level of activity and clinical symptoms (eg, severe cognitive or functional impairment, not indicated, contraindicated, other medical reason)

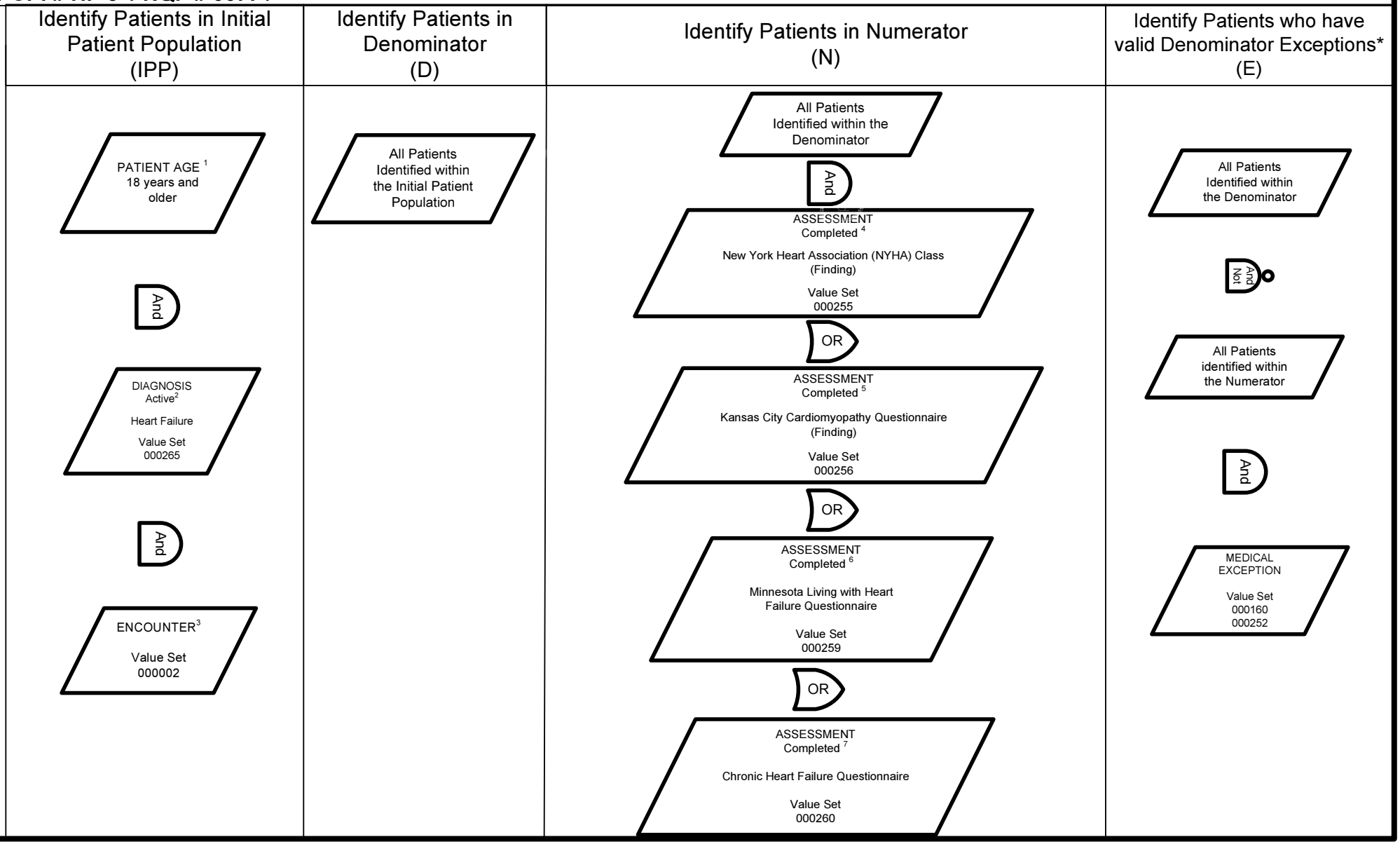
AMA - PCPI Level I EHR Specifications

Measure Logic for Heart Failure: Symptom and Activity Assessment

Measure Description: Percentage of patient visits for those patients aged 18 years and older with a diagnosis of heart failure with quantitative results of an evaluation of both current level of activity and clinical symptoms documented

Measurement Period: 12 consecutive months

PCPI # HF-3 / NQF # 0077 /



PARAMETER SPECIFICATIONS (Value Sets are found in the Coding Appendices):
IPP: [1] Patient Age: 18 years and older before the start of measurement period; [2] Diagnosis Active: before or simultaneously to encounter date; [3] Encounter: one visit during measurement period;
N: All in (N) occurring during the measurement period; [4 5 6 7] Assessment Completed-Listed assessments represent current available tools; [6 7] Assessment, completed- as demonstrated with value not empty;
E: All in (E) occurring before or simultaneously to the measurement period;

* Coded examples are NOT intended to be an exhaustive list. Exceptions will vary for each patient and situation.

Basic Measure Calculation:

$$\frac{(N)}{(D) - (E)} = \%$$

The PCPI strongly recommends that exception rates also be computed and reported alongside performance rates as follows:

Exception Calculation:

$$\frac{(E)}{(D)} = \%$$

Exception Types:
E= E1 (Medical Exceptions) + E2 (Patient Exceptions) + E3 (System Exceptions)
For patients who have more than one valid exception, only one exception should be be counted when calculating the exception rate

Initial Patient Population (IPP)	Denominator (D)	Numerator (N)	Denominator Exceptions (E)
Definition: The initial patient population identifies the general group of patients that the performance measureis designed to address; usually focused on a specific clinical condition (e.g., coronary artery disease, asthma). For example, a patient aged 18 years and older with a diagnosis of CADwho has at least 2 Visits during the measurement period.	**Definition:** The denominator defines the specific group of patients for inclusion in a specific performance measure based on specific criteria (e.g., patient's age, diagnosis, prior MI). In some cases, the denominator may be I dentical to the initial patient population.	**Definition:** The numerator defines the group of patients in the denominator for whom a process or outcome of care occurs (e.g., flu vaccine received).	**Definition:** Denominator exceptions are the valid reasons why patients who are included in the denominator population did not receive a process or outcome of care (described in the numerator). Patients may have Denominator Exceptions for medical reasons (e.g., patient has an egg allergy so they did not receive flu vaccine); patient reasons (e.g., patient declined flu vaccine); or system reasons (e.g., patient did not receive flu Vaccine due to vaccine shortage). These cases are removed from the denominator population for the performance calculation, however the number of patients with valid exceptions should be calculated and reported. This group of patients constitutes the Denominator Exception reporting population – patients for whom the numerator was not achieved and a there is a valid Denominator Exception.
Find the patients who meet the Initial Patient Population criteria (IPP)	Find the patients who qualify for the denominator (D): ○ From the patients within the Patient Population criteria (IPP) select those people who meet Denominator selection criteria. (In some cases the IPP and D are identical).	Find the patients who qualify for the Numerator (N): ○ From the patients within the Denominator (D) criteria, select those people who meet Numerator selection criteria. ○ Validate that the number of patients in the numerator is less than or equal to the number of patients in the denominator	From the patients who did not meet the Numerator criteria, determine if the patient meets any criteria for the Denominator Exception (E1 + E2+E3). If they meet any criteria, they should be removed from the Denominator for performance calculation. As a point of reference, these cases are removed from the denominator population for the performance calculation, however the number of patients with valid exceptions should be calculated and reported.

AMA-PCPI Level I EHR Specifications
Heart Failure - Symptom and Activity Assessment (HF-3)

value_set_id	clinical_topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_taxonomy	code	code_description
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.01	MAL HYP HRT DIS W HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.11	BEN HYP HRT DIS W HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.91	HYP HRT DIS NOS W HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.01	MAL HYP HRT/REN DIS W HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.03	MAL HYP HRT/REN DIS W HF&RF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.11	BEN HYP HRT/REN DIS W HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.13	BEN HYP HRT/REN DIS W HF&RF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.91	HYP HRT/REN DIS W HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.93	MAL HYP HRT/REN DIS W HF&RF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.0	CHF NOS
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.1	LEFT HEART FAILURE
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.20	SYSTOLIC HRT FAILURE NOS
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.21	AC SYSTOLIC HRT FAILURE
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.22	CHR SYSTOLIC HRT FAILURE
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.23	AC ON CHR SYSTOLIC HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.30	DIASTOLC HRT FAILURE NOS
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.31	AC DIASTOLIC HRT FAILURE
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.32	CHR DIASTOLIC HRT FAIL
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.33	AC ON CHR DIASTOLIC HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.40	SYSTOLIC/DIASTOLIC HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.41	AC SYSTOLIC/DIASTOLIC HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.42	CHR SYSTOLIC/DIASTOLIC HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.43	AC/CHR SYSTOLIC/DIASTOLIC HF
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.9	HEART FAILURE NOS
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I11.0	Hypertensive heart disease with heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I13.0	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I13.2	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.1	Left ventricular failure/Cardiac asthma
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.20	Unspecified systolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.21	Acute systolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.22	Chronic systolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.23	Acute on chronic systolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.30	Unspecified diastolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.31	Acute diastolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.32	Chronic diastolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.33	Acute on chronic diastolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.40	Unspecified combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.41	Acute combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.42	Chronic combined systolic (congestive) and diastolic (congestive) heart failure

AMA-PCPI Level I EHR Specifications
Heart Failure - Symptom and Activity Assessment (HF-3)

value_set_id	clinical_topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.43	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.9	Heart failure, unspecified / Biventricular (heart) failure NOS
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	364006	acute left-sided heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5053004	cardiac insufficiency due to prosthesis (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5148006	hypertensive heart disease with congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5375005	chronic left-sided congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10091002	high output heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10335000	chronic right-sided heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10633002	acute congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	13839000	Bernheim's syndrome (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	25544003	low output heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	33644002	postvalvulotomy syndrome (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	42343007	congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	43736008	rheumatic left ventricular failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	44313006	right heart failure secondary to left heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	46113002	hypertensive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	48447003	chronic heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	56675007	acute heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	60856006	cardiac insufficiency following cardiac surgery (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	66989003	chronic right-sided congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	74960003	acute left-sided congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	77737007	benign hypertensive heart disease with congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	80479009	acute right-sided congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	82523003	congestive rheumatic heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	83105008	malignant hypertensive heart disease with congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	84114007	heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	85232009	left heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	88805009	chronic congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	92506005	biventricular congestive heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	90727007	pleural effusion due to congestive heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	111283005	chronic left-sided heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	128404006	right heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194767001	benign hypertensive heart disease with congestive cardiac failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194779001	hypertensive heart and renal disease with (congestive) heart failure (disorder)

AMA-PCPI Level I EHR Specifications
Heart Failure - Symptom and Activity Assessment (HF-3)

value_set_id	clinical_topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_taxonomy	code	code_description
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194781004	hypertensive heart and renal disease with both (congestive) heart failure and renal failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195111005	Decompensated cardiac failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195112003	compensated cardiac failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195114002	acute left ventricular failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	206586007	congenital cardiac failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	233924009	heart failure as a complication of care (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	277639002	sepsis-associated right ventricular failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	314206003	refractory heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	359617009	acute right-sided heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	359620001	acute right heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	367363000	right ventricular failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	410431009	cardiorespiratory failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	417996009	systolic heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	418304008	diastolic heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	424404003	decompensated chronic heart failure (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426012001	right heart failure due to pulmonary hypertension (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426263006	congestive heart failure due to left ventricular systolic dysfunction (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426611007	congestive heart failure due to valvular disease (disorder)
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	441481004	chronic systolic heart failure
000265	HF	3	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	441530006	chronic diastolic heart failure
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99201	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99202	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99203	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99204	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99205	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99212	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99213	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99214	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99215	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99241	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99242	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99243	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99244	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99245	
000002	HF	3	IPP	Encounter -Nursing Facility	Encounter	CPT	99304	
000002	HF	3	IPP	Encounter -Nursing Facility	Encounter	CPT	99305	
000002	HF	3	IPP	Encounter -Nursing Facility	Encounter	CPT	99306	
000002	HF	3	IPP	Encounter -Nursing Facility	Encounter	CPT	99307	
000002	HF	3	IPP	Encounter -Nursing Facility	Encounter	CPT	99308	
000002	HF	3	IPP	Encounter -Nursing Facility	Encounter	CPT	99309	
000002	HF	3	IPP	Encounter -Nursing Facility	Encounter	CPT	99310	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99324	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99325	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99326	

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Heart Failure - Symptom and Activity Assessment (HF-3)

value_set_id	clinical_topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99327	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99328	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99334	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99335	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99336	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99337	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99341	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99342	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99343	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99344	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99345	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99347	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99348	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99349	
000002	HF	3	IPP	Encounter-Outpatient	Encounter	CPT	99350	
000255	HF	3	N	New York Heart Association (NYHA) Class Finding	Assessment	SNM	420300004	New York Heart Association Classification - Class I
000255	HF	3	N	New York Heart Association (NYHA) Class Finding	Assessment	SNM	421704003	New York Heart Association Classification - Class II
000255	HF	3	N	New York Heart Association (NYHA) Class Finding	Assessment	SNM	420913000	New York Heart Association Classification - Class III
000255	HF	3	N	New York Heart Association (NYHA) Class Finding	Assessment	SNM	422293003	New York Heart Association Classification - Class IV
000256	HF	3	N	Kansas City Cardiomyopathy Questionnaire Finding	Assessment	SNM	10190351000046103	Kansas City Cardiomyopathy Questionaire score less than 25 (finding)
000256	HF	3	N	Kansas City Cardiomyopathy Questionnaire Finding	Assessment	SNM	10190361000046100	Kansas City Cardiomyopathy Questionaire score 25-49 (finding)
000256	HF	3	N	Kansas City Cardiomyopathy Questionnaire Finding	Assessment	SNM	10190371000046107	Kansas City Cardiomyopathy Questionaire score 50-74 (finding)
000256	HF	3	N	Kansas City Cardiomyopathy Questionnaire Finding	Assessment	SNM	10190381000046109	Kansas City Cardiomyopathy Questionaire score less than or equal to 75 (finding)
000259	HF	3	N	Minnesota Living with Heart Failure Questionaire score	Assessment	SNM	10190401000046109	Minnesota Living with Heart Failure Questionaire score (observable entity)
000260	HF	3	N	Chronic Heart Failure Questionaire score	Assessment	SNM	10190421000046100	Chronic Heart Failure Questionaire score (observable entity)
000160	HF	3	E	Medical reason	Negation Rationale	HL7	21745	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	21747	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	21703	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	21704	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	22855	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	21990	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	21738	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	22259	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	21815	
000160	HF	3	E	Medical reason	Negation Rationale	HL7	22261	
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	290.4	Vascular dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	290.4	Vascular dementia, uncomplicated
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	290.41	Vascular dementia with delirium
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	290.42	Vascular dementia with delusions
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	290.43	Vascular dementia with depressed mood

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Heart Failure - Symptom and Activity Assessment (HF-3)

value_set_id	clinical_topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_taxonomy	code	code_description
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	292.82	Drug-induced persisting dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	294.1	Dementia in conditions classified elsewhere without behavioral disturbance
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	294.11	Dementia in conditions classified elsewhere with behavioral disturbance
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	330.1	Cerebral lipidoses
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I9	330.2	Cerebral degeneration in generalized lipidoses
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I10	F01.5	Vascular dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I10	F01.50	Vascular dementia without behavioral disturbance
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I10	F01.51	Vascular dementia with behavioral disturbance
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I10	F02.8	Dementia in other diseases classified elsewhere
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I10	F02.80	Dementia in other diseases classified elsewhere, without behavioral disturbance
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I10	F02.81	Dementia in other diseases classified elsewhere, with behavioral disturbance
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	I10	F03	Unspecified dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	52448006	Dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	26929004	Alzheimer's disease
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230269008	Focal Alzheimer's disease
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	416780008	Primary degenerative dementia of the Alzheimer type, presenile onset
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	6475002	Primary degenerative dementia of the Alzheimer type, presenile onset, uncomplicated
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230265002	Familial Alzheimer's disease of early onset
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230266001	Non-familial Alzheimer's disease of early onset
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	65096006	Primary degenerative dementia of the Alzheimer type, presenile onset, with delirium
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	54502004	Primary degenerative dementia of the Alzheimer type, presenile onset, with delusions
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	10532003	Primary degenerative dementia of the Alzheimer type, presenile onset, with depression
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	416975007	Primary degenerative dementia of the Alzheimer type, senile onset
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	66108005	Primary degenerative dementia of the Alzheimer type, senile onset, uncomplicated
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230267005	Familial Alzheimer's disease of late onset
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230268000	Non-familial Alzheimer's disease of late onset
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	4817008	Primary degenerative dementia of the Alzheimer type, senile onset, with delirium
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	55009008	Primary degenerative dementia of the Alzheimer type, senile onset, with delusions
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	26852004	Primary degenerative dementia of the Alzheimer type, senile onset, with depression
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230280008	Progressive aphasia in Alzheimer's disease

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Heart Failure - Symptom and Activity Assessment (HF-3)

value_set_id	clinical_topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	88339003	Dementia arising in the senium AND/OR presenium
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	70936005	Multi-infarct dementia, uncomplicated
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	12348006	Presenile dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	421023003	Presenile dementia associated with AIDS
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191452002	Presenile dementia with delirium
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191455000	Presenile dementia with depression
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191454001	Presenile dementia with paranoia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191451009	Uncomplicated presenile dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	268612007	Senile and presenile organic psychotic conditions
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	15662003	Senile dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	312991009	Senile dementia of the Lewy body type
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191461002	Senile dementia with delirium
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	371024007	Senile dementia with delusion
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191457008	Senile dementia with depressive or paranoid features
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191459006	Senile dementia with depression
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191458003	Senile dementia with paranoia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	371026009	Senile dementia with psychosis
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191449005	Uncomplicated senile dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191519005	Dementia associated with another disease
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	421529006	Dementia associated with AIDS
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	420614009	Organic dementia associated with AIDS
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	281004	Dementia associated with alcoholism
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	425390006	Dementia associated with Parkinson's Disease
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	429458009	Dementia due to Creutzfeldt Jakob disease
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	442344002	Dementia due to Huntington chorea
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230290000	Epileptic dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230282000	Traumatic encephalopathy
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	40425004	Postconcussion syndrome
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230283005	Punch drunk syndrome
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	278857002	Dementia of frontal lobe type
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	9345005	Dialysis dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191493005	Drug-induced dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	32875003	Inhalant-induced persisting dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	111480006	Psychoactive substance-induced organic dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	59651006	Sedative, hypnotic AND/OR anxiolytic-induced persisting dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	51928006	General paresis - neurosyphilis
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	82959004	Dementia paralytica juvenilis
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	62239001	Parkinson-dementia complex of Guam
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230289009	Patchy dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230288001	Semantic dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	90099008	Subcortical leukoencephalopathy
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	429998004	Vascular dementia

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Heart Failure - Symptom and Activity Assessment (HF-3)

value_set_id	clinical_topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191464005	Arteriosclerotic dementia with delirium
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191466007	Arteriosclerotic dementia with depression
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191465006	Arteriosclerotic dementia with paranoia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	56267009	Multi-infarct dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	10349009	Multi-infarct dementia with delirium
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	25772007	Multi-infarct dementia with delusions
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	14070001	Multi-infarct dementia with depression
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230286002	Subcortical vascular dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230287006	Mixed cortical and subcortical vascular dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	191463004	Uncomplicated arteriosclerotic dementia
000252	HF	3	E	Dementia	Diagnosis/Condition/Problem	SNM	230285003	Vascular dementia of acute onset

NATIONAL QUALITY FORUM

Measure Evaluation 4.1
December 2009

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The subcriteria and most of the footnotes from the evaluation criteria are provided in Word comments within the form and will appear if your cursor is over the highlighted area. Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized)**:** Complete all yellow highlighted areas of the form. Evaluate the extent to which each subcriterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: *If there is no TAP or workgroup, the SC also evaluates the subcriteria (yellow highlighted areas).*

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the subcriteria, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met
C = Completely (unquestionably demonstrated to meet the criterion)
P = Partially (demonstrated to partially meet the criterion)
M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)
N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)
NA = Not applicable (only an option for a few subcriteria as indicated)

(for NQF staff use) **NQF Review #:** 0079 **NQF Project:** Cardiovascular Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Heart Failure: Left Ventricular Ejection Fraction Assessment (Outpatient Setting)
De.2 **Brief description of measure***:* Percentage of patients aged 18 years and older with a diagnosis of heart failure for whom the quantitative or qualitative results of a recent or prior (any time in the past) LVEF assessment is documented within a 12 month period
1.1-2 **Type of Measure:** Process De.3 **If included in a composite or paired with another measure, please identify composite or paired measure**
De.4 **National Priority Partners Priority Area:** Population health De.5 **IOM Quality Domain**: Effectiveness, Equity De.6 **Consumer Care Need:** Living with illness

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	**NQF Staff**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.* A.1 **Do you attest that the measure steward holds intellectual property rights to the measure and the right to use aspects of the measure owned by another entity (e.g., risk model, code set)?** Yes A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:**	**A** **Y**☐ **N**☐
B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and	**B**

update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section	Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement Accountability	C Y☐ N☐
D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is provided. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement. D.1**Testing:** Yes, fully developed and tested D.2 **Have NQF-endorsed measures been reviewed to identify if there are similar or related measures?** Yes	D Y☐ N☐
(for NQF staff use**) Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. *Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.* (evaluation criteria) **1a. High Impact**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Affects large numbers, Leading cause of morbidity/mortality, High resource use, Severity of illness, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Heart failure is a chronic condition that poses a major and growing threat to the public's health. Improving the effectiveness of care and optimizing patient outcomes will become increasingly important as the population of the United States ages. •Currently, approximately 5.7 million Americans are living with heart failure. •Heart failure incidence approaches 10 per 1000 population after 65 years of age. •A person aged 40 years or older has a 1 in 5 chance of developing heart failure. •Hospital discharges for heart failure rose from 877,000 in 1996 to 1,106,000 in 2006. •80% percent of men and 70% of women less than 65 years of age who have heart failure will die within 8 years. •In 2005, 1 in 8 death certificates (292,214 deaths) in the United States mentioned heart failure. •For 2009, the estimated direct and indirect cost of heart failure in the United States is $37.2 billion, representing a portion of the estimated $475.3 billion for all cardiovascular diseases. 1a.4 **Citations for Evidence of High Impact:** Lloyd-Jones D, Adams RJ, Brown TM, et al., American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics–2010 update: a report from the American Heart Association. Circulation. 2010;126:e46-e215.	1a C☐ P☐ M☐ N☐

Comment [KP1]: 1a. The measure focus addresses:
•a specific national health goal/priority identified by NQF's National Priorities Partners; OR
•a demonstrated high impact aspect of healthcare (e.g., affects large numbers, leading cause of morbidity/mortality, high resource use (current and/or future), severity of illness, and patient/societal consequences of poor quality).

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: This measure is aimed at improving the number of patients with heart failure who receive an evaluation of their LVEF. Measurement of LVEF in heart failure patients is key to the implementation of therapeutic interventions demonstrated to slow disease progression and improve outcomes in patients with left ventricular systolic dysfunction.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
A 2003 study analyzing the quality of health care in the U.S. found that only 35.25% of participants with congestive heart failure who were beginning medical treatment received an evaluation of their LVEF within 1 month of the start of treatment.(1) For patients hospitalized with heart failure, a study analyzing data from 223 hospitals participating in the Acute Decompensated Heart Failure National Registry (ADHERE) between July 2002 and December 2003 found that left ventricular function assessment was documented in 84% of the 69,069 eligible admissions. Variability among participating hospitals was significant with rates at individual hospitals varying from 14 to 100%.(2)

(1)Appendix to McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. N Engl J Med. 2003;348:2635-2645.
(2)Fonarow GC, Yancy CW, Heywood JT. Adherence to heart failure quality-of-care indicators in US hospitals: analysis of the ADHERE Registry. Arch Intern Med. 2005; 165: 1469–1477.

Please see additional performance data in section 1 of the attached Measure Testing Summary.

1b.3 Citations for data on performance gap:
Please see additional performance data in section 1 and project descriptions at the end of the attached Measure Testing Summary.

1b.4 Summary of Data on disparities by population group:
The 2009 National Healthcare Disparities Report showed that disparities in care for heart failure exist across populations. Although the quality of hospital care for heart failure has improved overall, "care for Whites continues to improve at a higher rate than for minority populations. Thus, quality improvement has not necessarily translated to disparities reduction, which is critical for high-quality care."(1) Recommended hospital care for heart failure was characterized by evaluation of the patient's left ventricular ejection fraction and patient's receipt of an ACE inhibitor for left ventricular systolic dysfunction.
•In 2006, the proportion of Medicare patients with heart failure who received recommended hospital care was higher for Blacks than for Whites (91.4% compared with 90%).(1)
•In 2006, the proportion of Medicare patients with heart failure who received recommended hospital care was lower for American Indians (AI) or Alaska Natives (AN) (86.3%) and Hispanics (89.3%) compared with Whites (90%).(1)

(1) Agency for Healthcare Research and Quality. 2009 National Healthcare Disparities Report. http://www.ahrq.gov/qual/nhdr09/nhdr09.pdf. Published March 2010. Accessed May 25, 2010.

1b.5 Citations for data on Disparities:

1b C☐ P☐ M☐ N☐

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** Evaluation of LVEF in patients with heart failure provides important information that is required to appropriately direct treatment. Several pharmacologic therapies have demonstrated efficacy in slowing disease progression and improving outcomes in patients with left ventricular systolic dysfunction. LVEF assessed during the initial evaluation of patients presenting with heart failure can be considered valid unless the patient has demonstrated a major change in clinical status, experienced or recovered from a clinical event, or received therapy that might have a significant effect on cardiac function.

A comprehensive 2-dimensional echocardiogram with Doppler flow studies has been identified as the single

1c C☐ P☐ M☐ N☐

Comment [KP2]: 1b. Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating considerable variation, or overall poor performance, in the quality of care across providers and/or population groups (disparities in care).

Comment [k3]: 1 Examples of data on opportunity for improvement include, but are not limited to: prior studies, epidemiologic data, measure data from pilot testing or implementation. If data are not available, the measure focus is systematically assessed (e.g., expert panel rating) and judged to be a quality problem.

Comment [k4]: 1c. The measure focus is:
•an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed;
OR
•if an intermediate outcome, process, structure, etc., there is **evidence** that supports the specific measure focus as follows:
oIntermediate outcome – evidence that the measured intermediate outcome (e.g., blood pressure, Hba1c) leads to improved health/avoidance of harm or cost/benefit.
oProcess – evidence that the measured clinical or administrative process leads to improved health/avoidance of harm and
if the measure focus is on one step in a multi-step care process, it measures the step that has the greatest effect on improving the specified desired outcome(s).
oStructure – evidence that the measured structure supports the consistent delivery of effective processes or access that lead to improved health/avoidance of harm or cost/benefit.
oPatient experience – evidence that an association exists between the measure of patient experience of health care and the outcomes, values and preferences of individuals/ the public.
oAccess – evidence that an association exists between access to a health service and the outcomes of, or experience with, care.
oEfficiency – demonstration of an association between the measured resource use and level of performance with respect to one or more of the other five IOM aims of quality.

Comment [k5]: 4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., … [1]

most useful diagnostic test in the evaluation of patients with heart failure.(1)

(1)Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343–82.

1c.2-3. Type of Evidence: Evidence-based guideline

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
The single most useful diagnostic test in the evaluation of patients with HF is the comprehensive 2-dimensional echocardiogram coupled with Doppler flow studies to determine whether or not the LVEF is preserved or reduced. This measurement is essential to identify patients eligible for the implementation of therapeutic interventions demonstrated to slow disease progression and improve outcomes in patients with left ventricular systolic dysfunction.

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom***):**
Level of Evidence: C (Only consensus opinion of experts, case studies, or standard-of-care as noted by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines)

1c.6 Method for rating evidence: Levels of Evidence are classified as follows:
-Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses
-Level of Evidence B: Data derived from a single randomized trial or nonrandomized studies
-Level of Evidence C: Only consensus opinion of experts, case studies, or standard-of-care

Methodologies and policies from the ACC/AHA Task Force on Practice Guidelines state that "assigning a Level of Evidence B or C should not be construed as implying that the recommendation is weak. Many important clinical questions addressed in the guidelines either do not lend themselves to experimentation or have not yet been addressed by high quality investigations. Even though randomized controlled trials may not be available, the clinical question may be so relevant that it would be delinquent to not include it in the guideline."

1c.7 Summary of Controversy/Contradictory Evidence:

1c.8 Citations for Evidence (*other than guidelines***):**

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number***):**
Two-dimensional echocardiography with Doppler should be performed during initial evaluation of patients presenting with [heart failure] to assess LVEF, [left ventricular] size, wall thickness, and valve function. Radionuclide ventriculography can be performed to assess LVEF and volumes. (p. e9 in web publication)

Magnetic resonance imaging or computed tomography may be useful in evaluating chamber size and ventricular mass, detecting right ventricular dysplasia, or recognizing the presence of pericardial disease, as well as in assessing cardiac function and wall motion. (p. e11 in web publication)

1c.10 Clinical Practice Guideline Citation: Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343– 82.
1c.11 National Guideline Clearinghouse or other URL:
http://content.onlinejacc.org/cgi/reprint/53/15/e1.pdf

1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom***):**

Comment [k6]: 3 The strength of the body of evidence for the specific measure focus should be systematically assessed and rated (e.g., USPSTF grading system http://www.ahrq.gov/clinic/uspstf07/methods/benefit.htm). If the USPSTF grading system was not used, the grading system is explained including how it relates to the USPSTF grades or why it does not. However, evidence is not limited to quantitative studies and the best type of evidence depends upon the question being studied (e.g., randomized controlled trials appropriate for studying drug efficacy are not well suited for complex system changes). When qualitative studies are used, appropriate qualitative research criteria are used to judge the strength of the evidence.

Comment [k7]: USPSTF grading system **http://www.ahrq.gov/clinic/uspstf/grades.htm**: **A -** The USPSTF recommends the service. There is high certainty that the net benefit is substantial. **B -** The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. **C -** The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is at least moderate certainty that the net benefit is small. Offer or provide this service only if other considerations support the offering or providing the service in an individual patient. **D -** The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. **I -** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

Class I (Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines) 1c.13 **Method for rating strength of recommendation** (*If different from USPSTF system, also describe rating and how it relates to USPSTF*)**:** Classifications of Recommendations are classified as follows: Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective. Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment. Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy. Class IIb: Usefulness/efficacy is less well established by evidence/opinion. Class III: Conditions for which there is evidence and/or general agreement that a procedure/treatment is not useful/effective and in some cases may be harmful. 1c.14 **Rationale for using this guideline over others:** It is the PCPI policy to use guidelines, which are evidence-based, applicable to physicians and other healthcare providers, and developed by a national specialty organization or government agency. In addition, the PCPI has now expanded what is acceptable as the evidence base for measures to included documented quality improvement (QI) initiatives or implementation projects that have demonstrated improvement in the quality of care.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report*?	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, **met?** **Rationale:**	**1** **Y☐** **N☐**
2. SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES	
Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 **Do you have a web page where current detailed measure specifications can be obtained?** S.2 **If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 **Numerator Statement (***Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** Patients for whom the quantitative or qualitative results of a recent or prior (any time in the past) LVEF assessment is documented* within a 12 month period *Documentation must include documentation in a progress note of the results of an LVEF assessment, regardless of when the evaluation of ejection fraction was performed. Qualitative results correspond to numeric equivalents as follows: Hyperdynamic: corresponds to LVEF greater than 70% Normal: corresponds to LVEF 50% to 70% (midpoint 60%) Mild dysfunction: corresponds to LVEF 40% to 49% (midpoint 45%) Moderate dysfunction: corresponds to LVEF 30% to 39% (midpoint 35%) Severe dysfunction: corresponds to LVEF less than 30% 2a.2 **Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** Once during the measurement period	**2a-specs** **C☐** **P☐** **M☐** **N☐**

Comment [KP8]: 2a. The measure is well defined and precisely specified so that it can be implemented consistently within and across organizations and allow for comparability. The required data elements are of high quality as defined by NQF's Health Information Technology Expert Panel (HITEP) .

2a.3 Numerator Details (*All information required to collect/calculate the numerator, including all codes, logic, and definitions***):**
See attached for EHR Specifications.
For Claims/Administrative: Report CPT Category II Code 3021F- Left ventricular ejection fraction (LVEF) < 40% or documentation of moderately or severely depressed left ventricular systolic dysfunction

OR

CPT Category II Code 3022F- Left ventricular ejection fraction (LVEF) >= 40% or documentation as normal function or mildly depressed left ventricular systolic function

2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):**
All patients aged 18 years and older with a diagnosis of heart failure

2a.5 Target population gender: Female, Male
2a.6 Target population age range: 18 years of age and older

2a.7 Denominator Time Window (*The time period in which cases are eligible for inclusion in the denominator***):**
12 consecutive months

2a.8 Denominator Details (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**
See attached for EHR Specifications.
For Claims/Administrative: See coding tables attached for coding (ICD-9-CM, ICD-10-CM, SNOMED, CPT)

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** None

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**

2a.12-13 Risk Adjustment Type: No risk adjustment necessary

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**

2a.15-17 Detailed risk model available Web page URL or attachment:

2a.18-19 Type of Score: Rate/proportion
2a.20 Interpretation of Score: Better quality = Higher score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
See attached for calculation algorithm.

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**

2a.23 Sampling (Survey) Methodology *If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate)*:

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Paper medical record/flow-sheet, Electronic administrative data/claims, Electronic clinical data, Electronic Health/Medical Record, Registry data

2a.25 Data source/data collection instrument (*Identify the specific data source/data collection*

Comment [k9]: 11 Risk factors that influence outcomes should not be specified as exclusions.
12 Patient preference is not a clinical exception to eligibility and can be influenced by provider interventions.

instrument, e.g. name of database, clinical registry, collection instrument, etc.):
This measure, in its previous specifications, is currently being used in the ACCF PINNACLE registry for the outpatient office setting.

2a.26-28 **Data source/data collection instrument reference web page URL or attachment:** URL www.pinnacleregistry.org

2a.29-31 **Data dictionary/code table web page URL or attachment:** Attachment NQF 0079_PCPI_HF-1_LVEF Assessment.pdf

2a.32-35 **Level of Measurement/Analysis** (*Check the level(s) for which the measure is specified and tested)*
Clinicians: Individual, Clinicians: Group

2a.36-37 **Care Settings (***Check the setting(s) for which the measure is specified and tested)*
Home, Ambulatory Care: Office, Ambulatory Care: Clinic, Nursing home (NH) /Skilled Nursing Facility (SNF), Ambulatory Care: Hospital Outpatient, Assisted Living, Group homes

2a.38-41 **Clinical Services** (*Healthcare services being measured, check all that apply*)
Clinicians: PA/NP/Advanced Practice Nurse, Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 **Data/sample** *(description of data/sample and size)*: Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary.

2b.2 **Analytic Method** *(type of reliability & rationale, method for testing)*:
Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary.

2b.3 **Testing Results** *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary.

2b C☐ P☐ M☐ N☐

2c. Validity testing

2c.1 **Data/sample** *(description of data/sample and size)*:

2c.2 **Analytic Method** *(type of validity & rationale, method for testing)*:
All PCPI performance measures are assessed for content validity by expert work group members during the development process. Additional input on the content validity of draft measures is obtained through a 30-day public comment period and by also soliciting comments from a panel of consumer, purchaser, and patient representatives convened by the PCPI specifically for this purpose. All comments received are reviewed by the expert work group and the measures adjusted as needed. Other external review groups (eg, focus groups) may be convened if there are any remaining concerns related to the content validity of the measures.

2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:

2c C☐ P☐ M☐ N☐

2d. Exclusions Justified

2d.1 **Summary of Evidence supporting exclusion(s):**
This measure has no exclusions.

2d.2 **Citations for Evidence:**

2d C☐ P☐ M☐ N☐ NA☐

Rating: C=Completely; P=Partially; M=Minimally; N=Not at all; NA=Not applicable

Comment [KP10]: 2b. Reliability testing demonstrates the measure results are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period.

Comment [k11]: 8 Examples of reliability testing include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing may address the data items or final measure score.

Comment [KP12]: 2c. Validity testing demonstrates that the measure reflects the quality of care provided, adequately distinguishing good and poor quality. If face validity is the only validity addressed, it is systematically assessed.

Comment [k13]: 9 Examples of validity testing include, but are not limited to: determining if measure scores adequately distinguish between providers known to have good or poor quality assessed by another valid method; correlation of measure scores with another valid indicator of quality for the specific topic; ability of measure scores to predict scores on some other related valid measure; content validity for multi-item scales/tests. Face validity is a subjective assessment by experts of whether the measure reflects the quality of care (e.g., whether the proportion of patients with BP < 140/90 is a marker of quality). If face validity is the only validity addressed, it is systematically assessed (e.g., ratings by relevant stakeholders) and the measure is judged to represent quality care for the specific topic and that the measure focus is the most important aspect of quality for the specific topic.

Comment [KP14]: 2d. Clinically necessary measure exclusions are identified and must be:
•supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;
AND
•a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;
AND
•precisely defined and specified:
–if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of cases excluded, exclusion rates by type of exclusion);
if patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category ... [2]

Comment [k15]: 10 Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, sensitivity analyses with and without the exclusion, and variability of exclusions across providers.

2d.3 Data/sample *(description of data/sample and size)*: Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary **2d.4 Analytic Method** *(type analysis & rationale)*: Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary **2d.5 Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary	
2e. Risk Adjustment for Outcomes/ Resource Use Measures **2e.1 Data/sample** *(description of data/sample and size)*: **2e.2 Analytic Method** *(type of risk adjustment, analysis, & rationale)*: This is a process measure; risk adjustment is not indicated. **2e.3 Testing Results** *(risk model performance metrics)*: **2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:**	**2e** C☐ P☐ M☐ N☐ NA☐
2f. Identification of Meaningful Differences in Performance **2f.1 Data/sample from Testing or Current Use** *(description of data/sample and size)*: Please see additional information in section 1 of the attached Measure Testing Summary. **2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*: Please see additional information in section 1 of the attached Measure Testing Summary. **2f.3 Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*: Please see additional information in section 1 of the attached Measure Testing Summary.	**2f** C☐ P☐ M☐ N☐
2g. Comparability of Multiple Data Sources/Methods **2g.1 Data/sample** *(description of data/sample and size)*: Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary. **2g.2 Analytic Method** *(type of analysis & rationale)*: Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary. **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*: Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary.	**2g** C☐ P☐ M☐ N☐ NA☐
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** The ACCF, AHA, and PCPI advocate that performance measure data should, where possible, be stratified by race, ethnicity, and primary language to assess disparities and initiate subsequent quality improvement activities addressing identified disparities, consistent with recent national efforts to standardize the collection of race and ethnicity data. A 2008 NQF report endorsed 45 practices including stratification by the aforementioned variables.(1) A 2009 IOM report "recommends collection of the existing Office of Management and Budget (OMB) race and Hispanic ethnicity categories as well as more fine-grained categories of ethnicity (referred to as granular ethnicity and based on one's ancestry) and language need (a rating of spoken English language proficiency of less than very well and one's preferred language for health-	**2h** C☐ P☐ M☐ N☐ NA☐

Comment [KP16]: 2e. For outcome measures and other measures (e.g., resource use) when indicated:
•an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care;[Error! Bookmark not defined.] OR rationale/data support no risk adjustment.

Comment [k17]: 13 Risk models should not obscure disparities in care for populations by including factors that are associated with differences/inequalities in care such as race, socioeconomic status, gender (e.g., poorer treatment outcomes of African American men with prostate cancer, inequalities in treatment for CVD risk factors between men and women). It is preferable to stratify measures by race and socioeconomic status rather than adjusting out differences.

Comment [KP18]: 2f. Data analysis demonstrates that methods for scoring and analysis of the specified measure allow for identification of statistically significant and practically/clinically meaningful differences in performance.

Comment [k19]: 14 With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74% v. 75%) is clinically meaningful; or whether a statistically significant difference of $25 in cost for an episode of care (e.g., $5,000 v. $5,025) is practically meaningful. Measures with overall poor performance may not demonstrate much variability across providers.

Comment [KP20]: 2g. If multiple data sources/methods are allowed, there is demonstration they produce comparable results.

Comment [KP21]: 2h. If disparities in care have been identified, measure specifications, scoring, and analysis allow for identification of disparities through stratification of results (e.g., by race, ethnicity, socioeconomic status, gender);OR rationale/data justifies why stratification is not necessary or not feasible.

related encounters)."(2)

References
(1)National Quality Forum Issue Brief (No.10). Closing the Disparities Gap in Healthcare Quality with Performance Measurement and Public Reporting. Washington, DC: NQF, August 2008.

(2)Race, Ethnicity, and Language Data: Standardization for Health Care Quality Improvement. March 2010. AHRQ Publication No. 10-0058-EF. Agency for Healthcare Research and Quality, Rockville, MD. Available at: http://www.ahrq.gov/research/iomracereport. Accessed May 25, 2010.

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*

2

Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, **met?**
Rationale:

2
C☐
P☐
M☐
N☐

3. USABILITY

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)

Eval Rating

3a. Meaningful, Understandable, and Useful Information

3a.1 **Current Use:** In use

3a.2 **Use in a public reporting initiative (disclosure of performance results to the public at large)** (*If used in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years*)**:**
This measure is not yet used in any public reporting initiative. The measure will, however, be eligible for inclusion in the CMS PQRS and other government programs in 2012 and would thus provide information about clinician participation to the public. The ACCF, AHA, and PCPI believe that the reporting of such participation information is a beneficial first step on a trajectory toward the public reporting of performance results, which is most appropriate after the measures are thoroughly tested and the reliability of the performance data has been validated. Continued NQF endorsement will facilitate our ongoing progress toward this public reporting objective.

3a.3 **If used in other programs/initiatives (***If used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years***):**
All PCPI measures are suitable for use in quality improvement initiatives and are made freely available on the PCPI website and through the implementation efforts of medical specialty societies and other PCPI members. The PCPI strongly encourages the use of its measures in QI initiatives and seeks to provide information on such initiatives to PCPI members.

The American Heart Association's Get With The Guidelines®-Outpatient (GWTG-O) is a virtual performance improvement program that will improve adherence to evidence-based care in the outpatient setting, including specialist practices, general healthcare practices and health clinics. GWTG-Outpatient has had a long history of quality improvement for cardiovascular care. They have published 65 publications over the past 10 years. This program is designed to assist healthcare professionals in the outpatient setting to provide the best possible care to patients. This program collects a number of clinical measures for primary and secondary prevention. Clinical measure sets include those developed by American Heart Association, including those co-developed with other organizations, such as the American College of Cardiology Foundation and the American Medical Association, as well as other National Quality Forum endorsed measures.

Through this program, data is collected on clinical measures affecting a number of cardiovascular related conditions including, atrial fibrillation, coronary artery disease, heart failure, hypertension, diabetes, and preventative care. The primary analytical system used is Duke Clinical Research Institute. Get With The Guidelines®-Outpatient is a quality improvement program that can be utilized for Maintenance of

3a
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N☐

Comment [KP22]: 3a. Demonstration that information produced by the measure is meaningful, understandable, and useful to the intended audience(s) for both public reporting (e.g., focus group, cognitive testing) and informing quality improvement (e.g., quality improvement initiatives). An important outcome that may not have an identified improvement strategy still can be useful for informing quality improvement by identifying the need for and stimulating new approaches to improvement.

Certification (MOC) with groups like American Board of Internal Medicine (ABIM) and American Board of Family Medicine (ABFM). ABIM has confirmed that the reports received from Get With The Guidelines-Outpatient can be utilized in completion of their Self-Directed Practice Improvement Module (PIM). The Self-Directed PIM provides one pathway for earning practice performance credit in ABIM's MOC program. This program includes several integral components: A preliminary Continuing Education (CE) course for the care team, data submission and reporting that is integrated with existing Electronic Health Records (EHRs)/health technology platforms, corresponding professional and provider education including webinars, online tools and resources, digital access to reference materials and videos through the Get With The Guidelines®-Outpatient website (http://outpatient.heart.org). The free continuing education activity titled, Outpatient Quality Improvement Focus, addresses the quality chasm and treatment gap, presents the benefits of quality improvement and identifies the steps necessary for implementation in the practice setting. This continuing education activity is certified for physicians, nurses and pharmacists.

The American College of Cardiology Foundation's Cardiology Practice Improvement Pathway (CPIP) uses clinical measure sets that are developed and specified by the American College of Cardiology Foundation with the American Heart Association and the American Medical Association's Physician Consortium for Performance Improvement for Hypertension, Stable Coronary Artery Disease, Heart Failure, and Atrial Fibrillation/Atrial Flutter. This program is intended as an approved quality improvement product that can be applied toward ABIM's Part IV practice performance requirement for Maintenance of Certification (ABIM AQI application submitted). They are in the process of creating a homepage on the Cardiosource.org homepage. The URL will be cardiosource.org/cpip. The web-based tool will be available after spring 2011. Through an online webinar hosted in November 2010, CPIP anticipates enrolling 50 - 100 practices during 2011 which will provide data from about 500-1,000 cardiologists. This ACCF initiative has contracted with the NY QIO: IPRO to analyze and scores based on thresholds. Of the 100 points needed to achieve recognition in the program, 70 come directly from clinical points such as the Heart Failure measures that are being submitted to NQF for consideration. IPRO will audit 5% of practices who submit their data for recognition evaluation.

The American College of Cardiology Foundation's has an Performance Improvement program entitled "A New Era" which is an educational format approved for credit by the American Medical Association (AMA) and the American Nursing Credentialing Center. This continuing medical education program blends both quality improvement and educational methodologies to provide a high quality learning experience that impacts changes to practice. These activities are structured, long-term processes in which a healthcare professional learns about the heart failure specific performance metrics, uses metrics to retrospectively assess his practice, applies these metrics prospectively over a useful interval, and reevaluates his performance. As part of this process, clinicians set goals for change and engage in structured learning activities to improve their performance. As of December 6th, 2010:
- 425 clinicians have enrolled in A New ERA
- The data is generated from all but four states (Montana, New Hampshire, South Dakota, and Wyoming)
- 82% are physicians
- 90% agreed or strongly agreed that performance metric data were valuable
- 80% agreed or strongly agreed that performance metric data review would help them improve their practice
- No one has finished the program, as it takes several months to do so

In 2008, the American College of Cardiology Foundation launched the PINNACLE program (formerly known as the Improving Continuous Cardiac Care or IC3). This was the first, national, prospective, outpatient based cardiac QI registry in the US. While participation is voluntary, this registry collects a variety of longituditional patient data at the point of service, including patients' symptoms, vital signs, medication, and recent hospitalizations. Jointly developed ACCF/AHA/PCPI measures for Coronary Artery Disease, Heart Failure, and Atrial Fibrillation. Data collection is achieved in 2 ways for the practices: paper forms or practice's electronic medical record data collection systems. The primary analytical system used is St. Luke's Mid America Heart Institute. The ACCF registry, PINNACLE, pulls data from outpatient facilities via paper flowsheets or 14 EHR vendors. As of December 10, 2010, there are 47 practices collecting data at 200 sites with 276,000 unique patients representing 1 million documented encounters.

Testing of Interpretability (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*)

3a.4 Data/sample *(description of data/sample and size)*: **3a.5 Methods** *(e.g., focus group, survey, QI project)*: **3a.6 Results** *(qualitative and/or quantitative results and conclusions)*:	
3b/3c. Relation to other NQF-endorsed measures **3b.1 NQF # and Title of similar or related measures:** NQF # 0135: Evaluation of Left ventricular systolic function (LVS)	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
3b. Harmonization If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source or different topic but same target population): **3b.2 Are the measure specifications harmonized? If not, why?** The ICD-9 codes to determine patient eligibility are harmonized with NQF# 0135. There are slight differences in the measure language as a result of the different care settings specified for each measure.	**3b** C☐ P☐ M☐ N☐ NA☐
3c. Distinctive or Additive Value **3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** NQF#0135 focuses on the inpatient setting with the facility as the level of measurement/analysis. This measure is specific to the outpatient setting with the individual clinician as the defined level of measurement/analysis. **5.1 If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the same target population), Describe why it is a more valid or efficient way to measure quality:**	**3c** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability*?	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, **met?** **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**
4a. Data Generated as a Byproduct of Care Processes **4a.1-2 How are the data elements that are needed to compute measure scores generated?** Data generated as byproduct of care processes during care delivery (Data are generated and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition), Coding/abstraction performed by someone other than person obtaining original information (E.g., DRG, ICD-9 codes on claims, chart abstraction for quality measure or registry)	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources **4b.1 Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes **4b.2 If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** C☐ P☐ M☐ N☐

Comment [KP23]: 3b. The measure specifications are harmonized with other measures, and are applicable to multiple levels and settings.

Comment [k24]: 16 Measure harmonization refers to the standardization of specifications for similar measures on the same topic (e.g., *influenza immunization* of patients in hospitals or nursing homes), or related measures for the same target population (e.g., eye exam and HbA1c for *patients with diabetes*), or definitions applicable to many measures (e.g., age designation for children) so that they are uniform or compatible, unless differences are dictated by the evidence. The dimensions of harmonization can include numerator, denominator, exclusions, and data source and collection instructions. The extent of harmonization depends on the relationship of the measures, the evidence for the specific measure focus, and differences in data sources.

Comment [KP25]: 3c. Review of existing endorsed measures and measure sets demonstrates that the measure provides a distinctive or additive value to existing NQF-endorsed measures (e.g., provides a more complete picture of quality for a particular condition or aspect of healthcare, is a more valid or efficient way to measure).

Comment [KP26]: 4a. For clinical measures, required data elements are routinely generated concurrent with and as a byproduct of care processes during care delivery. (e.g., BP recorded in the electronic record, not abstracted from the record later by other personnel; patient self-assessment tools, e.g., depression scale; lab values, meds, etc.)

Comment [KP27]: 4b. The required data elements are available in electronic sources. If the required data are not in existing electronic sources, a credible, near-term path to electronic collection by most providers is specified and clinical data elements are specified for transition to the electronic health record.

4c. Exclusions 4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No 4c.2 **If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ NA☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences 4d.1 **Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results.** Although we are not currently aware of any unintended consequences related to this measure, we plan through an active redesign of the PCPI website to facilitate the collection of information on unintended consequences from the users of PCPI measures.	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation 4e.1 **Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data/missing data, timing/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/ implementation issues:** Please see additional information in section 3 of the attached Measure Testing Summary. 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** Costs to implement the measure have not been calculated. 4e.3 **Evidence for costs:** 4e.4 **Business case documentation:**	**4e** C☐ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility*?	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, **met?** **Rationale:**	**4** C☐ P☐ M☐ N☐
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited** ☐
Steering Committee: Do you recommend for endorsement? **Comments:**	Y☐ N☐ A☐
CONTACT INFORMATION	
Co.1 **Measure Steward (Intellectual Property Owner)** Co.1 **Organization** American Medical Association, 515 N State St, Chicago, Illinois, 60654 Co.2 **Point of Contact** Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-5056-	
Measure Developer If different from Measure Steward	

Comment [KP28]: 4c. Exclusions should not require additional data sources beyond what is required for scoring the measure (e.g., numerator and denominator) unless justified as supporting measure validity.

Comment [KP29]: 4d. Susceptibility to inaccuracies, errors, or unintended consequences and the ability to audit the data items to detect such problems are identified.

Comment [KP30]: 4e. Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, etc.) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use).

Co.3 Organization
American Medical Association, 515 N State St, Chicago, Illinois, 60654

Co.4 Point of Contact
Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-4469-

Co.5 Submitter If different from Measure Steward POC
Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-5056-, American Medical Association

Co.6 Additional organizations that sponsored/participated in measure development
American College of Cardiology Foundation/American Heart Association

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.
Robert O. Bonow, MD, MACC, FAHA, FACP (Co-Chair) (cardiology)
Theodore G. Ganiats, MD (Co-Chair) (family medicine; measure methodology)
Craig T. Beam, CRE (patient representative)
Kathleen Blake, MD (cardiac electrophysiology)
Donald E. Casey, Jr., MD, MPH, MBA, FACP (internal medicine)
Sarah J. Goodlin, MD (geriatrics, palliative medicine)
Kathleen L. Grady, PhD, APN, FAAN, FAHA (cardiac surgery)
Randal F. Hundley, MD, FACC (cardiology, health plan representative)
Mariell Jessup, MD, FACC, FAHA, FESC (cardiology, heart failure)
Thomas E. Lynn, MD (family medicine, measure implementation)
Frederick A. Masoudi, MD, MSPH (cardiology)
David Nilasena MD, MSPH, MS (general preventive medicine, public health, measure implementation)
Paul D. Rockswold, MD, MPH (family medicine)
Ileana L. Piña, MD, FACC (cardiology, heart failure)
Lawrence B. Sadwin (patient representative)
Joanna D. Sikkema, MSN, ANP-BC, FAHA (cardiology)
Carrie A. Sincak, PharmD, BCPS (pharmacy)
John Spertus, MD, MPH (cardiology)
Patrick J. Torcson, MD, FACP, MMM (hospital medicine)
Elizabeth Torres, MD (internal medicine)
Mark V. Williams, MD, FHM (hospital medicine)
John B Wong, MD (internal medicine)

PCPI measures are developed through cross-specialty, multi-disciplinary work groups. All medical specialties and other health care professional disciplines participating in patient care for the clinical condition or topic under study must be equal contributors to the measure development process. In addition, the PCPI strives to include on its work groups individuals representing the perspectives of patients, consumers, private health plans, and employers. This broad-based approach to measure development ensures buy-in on the measures from all stakeholders and minimizes bias toward any individual specialty or stakeholder group. All work groups have at least two co-chairs who have relevant clinical and/or measure development expertise and who are responsible for ensuring that consensus is achieved and that all perspectives are voiced.

Ad.2 If adapted, provide name of original measure: Heart Failure(HF): Left Ventricular Function Assessment
Ad.3-5 If adapted, provide original specifications URL or attachment

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 Year the measure was first released: 2003
Ad.7 Month and Year of most recent revision: 12, 2010
Ad.8 What is your frequency for review/update of this measure? Every 3 years or as new evidence becomes available that materially affects the measures
Ad.9 When is the next scheduled review/update for this measure? 12, 2013

Ad.10 Copyright statement/disclaimers: This Physician Performance Measurement Set (PPMS) and related data specifications were developed by the Physician Consortium for Performance Improvement® (the Consortium)

including the American College of Cardiology (ACC), the American Heart Association (AHA) and the American Medical Association (AMA) to facilitate quality improvement activities by physicians. The performance measures contained in this PPMS are not clinical guidelines and do not establish a standard of medical care, and have not been tested for all potential applications. While copyrighted, they can be reproduced and distributed, without modification, for noncommercial purposes, e.g., use by health care providers in connection with their practices. Commercial use is defined as the sale, license, or distribution of the performance measures for commercial gain, or incorporation of the performance measures into a product or service that is sold, licensed or distributed for commercial gain. Commercial uses of the PPMS require a license agreement between the user and the AMA, (on behalf of the Consortium) or the ACC or the AHA. Neither the AMA, ACC, AHA, the Consortium nor its members shall be responsible for any use of this PPMS.

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Limited proprietary coding is contained in the measure specifications for convenience. Users of the proprietary code sets should obtain all necessary licenses from the owners of these code sets. The AMA, the ACC, the AHA, the Consortium and its members disclaim all liability for use or accuracy of any Current Procedural Terminology (CPT®) or other coding contained in the specifications.

Ad.11 -13 Additional Information web page URL or attachment: Attachment Testing Summary HF NQF Final_2_10_2011-634329406371279685.pdf

Date of Submission (*MM/DD/YY*)**:** 03/16/2011

Page 3: [1] Comment [k5] **Karen Pace** **10/5/2009 8:59:00 AM**

4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., mammography) or measures for multiple care processes that affect a single outcome.

Page 7: [2] Comment [KP14] **Karen Pace** **10/5/2009 8:59:00 AM**

2d. Clinically necessary measure exclusions are identified and must be:

- supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;

AND

- a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;

AND

- precisely defined and specified:
  - if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of cases excluded, exclusion rates by type of exclusion);

if patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately).

PCPI Performance Measure Testing Results – Heart Failure

The PCPI Testing Protocol outlines the comprehensive set of tests that should be conducted in different practice settings, using different data sources, for each performance measurement set. The PCPI recognizes that multiple testing projects will be needed to achieve the required test results for each measurement set. Moreover, testing and surveillance should be part of continued evaluation and updating of the measures.

This document presents results for the American College of Cardiology (ACC)/American Heart Association (AHA)/ PCPI Heart Failure Physician Performance Measures from the CMS PQRI program, the DOQ program, a peer-reviewed study, and the Cardio-HIT project.

1. Where are the measures used and what are the documented performance rates ?

Performance rates for individual measures are found to vary across the measure reporting and testing programs. This is expected, in that the performance rates are derived from different data sources, different practice sites, and variation in both the program implementation of the measures and approaches to implementation of the measures at individual practices or by the physicians in the practice sites included in the testing project. Variation in performance rates across practice sites suggests that the measure is able to differentiate among practices. In addition, no single relatively high value of performance for a measure should be used as an indication of that measure being "topped out", and hence no longer important or meaningful to measure.

PCPI #	**NQF endorsed (#)**	**Measure**	**CMS PQRI[1]** (years, data source, performance 2007, 2008)	**Performance CMS DOQ-IT** (2008) (performance mean)	**Performance Baker[2] (EHR-only v. hybrid)** (2007) (performance)	**PCPI Cardio-HIT Incubator Group[3]** (EHRs) (2009) (performance)	**PINNACLE Registry Multi Month Comparison** (2010) (performance)[4]	**Performance Persell[5] Quality Improvement System** (surrogate testing) (2007-2009)
HF-1	0079	Left ventricular function assessment		**85.48%**		**23.3%**	**64.7%**	
HF-2	0085	Weight measurement		**97.85%**		**54.4%**		
HF-3		Blood pressure measurement		**98.92%**		**81.7%**		
HF-4	0078	Assessment of Clinical Symptoms of Volume Overload (Excess)					**50.17%**	
HF-5	0077	Assessment of Activity Level						
HF-8	0083	Beta-blocker therapy	PQRI# 8 2007: **52.29%** claims 2008: **48.66%** claims	**86.34%**	**90.9% - 92.8%**		**88.81%**	**81.4% - 90.2%**
HF-9	0081	ACEI/ARB therapy	PQRI# 5 2007: **49.26%** claims 2008: **37.20%** claims	**80.38%**	**93.9% - 98.7%**		**79.48**%	**84.9% - 89.3%**
HF-10	0084	Warfarin therapy – patients with afib	n/a	**67.03%**	**70.4% - 93.6%**	**77.8%**		**66.7% - 85.3%**

Performance ranges found in the PINNACLE project are as follows:

Measure	25th percentile	Median	75th percentile	90th percentile	Mean (St Dev)
LVEF HF-1	42.5%	74.2%	92.7%	99.5%	66.2% (+/– 31.4%)
ACE/ARB HF-9	73.9%	81.9%	90%	92.7%	81.8% (+/- 8.8%)
BB HF-8	77.3%	89.5%	94.4%	98.9%	85.5% (+/- 11.9%)
Assessment HF 4-5	0.3%	72.6%	93.3%	100%	53.7% (+/- 41.3%)

What are the reported exception rates? (# patients with valid exceptions / (# patients in denominator)

It is expected that reported exception rates will vary across measures and across the measure reporting and testing programs. This is primarily due to differences in the types of measure (eg, medications versus screening), data sources examined in testing, variation among the practice sites where the measures were implemented, and the types and number of reasons included in the measure specification (ie, medical reason, patient reason, and system reason). Any one value for a reported exception rate, in of itself, should not be interpreted as indication of gaming or patient selection behavior.

	CMS PQRI 2007	CMS PQRI 2008	PCPI Cardio-HIT Incubator Group 2009
Beta-blocker therapy	**2.82%**	**0.0%***	**5.39%**
ACEI/ARB therapy	**5.81%**	**4.15%**	**6.17%**
Warfarin therapy	na	na	**5.26%**

*Unable to calculate.

2. **Which tests have been carried out in which settings or data sources?** Tests of feasibility/ implementation, reliability, validity, and unintended consequences conducted in a variety of practice settings including (eg solo practices, large practices, academic practices, safety-net practices, single- and multi-specialty groups).

Setting / Data Source	Medical Record (Gold Standard) (Paper or Electronic)	EHR Reporting	Registry	Administrative Data (single source)	Administrative Data (multiple sources)	Administrative Data Plus Clinical Data
Solo Practice	• Feasibility • Inter-Rater Reliability	• Feasibility • Parallel forms Reliability				
Specialty Practice	• Feasibility • Inter-Rater Reliability		• Feasibility • Parallel-forms Reliability			
Safety-net practice						
Academic Setting						
Community Setting						

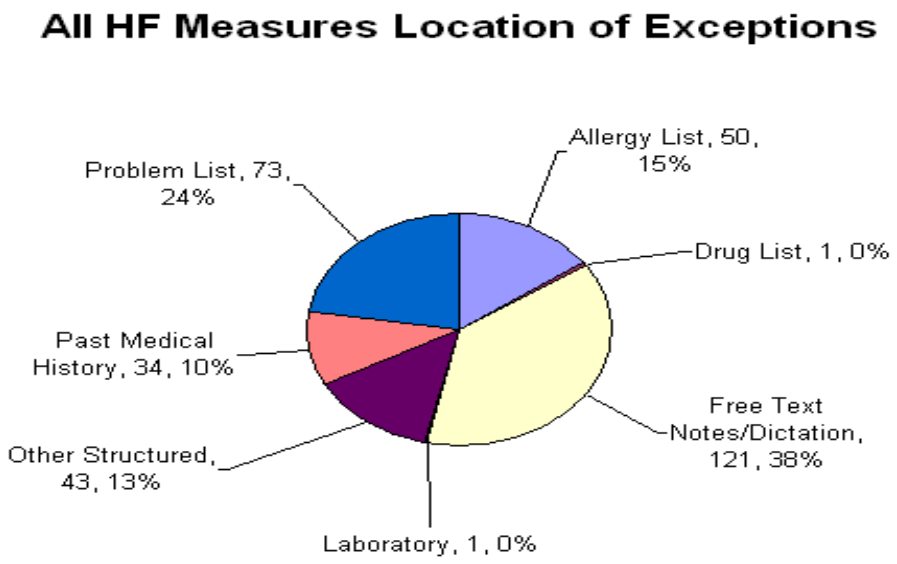
Feasibility Testing	**3. How confident are we that practices can accurately collect and report these measures in a sustainable fashion?** These measures have been tested and found to be generally feasible in EHR, paper, and claims data sources. Results from a study published by Persell, the AMA-sponsored Cardio-HIT project, and the CMS Doctors' Office Quality (DOQ) IT Project, as well as use in CMS's PGP Demonstration project and EHR demonstration project revealed that the heart failure measures are feasible to collect, as currently specified. The feasibility of a PCPI performance measure/measure set refers to: • Whether or not data are stored in a codified field • Which clinical codes sets are utilized/available • Where in the record the data are found • Necessary clarifications needed to implement the measure • Documentation of challenges to measure implementation • The extent to which clinical practices are able to interpret measure definitions and technical specifications, and a) integrate them into existing workflows and health information systems to collect, manage, and manipulate data elements; b) compute performance measures; and c) generate performance reports within a reasonable time frame and budget. **AMA PCPI Testing Project: Cardio-HIT** Data Source 5 physician offices with 5 different EHRS, in use for at least 4 years at time of project 13,985 eligible patients Methods Translated integrated measure specifications to data fields within practice EHRs Location of data (eg, problem list, medication summary) was recorded for data elements as well as whether or not the data was codified using a standard code set such as LOINC or SNOMED • Exported de-identified patient data to a warehouse for measure calculation -- successfully completed by all sites. • Location of exception data useful to inform EHR design, CDS design. Results • Each of the practice sites mapped the data elements required for each of the HF measures to their individual EHR and determined the additional system and work flow modifications required to integrate any additional data elements needed. • Since each practice had a unique set of data fields, individual mapping of the data elements at the practice level was required. Each EHR required the development of additional data fields in order to achieve the functionality required to query and report on all data elements for all measures. • An interface template was developed for each practice EHR which contains the unique set of data fields, validation requirements and acceptable values associated with ACC/AHA/PCPI measures. Using the interface template, each practice queried its EHR database to compile the data elements required for each measure. To assure consistent capture of data across a disperse set of EHR systems, the interface template identifies the submission of the prescribed coding system or standardized medical vocabulary as defined per the ACC/AHA/PCPI measure. • It was not required that each data element be sent to the data warehouse using a specific coding system or standardized coding language but rather that each site would determine what specificity of data was feasible based on the current structure of data in their EHR. The consensus of the Cardio-HIT team was to

provide industry accepted coded values (as identified by HITSP) if available. Examples include LOINC coding for lab tests, ICD for diagnoses and NDC for medications.

- In cases where the EHR was unable to support a medical vocabulary, an acceptable alternative was to substitute a "Y/N" value for those fields. For example, some sites were able to capture the prescription of a medication through the use of NDC codes but other sites determined that the use of Yes/No, medication prescribed (no CPT-II codes sent for medicaitons; CPT-II codes were sent for exceptions) was more feasible.

Percent of HF Exceptions Found in Codified Data

	Problem List	Past Medical History	Free Text Notes/ Dictation	Other Structured Text	Allergy List	Drug List	Laboratory
All 3 HF Measures: Beta Blocker, ACE/ARB, Warfarin	**24%**	**10%**	**38%**	**13%**	**15%**	**0%**	**0%**



Baker, et al. – EHRs

Observational study compared automated review of EHRs data with automated review followed by manual review of electronic notes for patients with apparent quality deficits (hybrid review).

- Performance based on automated review of EHRs data was similar to that based on hybrid review for the three drug-related measures studied, though performance was better in the hybrid review for all cases.
- For the warfarin measure, the hybrid review improved performance from 70.4% to 93.6%, primarily because contraindications to prescribing warfarin were not detected in the automated review.
- Failure to recognize contraindications to medications documented only in provider notes caused performance on medication-based quality measures to be underestimated.

Doctor's Office Quality (DOQ) Project

Data Source

National feasibility study, the CMS Doctors' Office Quality[6] (DOQ) Project

Methods

Reviewers assessed the feasibility of use of the ACC/AHA/PCPI measures in offices by performing retrospective audits of paper medical records and electronic health records

Results

The results revealed that 4 of the 6 measures studied from the HF set are feasible to collect, as currently specified. As part of the DOQ project, reviewers assessed the feasibility of use of the ACC/AHA/PCPI measures in offices by performing retrospective audits of paper medical records and electronic health records.

Limitations to feasibility were as follows:

DENOMINATOR IDENTIFICATION:

- ICD-9 coding was not sufficient in identifying patients with LVSD

NUMERATOR IDENTIFICATION:

- Left Ventricular Function Assessment, and Left Ventricular Function Testing
  - Site 1: Feasible with limitations.
    - LVSD data cannot be retrieved, but this functionality is expected with the new cardiology system being implemented
  - Site 2: Feasible
- Weight Measurement
  - Site 1: Feasible
  - Site 2: Feasible
- Blood Pressure Screening
  - Site 1: Feasible
  - Site 2: Feasible
- Beta Blocker Therapy
  - Site 1: Feasible with limitations.
    - The EHR currently stores results/interpretation as text only and not discrete values, and only indicates whether an order has been completed or not, but this additional functionality is expected with the new cardiology system being implemented
  - Site 2: not tested
- ACE inhibitor therapy
  - Site 1: Feasible with limitations.
    - The EHR currently stores results/interpretation as text only and not discrete values, and only indicates whether an order has been completed or not, but this additional functionality is expected with the new cardiology system being implemented
  - Site 2: not tested
- Warfarin Therapy for Patients with Afib
  - Site 1: Feasible
  - Site 2: Feasible

CMS PQRI –2008 –Claims

- Two HF measures, PQRI #5 and #8, were included in 2007 and 2008 PQRI..
- The rate of submissions accepted as appropriately coded were (2008):
  - Beta-blocker therapy for LVSD **77.30** %
    - **13.43** % of submissions were rejected due to an incorrect DX code
  - ACE inhibitor or ARB therapy for LVSD **67.57** %
    - **25.48** % of submissions were rejected due to an incorrect DX code
- Denominator mismatch rates (% rejected due to incorrect matching of quality code and denominator) were (2008):

- Beta-blocker therapy for LVSD **22.7** %
  - **13.43** % of submissions were rejected due to an incorrect DX code
- ACE inhibitor or ARB therapy for LVSD **32.43** %
  - **25.48** % of submissions were rejected due to an incorrect DX code

Pinnacle Registry Multi Month Comparison
Patient cohorts were created by analyzing one month of submissions to the PINNACLE registry. The first cohort is made up of encounters during October 2009 and the second cohort is made up of encounters during September 2010, made up of 22 and 23 practices, respectively, representing approximately 191 sites. There are 10,627 patient records in the first cohort and 11,692 patients in the second cohort, 83.9% of which are unique. Submissions to the registry are voluntary, and demonstrate feasibility by the number of records which were submitted.

Reliability Testing

4. How confident are we that the measures accurately and consistently assess the performance of physicians providing the care assessed in the measure?

Reliability is whether two abstractors, reviewing the same data from the same data source, would come to the same conclusion as to the patient meeting the measure, not meeting the measure, or qualifying as an exception.

Baker, et al. – EHRs
Inter-rater reliability was not conducted. Parallel forms reliability was conducted.
Baker, et al. did not calculate Kappa statistics for inter-rater reliability.

Cardio-HIT – Multi-site EHRs
Inter-rater reliability was not conducted. Parallel forms reliability was conducted.
Cardio-HIT did not calculate Kappa statistics for inter-rater reliability.

Doctor's Office Quality Pilot Project

Data Source:
2 practices sites with electronic health records
Methods
Abstractor responses were compared with "gold standard" responses determined by two abstractors familiar with the data definitions and who were responsible for abstractor training.
Results

Measure	Doctor's Office Quality (DOQ) Project (agreement %, Trial 1, Trial 2)
LVF Assessment Recorded	45 / 48 **94** % 4 / 4 **100** %
LVF Testing for Hospitalized Patients	30 / 48 **63** % 4 / 4 **100** %
Visits with Weights Recorded	449 / 464 **97** % 36 /455 **80** %
Visits with Blood Pressure Recorded	452 / 464 **97** % 36 / 45 **80** %
Beta-Blocker Therapy (with LVSD)	44 / 48 **92** % 4 / 4 **100** %
ACE Inhibitor Therapy (with LVSD)	45 / 48 **94** % 4 / 4 **100** %
Warfarin Therapy (with afib)	45 / 48 **94** % 4 / 4 **100** %

Measure reliability can also be tested by taking two comparable, independent samples from a set of data, and determining if the performance in both samples is not statistically different.

Pinnacle Registry Multi Month Comparison

Using these assumptions, then, PINNACLE analysts established two patient cohorts separated by eleven months. The first cohort is from October 2009 and the second patient cohort is from September 2010. Analysis of the two cohorts shows that 83.9% of the patients in the sample are primary cases and thus the cohorts contain sufficient uniqueness to assess the reliability of measures with a test-retest methodology. Furthermore, the HF population in each cohort presents consistently with near identical clinical descriptors, including the distribution of LVEF values [severely reduced (9.5%, 8.9%), moderately reduced (11.7%, 4.8%), mildly reduced (12.5%, 12.1%), normal (66.2%, 67.9%)] and New York Heart Association class [Class I (39.1%, 35.6%), Class II (41.8%, 43.3%), Class III (17.3%, 19.0%), Class IV (1.8%, 2.1%)].

Once the cohorts were defined, performance was calculated at the individual physician level and the practice level. These rates were then aggregated to calculate the mean and standard deviation by cohort. Means were compared using the independent sample t-test to demonstrate that it is not possible to reject the null hypothesis at the .05 level.

Note: A 2 tailed t-test was conducted. Because the p value is greater than the α level there is no significant difference between the measures of the two cohorts. Practice is the unit of measure for the t test. Some N's are unequal because a practice was missing one or more data elements needed to calculate the performance measure.

Measure	October 2009 Mean Performance (n, std dev)	September 2010 Mean Performance (n, std dev)	t	p	alpha	Statistically Different?
LVS Function Assessment	63.14% (22, 0.315)	64.70% (23, 0.316)	-0.166	0.869	0.05	No (p>alpha)
ACE or ARB for patients with LVSD	81.90% (21, 0.159)	79.48% (21, 0.210)	0.423	0.674	0.05	No (p>alpha)
Assessment of Clinical Symptoms of Volume Overload (Excess) AND Assessment of Activity Level	51.86% (22, 0.410)	50.17% (23, 0.431)	0.468	0.893	0.05	No (p>alpha)
Beta blocker therapy	83.86% (21, 0.156)	88.81% (21, 0.113)	1.180	0.245	0.05	No (p>alpha)

NOTE: n is measured at the level of practice sites

We interpret this finding to indicate the performance measure is reliable for the following reasons:

1. We have demonstrated that the two cohorts are largely unique, with 83.9% of the sample populations composed of non-overlapping patients.
2. We have also demonstrated that despite this uniqueness, the HF population attributes are highly consistent, as expected with large sample sizes and expected mean regression.
3. We have asserted based on experience and detailed registry analysis that absent major scientific change or aggressive PI or QI interventions, physician performance is both non-stochastic and consistent over time.
4. Thus, the fact that physician performance was statistically non-differentiable between the two cohorts indicates measure repeatability and hence reliability.

Measure Exceptions Validated

(and specific exception reasons documented to inform measure maintenance)

5. Are exceptions clinically appropriate and consistently documented?

Exceptions found for these measures were clinically appropriate.

AMA PCPI Testing Project: Cardio-HIT

Data Source

5 physician offices with 5 different EHRs, in use for at least 4 years at time of project
13,985 eligible patients

Methods

- Translated integrated measure specifications to data fields within practice EHRs
- Manual review of 5 EHRs compared to automated exporting of data to a data warehouse for measure calculation.
- Agreement was determined by comparing an exception that was reported to the data warehouse, which, upon manual abstraction of the EHRs, was confirmed to be appropriate when compared to an a priori list (predetermined list of medical, patient, or system reasons) developed by the clinical experts on the project team and review of clinical guidelines.

Results

- Reported exceptions were validated upon manual review of the medical record, against an a priori list generated by expert opinion. Measure exceptions were validated 95.32% of the time.
- Top medical exception reasons reported were:
  - Beta-blocker therapy: Lung/pulmonary contraindication was the exception reason for 31.04% of exceptions.
  - ACEI/ARB therapy: Renal contraindication was the medical exception reason for 66.36% of exceptions.
  - Warfarin therapy: Gastrointestinal tract contraindication was the exception reason for 20.41% of the exceptions.

All Exceptions – Weighted Data Abstraction Sample	Medical Reason	Clinical Contraindication	Drug Allergy	Drug Interaction	Drug Intolerance
Overall (n=306)	98.2%	85.23%	4.7%	0.0%	10.1%
Beta Blocker Therapy (n=118)	98.0%	74.7%	3.5%	0.0%	21.8%
ACE inhibitor/ARB Therapy (n=127)	99.5%	89.8%	5.9%	0.00%	4.2%
Warfarin Therapy (n=61)	96.1%	95.8%	4.2%	0.0%	0.0%

Beta Blocker Therapy Weighted Sample Data- All Exceptions		
Exceptions	Frequency (%) †	Frequency (n)
Adverse Reaction to Beta Blockers	5.66%	0.275
Doc. of bradycardia/< 50 bpm/correlation for NOT Rx beta-blockers	5.66%	0.275
End of Life Issues	6.47%	0.315
Fatigue	5.66%	0.275
Lung/Pulmonary	58.78%	2.860
Other doc. by pract. for not prescribing therapy	12.12%	0.590
Uncompensated CHF	5.66%	0.275

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure
Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

ACE Inhibitor or ARB Therapy Weighted Sample Data- All Exceptions

Exceptions	Frequency (%) †	Frequency (n)
Adverse reaction to ACE inhibitor or ARB therapy	3.61%	0.987
Allergy/intolerance (e.g., cough) to ACE inhibitor or ARB therapy	7.38%	2.018
End of Life Issues	3.72%	1.016
Hyperkalemia	3.72%	1.016
Hypotension	13.94%	3.811
Moderate or severe aortic stenosis subaortic stenosis	1.26%	0.343
Other doc. by pract. for not prescribing therapy	4.92%	1.345
Patient Refusal	9.02%	2.466
Renal	52.43%	14.331

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

Warfarin Therapy Weighted Sample Data- All Exceptions

Exceptions	Frequency (%) †	Frequency (n)
Bleeding Risk	6.54%	4.113
Dementia/advanced dementia	5.17%	3.248
End of life issues	6.76%	4.247
GI Tract	12.92%	8.123
Hematologic Abnormalities	5.82%	3.657
Hepatic/Liver	6.54%	4.113
Non-compliance with INR follow-up/medication management	0.50%	0.315
Other doc. by pract. for not prescribing therapy	23.62%	14.847
Other significant bleeding	8.54%	5.371
Patient Refusal	12.08%	7.596
Risk for Falls	11.51%	7.235

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

Location and Codification of Exceptions

	Allergy List		Drug List	
Measure	# Included	% Coded	# Included	% Coded
All HF Measures	46	4.35%	0	0.00%
Beta-blocker Therapy	14	7.14%	0	0.00%
ACE/ARB Therapy	19	5.26%	0	0.00%
Warfarin Therapy	13	0.00%	0	0.00%

	Free Text Notes/Dictation		Laboratory	
Measure	# Included	% Coded	# Included	% Coded
All HF Measures	126	11.11%	1	0.00%
Beta-blocker Therapy	39	12.82%	0	0.00%
ACE/ARB Therapy	46	6.52%	1	0.00%
Warfarin Therapy	41	14.63%	0	0.00%

Measure	Other Structured		Past Medical History	
	# Included	% Coded	# Included	% Coded
All HF Measures	45	17.78%	31	9.68%
Beta-blocker Therapy	15	20.00%	13	0.00%
ACE/ARB Therapy	17	11.76%	10	10.00%
Warfarin Therapy	13	23.08%	8	25.00%

Measure	Problem List		TOTAL
	# Included	% Coded	
All HF Measures	75	86.67%	324
Beta-blocker Therapy	23	91.30%	104
ACE/ARB Therapy	32	93.75%	125
Warfarin Therapy	20	70.00%	95

Top Medical Reasons for Exceptions –Beta Blocker Therapy (Weighted Sample Data)

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Adverse Reaction to Beta Blockers	5.13%	6.029		
Allergy List			6.029	0.00%
Doc. of bradycardia/< 50 bpm/correlation for NOT Rx beta-blockers	11.00%	12.931		
Allergy List			1.381	0.00%
Discharge Sumary			1.381	0.00%
Free Notes			5.522	0.00%
Past Medical History			2.761	0.00%
Problem List			1.887	100.00%
End of Life Issues	1.17%	1.381		
Free Text			1.381	0.00%
Fatigue	17.82%	20.947		
Allergy List			0.994	0.00%
Assessment List			2.761	0.00%
Free Text			8.403	0.00%
Past Medical History			2.761	0.00%
Problem List			4.648	70.30%
Stress Test			1.381	0.00%
History of 2nd or 3rd Degree AV block without permanent pacemaker	4.37%	5.135		
Consultation			0.994	0.00%
Free Text			1.381	100.00%
Problem List			2.761	100.00%
Hypotension	17.84%	20.967		
Allergy List			1.381	0.00%
ED notes			1.887	0.00%
Free Text			12.177	0.00%
Past Medical History			2.761	0.00%
Problem List			2.761	100.00%
Lung/Pulmonary	31.04%	36.490		
Allergy List			2.761	50.00%
Assessment List			3.368	59.01%
Free Text			8.642	34.72%

Past Medical History			9.277	0.00%
Problem List			12.443	88.90%
Other doc. by pract. for not prescribing therapy	10.03%	11.790		
Allergy List			5.135	0.00%
Assessment List			0.994	100.00%
Free Text			4.280	0.00%
Problem List			1.381	100.00%
Uncompensated CHF	1.61%	1.887		
Discharge Summary			0.506	0.00%
H&P			1.381	0.00%
† Frequencies are given as a percent of the total number of Medical Exceptions for this measure				

Top Medical Reasons for Exceptions – ACE Inhibitor or ARB Therapy (Weighted Sample Data)

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Adverse reaction to ACE inhibitor or ARB therapy	4.30%	5.483		
Allergy List			5.483	0.00%
Allergy/intolerance (e.g., cough) to ACE inhibitor or ARB therapy	3.58%	4.557		
Allergy List			4.139	0.00%
Free Text			0.418	0.00%
End of Life Issues	1.02%	1.302		
Free Text			1.302	0.00%
Hyperkalemia	9.61%	12.241		
Allergy List			1.995	0.00%
Discharge Summary			1.344	0.00%
Free Text			6.214	0.00%
Lab			1.344	0.00%
Problem List			1.344	100.00%
Hypotension	8.34%	10.622		
Discharge Summary			1.344	0.00%
Free Text			9.278	0.00%
Moderate or severe aortic stenosis subaortic stenosis	1.89%	2.413		
Past Medical History			0.418	0.00%
Problem List			1.995	67.38%
Other doc. by pract. for not prescribing therapy	4.90%	6.240		
Allergy List			2.795	0.00%
Free Text			3.445	0.00%
Renal	66.36%	84.542		
Allergy List			4.758	28.25%
Assessment List			11.172	0.00%
Discharge Summary			2.832	22.98%
Free Text			25.394	18.44%
H&P			0.418	0.00%
Past Medical History			10.167	13.22%
Problem List			29.801	97.82%
† Frequencies are given as a percent of the total number of Medical Exceptions for this measure				

Top Medical Reasons for Exceptions – ACE Inhibitor or Warfarin Therapy

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Allergy or intolerance	3.01%	1.850		
Allergy List			1.850	0.00%
Bleeding Risk	6.30%	3.871		
Free Text Notes/Dictation			3.255	0.00%
Problem List			0.617	0.00%
Dementia/advanced dementia	2.64%	1.624		
Free Text Notes/Dictation			1.173	61.60%
Problem List			0.451	0.00%
End of life issues	1.91%	1.173		
Free Text Notes/Dictation			1.173	0.00%
GI Tract	20.41%	12.534		
Allergy List			1.233	0.00%
Free Text Notes/Dictation			5.058	37.48%
H&P			0.451	0.00%
Past Medical History			2.598	32.66%
Problem List			3.195	73.44%
Hematologic Abnormalities	20.13%	12.362		
Assessment List			3.394	0.00%
Free Text Notes/Dictation			2.996	43.36%
H&P			0.451	0.00%
Past Medical History			0.451	0.00%
Problem List			5.070	91.11%
Hepatic/Liver	8.82%	5.416		
Assessment List			1.697	50.00%
Free Text Notes/Dictation			0.849	0.00%
Problem List			2.870	54.74%
Non-compliance with INR follow-up/medication management	1.38%	0.849		
Free Text Notes/Dictation			0.849	0.00%
Other doc. by pract. for not prescribing therapy	5.74%	3.527		
Allergy List			2.062	0.00%
Free Text Notes/Dictation			1.465	0.00%
Other significant bleeding	14.43%	8.863		
Free Text Notes/Dictation			7.239	6.22%
Past Medical History			0.901	50.00%
Problem List			0.723	100.00%
Risk for falls	15.22%	9.346		
Allergy List			2.466	0.00%
Assessment List			0.849	0.00%
Discharge Summary			0.451	0.00%
Free Text Notes/Dictation			5.130	16.54%
Past Medical History			0.451	0.00%

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Comparison of Data Sources *Note: in these projects it is recommended to always compare the secondary data source to the current gold standard of manual abstraction of the medical record.	**6. Is measure collection from different data sources comparable? How does automated measure calculation compare to manual measure abstraction?** **AMA PCPI Testing Project: Cardio-HIT** Data Source 5 physician offices with 5 different EHRs, in use for at least 4 years at time of project 13,985 eligible patients Methods • Translated integrated measure specifications to data fields within practice EHRs • Accuracy of heart failure data elements were verified by comparing automated measure abstraction and calculation against manual abstraction of an EHRs • For three samples of patients, researchers completed a manual review of each patient's electronic chart o Sample 1: patients who appeared to meet the numerator of the quality measure o Sample 2: patients who appeared to fail the quality measure (did not meet numerator nor have exception) o Sample 3: patients who appeared to not meet the numerator and have an exception to the quality measure Results Performance rates calculated automatically by the data warehouse compared to the rates of performance, opportunities for improvement and misclassification rates determined with manually abstracted data samples. • Automated review alone: Overall performance for the three measures was 76.84% and varied among the measures: ▪ Beta-blocker therapy: 86.34% ▪ ACEI/ARB therapy: 80.38% ▪ Warfarin therapy: 67.03% • Manual review alone: 22.35% of the cases were identified as failing to meet the measure (opportunities for improvement): ▪ Beta-blocker therapy: 9.30% ▪ ACEI/ARB therapy: 19.53% ▪ Warfarin therapy: 27.69% • Discrepancies between performance measures based on EHRs automated review alone and those based on automated review plus manual review were due to two types of misclassification: ▪ identify performance among true, eligible patients ▪ failure to correctly exclude patients • The overall rate of misclassification in the automatic calculation (identified from manual review) was 10.23% and varied across the measures: ▪ Beta-blocker therapy: 22.35% ▪ ACEI/ARB therapy: 14.34% ▪ Warfarin therapy: 4.54% **7. If automated reporting identifies a patient as meeting the measure, what likelihood is there that manual review will validate that finding?** Patient samples from populations identified by the automated reporting as Measure Mets, Opportunities for Improvement or Exceptions were validated upon manual review of the medical record for the six HF measures

Measure Mets

- Automated review: 89.90% of patients met the numerator
  - Left ventricular function: 85.48%
  - Weight measurement: 97.85%
  - Blood pressure screening: 98.92%
  - Beta-blocker therapy: 86.34%
  - ACEI/ARB therapy: 80.38%
  - Warfarin therapy: 67.03%
- Upon manual validation of the patient sample: 82.88% met the numerator
  - Left ventricular function: 59.57%
  - Weight measurement: 88.35%
  - Blood pressure screening: 98.53%
  - Beta-blocker therapy: 95.82%
  - ACEI/ARB therapy: 75.52%
  - Warfarin therapy: 80.21%

Opportunities for Improvement

- Automated review: 9.96% of patients were opportunities for improvement
  - Left ventricular function: 14.52%
  - Weight measurement: 2.15%
  - Blood pressure screening: 1.08%
  - Beta-blocker therapy: 12.93%
  - ACEI/ARB therapy: 18.41%
  - Warfarin therapy: 31.24%
- Upon manual validation of the patient sample 44.14% of the opportunities for improvement remained opportunities for improvement
  - Left ventricular function: 65.12%
  - Weight measurement: 77.85%
  - Blood pressure screening: 59.63%
  - Beta-blocker therapy: 9.30%
  - ACEI/ARB therapy: 19.53%
  - Warfarin therapy: 27.69%
- Upon manual validation of the above patient sample
  - 34.31% were found to meet the numerator of the measure
  - 16.37% were found to have an exception
  - 5.18% were found to meet the numerator and had an exception

Exceptions (only the 3 drug measures reported exceptions)

- Automated review: 5.57% of patients had an exception
  - Beta-blocker therapy: 5.39%
  - ACEI/ARB therapy: 6.17%
  - Warfarin therapy: 5.26%
- Upon manual validation of the exception patient sample, the overall agreement rate was 94.05%
  - Beta-blocker therapy: 84.20%
  - ACEI/ARB therapy: 100.00%
  - Warfarin therapy: 95.66%

8. Are the individual parts of the measure (numerator, denominator, exceptions) reliably calculated, as compared to the overall measure?

Over the 3 drug measures analyzed, the agreement rates were:

- Numerator: 76.84%
- Denominator: 94.43%
- Exception: 66.19%
- Overall: 72.18%

9. What proportion of patients that met the measure are correctly identified?

Sensitivity: 74.75%

10. What proportion of patients that do not meet the measure are correctly identified?

AMA PCPI Testing Project: Cardio-HIT

Specificity: 70.10%

Patients Automatically Identified as Exceptions	Agreement			
Measure	Mean Rate	S.E.	95% C.I.	N
All HF Measures	87.312%	2.026%	83.16%, 91.47%	270
Beta-blocker Therapy	76.221%	3.839%	68.29%, 84.15%	123
ACE/ARB Therapy	97.793%	1.506%	94.32%, 100%	95
Warfarin Therapy	94.384%	3.198%	87.15%, 100%	52

Patients Automatically Identified as Opportunities for Improvement	Agreement				
Measure	Mean Rate	S.E.	95 % C.I.	N - num	N - den
All HF Measures	44.14%	2.17%	39.80% ,48.48%	232	526
Left Ventricular Function	65.12%	3.32%	58.38% ,71.87%	134	206
Weight Measurement	77.85%	7.20%	62.25% ,93.46%	26	33
Blood Pressure Screening	59.63%	10.46%	36.87% ,82.40%	13	22
Beta-blocker Therapy	9.30%	4.13%	0.18% ,18.41%	5	49
ACE/ARB Therapy	19.53%	4.89%	9.18% ,29.87%	13	66
Warfarin Therapy	27.69%	3.66%	20.18% ,35.21%	41	149

False Positive Opportunities for Improvement - Numerator Actually Met					
Measure	Mean Rate	S.E.	95% C.I.	N - num	N - den
All HF Measures	34.31%	2.07%	30.16% ,38.46%	180	526
Left Ventricular Function	34.88%	3.32%	28.13% ,41.62%	72	206
Weight Measurement	7.53%	4.57%	0.00% ,18.00%	3	33
Blood Pressure Screening	40.37%	10.46 %	17.605% ,63.13%	9	22
Beta-blocker Therapy	59.06%	7.00%	44.34% ,73.79%	29	49
ACE/ARB Therapy	31.88%	5.75%	19.86% ,43.91%	21	66
Warfarin Therapy	31.47%	3.80%	23.68% ,39.26%	47	149
Left Ventricular Function	34.31%	2.07%	30.16% ,38.46%	180	526

Measure	Mean Rate	S.E.	95% C.I.	N - num	N - den
All HF Measures	16.37%	1.61%	13.12% ,19.63%	86	526
Left Ventricular Function	0.00%	0.00%	0.00%, 0.24%	0	206
Weight Measurement	14.62%	6.12%	1.12% ,28.11%	5	33
Blood Pressure Screening	0.00%	0.00%	0.00%, 2.27%	0	22
Beta-blocker Therapy	9.30%	4.13%	0.18% ,18.41%	5	49
ACE/ARB Therapy	34.25%	5.85%	22.02% ,46.49%	23	66
Warfarin Therapy	36.30%	3.94%	28.25% ,44.35%	54	149
Left Ventricular Function	16.37%	1.61%	13.12% ,19.63%	86	526

EHR "In Silo" Verification

Note: initially this may be of limited usefulness until EHR functionality and use progresses

11. Can EHR products reliably identify data elements and calculate these measures?

A "dummy" data set of patient data will be provided to several EHR vendors along with EHR measure specifications. The vendors will use this test file to determine if their system can reliably calculate the measures based on intended documentation patterns.

This test has not yet been performed for this measure set.

Predictive Validity

12. Does high performance on these measures lead to better patient outcomes?

If the scientific evidence regarding the process of care is strong and widely accepted in the field, no formal evaluation of predictive validity is necessary. If the evidence is less strong, however, it is desirable to show that high performance leads to better patient outcomes.

This test has not yet been performed for this measure set. It should be noted that the Persell study shows that targeted QI projects can improve performance on the process measures.

Unintended Consequences

13. Have monitoring and testing uncovered unexpected consequences of measurement?

Testing should be performed for anticipated unintended consequences. Unanticipated unintended consequences should be monitored for on a long term basis as they may only occur in later stages and widespread adoption.
This test has not yet been performed for this measure set.

Project Descriptions

Doctor's Office Quality Pilot Project

Data was captured at two large physician practice groups who use two distinct EHR systems. The study population of group 1 was their fee-for service Medicare patients. The study population was all non-Medicare patients for Group 2. Once the DOQ clinical measures were developed, the practices were given technical specifications to use to capture the quality measures from their EHR system. Feasibility was assessed for all measures, and some measures were implemented.

Baker, et al (EHRs-only v. hybrid)

The objective of the study was to evaluate the accuracy of an automated system that used EHRs data and specifications from national organizations to measure quality of care for outpatients with heart failure. The research was designed as an observational study comparing success rates on quality measures based on automated review of EHRs data compared to automated review followed by manual review of physician notes for apparent failures (hybrid review).
A single site setting at an academic general internal medicine clinic with several years experience using a commercial EHRs. The researchers measured the left ventricular ejection fraction (LVEF), prescription of a beta blocker and an angiotensin converting enzyme

inhibitor (ACEI) for patients with left ventricular systolic dysfunction (LVEF < 0.40), and prescription of warfarin for patients with comorbid atrial fibrillation.
Adult patients, 517 records, with a qualifying ICD-9 diagnosis of heart failure and two or more clinic visits over the last 18 months. Success rates based only on automated review of EHRs data versus hybrid review were similar for LVEF measurement (94.6% vs. 97.3%) and beta blocker prescription (90.9% vs. 92.8%). However, success rates based on automated review of EHRs data were substantially lower than hybrid review for prescription of ACEI (93.9% vs. 98.6%) and warfarin for atrial fibrillation (70.4% vs. 93.5%).
The studied concluded that using EHRs data alone to measure quality remains problematic because exclusion criteria are often documented only in physicians' notes. EHRs vendors and national quality organizations should collaboratively develop systems to facilitate collection of the data required to routinely assess quality of care.

Cardio-HIT Project
The AMA received funding for Phase II of the Cardio-HIT project from the Agency for Healthcare Research and Quality (AHRQ). The AMA in collaboration with five (5) physician practice sites, the Iowa Foundation for Medical Care, and the National Committee for Quality Assurance, conducted a 2-year, observational study of exception reporting, building on the prior work under Cardio-HIT, a research collaborative of six (6) EHRs-enabled independent group practices that collected data and reported on nationally recognized physician performance measures for coronary artery disease and heart failure.
In Cardio-HIT Phase II, we: (1) empirically documented the prevalence and patterns of exception reporting in these measures; (2) assessed the feasibility and accuracy of exception reporting by validating a sample of reported exceptions against manual EHRs record review; and (3) analyzed and addressed stakeholder perspectives on exception reporting to refine existing principles in the design of physician performance measures.

Pinnacle Registry Multi Month Comparison
Two cohorts of patient encounters for patients aged 18 years and older with a diagnosis of heart failure were created by analyzing two distinct months of data submissions to the PINNACLE Registry™. The first cohort is made up of encounters during October 2009 and the second cohort is made up of encounters during September 2010, made up of 22 and 23 practices, respectively, representing approximately 191 sites. There are 10,627 patient records in the first cohort and 11,692 patients in the second cohort, 83.9% of which are unique.
Overview
Assessing the reliability of measures in large scale electronic databases being sourced by disparate EHR systems requires the application of novel techniques. While we expect coding for commonly used data elements to become more standardized in the medium to long term, the proliferation of EHR vendors and the predisposition toward practice-level customization precipitated by stimulus funding has only exacerbated the variation in electronic documentation in the short term. As a result, registries like PINNACLE must rely on a layered normalization and data quality approach to ensure reliability. PINNACLE presently applies four layers of quality control: 1) custom data mapping with multi-iteration, multi-stakeholder validation, 2) a formal Data Quality Report utility and tight XSD schema, and 3) continuous aggregate data quality review. In addition, for the purposes of this application, PINNACLE analysts have applied statistical sampling techniques (described below) to replicate at scale (tens of thousands of records) more traditional, small scale chart audits.

Custom Data Mapping with Multi-Iteration, Multi-Stakeholder Validation
The System Integration technology employed by the PINNACLE Registry is partially automatic and partially manual. The automatic portions of the process rely on standard data maps that correspond with the data structure of individual EHR products and versions. Relatively straightforward data elements, such as date of birth and heart failure diagnosis, are

generally structured consistently across practices with similar EHRs and can thus be identified and mapped automatically with software. More complex or less common elements, NYHA class for example, must be identified and mapped manually. This process relies on clinical and technical experts from the practice working with PINNACLE project managers and engineers to locate, and potentially normalize, the relevant data element. While potentially time consuming, this process ensures that multiple, highly-trained stakeholders (providers, practice technologists, PINNACLE project managers, engineers, and clinical staff) are reviewing and concurring on the accuracy of the data maps.
Furthermore, at multiple stages during the integration process practices and providers are reviewing both raw data pulls and calculated performance measures on test data extracts, full data extracts, and production extracts. Only after mapping is completed and the practice and PINNACLE staff have signed off on the accuracy of the data maps is the system placed into production.

Data Quality Report utility and XSD Schema
Production-level data extraction occurs on a massive scale. Initial production data extracts to generate baseline performance in the registry for even a single large practice can number in the hundreds of thousands of patient encounters. More routine monthly and quarterly extracts can generate thousands, or even tens of thousands, of encounters per practice. At that volume, human validation of inbound data quality is impossible. Instead PINNACLE deploys a two layered automated data quality validation process. The first layer is a data quality utility, called the DQR, which applies 65 unique tests to inbound data. These tests include valid range checks, parent child relationships, data completeness, and coding accuracy. The utility then generates a report alerting PINNACLE engineers, EHR vendors, or sometimes the practices themselves, to data errors. Depending on the scale of error, files may either be rejected in their entirety for revision and re-submittal or individual records may be segregated from the data load. After the file clears the DQR it must then pass a final XSD validation before being loaded into the data warehouse for production reporting.

Continuous Aggregate Data Quality Review
Once data has been calculated and aggregated at the practice and national level it then becomes possible and appropriate to reapply human scrutiny to data quality and measure reliability management. PINNACLE employs highly skilled professional assets, including the former chief data quality analyst for the 2010 United States Census, to be continuously reviewing and evaluating the accuracy of PINNACLE's reporting. In addition to evaluating data completeness, PINNACLE data quality resources also monitor inter- and intra-practice and provider, as well as inter-temporal, performance variability. PINNACLE is now of sufficient maturity that patterns in provider and practice level performance can be quickly interpreted to indentify 1) failures in data mapping, 2) failures in physician documentation (especially exclusion documentation), and 3) accurate assessments of performance.

Statistical Sampling Techniques for Assessment of Measure Reliability
Due to the scale of the PINNACLE Registry, as well as a series of outstanding methodological questions as to the value of EHR chart audits for validating information that was extracted from the same electronic source data, PINNACLE has not conducted such analyses. Instead, PINNACLE analysts use the scale of the registry itself to create smaller sample cohorts to assess the reliability and stability of measures. This approach requires certain assumptions, which we believe have prima facie validity and are confirmed from large scale analysis of the registry. The assumptions are as follows:
1. Physician performance is non-stochastic over time
2. Physician performance is statistically stable over modest time intervals absent exogenous shocks (i.e. major new scientific findings or direct performance improvement interventions)
3. At large patient population sizes, independent AF populations present consistently and

	normally **Persell, et al (Quality Improvement System)** This study was a time series analysis at a large internal medicine practice using a commercial EHR. Subjects included all adult patients eligible for each measure (range approximately 100-7500 patients). Measures included were modified versions of the national measures, which were updated to allow for extraction from the EHR and local workflow patterns. During the year before the intervention, performance improved significantly for 14 measures. Implementation of a multifaceted QI intervention using EHR tools to improve quality measurement and the accuracy and timeliness of clinician feedback improved performance and/or accelerated the rate of improvement for multiple measures simultaneously. For some measures clinical care changed, and for others, documentation was improved.

AMA-PCPI Level I EHR Specifications

Clinical Topic	Heart Failure
Measure Title	**Left Ventricular Ejection Fraction (LVEF) Assessment**
Measure #	**PCPI HF-1 / NQF 0079 / PQRI 198**
Measure Description	Percentage of patients aged 18 years and older with a diagnosis of heart failure for whom the quantitative or qualitative results of a recent or prior (any time in the past) LVEF assessment is documented within a 12 month period
Measurement Period	Twelve consecutive months
Initial Patient Population	Patient Age: Patients aged 18 years and older before the start of the measurement period Diagnosis Active: Patient has a diagnosis of Heart Failure before or simultaneously to encounter date Encounter: At least two visits with the physician, physician's assistant, or nurse practitioner during the measurement period
Denominator Statement	All patients aged 18 years and older with a diagnosis of heart failure
Numerator Statement	Patients for whom the quantitative or qualitative* results of a recent or prior (any time in the past) LVEF assessment is documented** within a 12 month period *Qualitative results correspond to numeric equivalents as follows: • Hyperdynamic: corresponds to LVEF greater than 70% • Normal: corresponds to LVEF 50% to 70% (midpoint 60%) • Mild dysfunction: corresponds to LVEF 40% to 49% (midpoint 45%) • Moderate dysfunction: corresponds to LVEF 30% to 39% (midpoint 35%) • Severe dysfunction: corresponds to LVEF less than 30% **Documentation must include documentation in a progress note of the results of an LVEF assessment, regardless of when the evaluation of ejection fraction was performed.
Denominator Exceptions	None

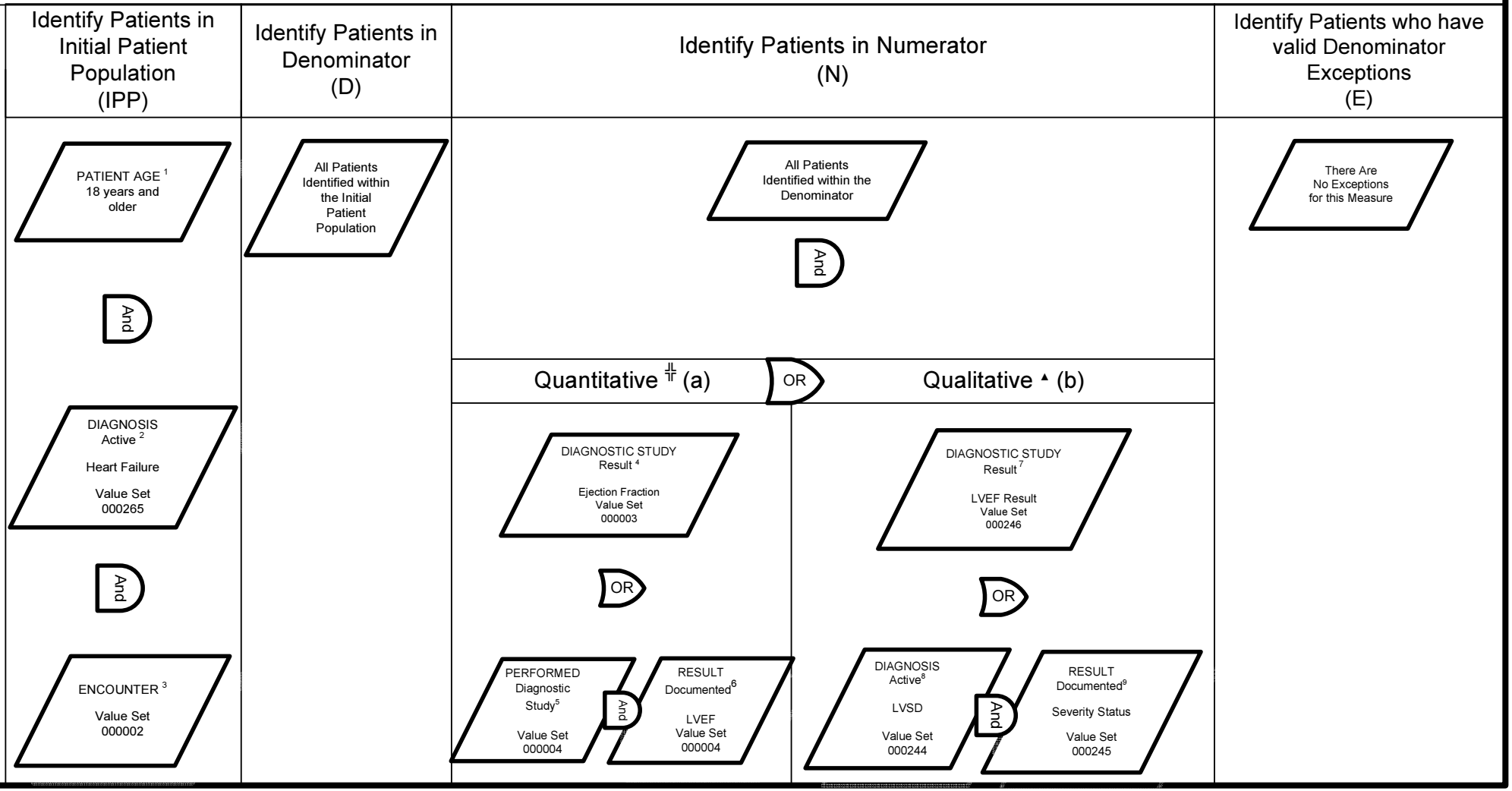
AMA - PCPI Level I EHR Specifications

Measure Logic for Heart Failure: Left Ventricular Ejection Fraction (LVEF) Assessment

Measure Description: Percentage of patients aged 18 years and older with a diagnosis of heart failure for whom the quantitative or qualitative results of a recent or prior (any time in the past) LVEF assessment is documented within a 12 month period

Measurement Period: 12 Consecutive Months

PCPI Measure #: HF-1



PARAMETER SPECIFICATIONS (Value Sets are found in the Coding Appendices):

IPP: [1] Patient Age: 18 years and older before the start of measurement period; [2] Diagnosis, Active: before or simultaneously to encounter date; [3] Encounter: ≥ to 2 visits during measurement period.

N: All Results, [4, 6, 9], in (N) 'Not Empty'; [4] Diagnostic Study, Result-documented during measurement period; [5] Performed, Diagnostic Study- before or simultaneously to measurement period; [6] Result, Documented-during measurement period; [7] Diagnostic Study, Result-documented during measurement period; [8] Diagnosis, Active- before or simultaneously to measurement period; [9] Result, Documented-during measurement period; Notes-Diagnostic Study (all) may be performed before or during measurement period; Results (all) should be 'documented' (reviewed) annually;

╬The results will be documented as numerical values represented as a percentage

▲ Qualitative results correspond to numeric equivalents as follows (Crosswalk):
Hyperdynamic: corresponds to LVEF greater than 70%
Normal: corresponds to LVEF 50% to 70% (midpoint 60%)
Mild dysfunction: corresponds to LVEF 40% to 49% (midpoint 45%)
Moderate dysfunction: corresponds to LVEF 30% to 39% (midpoint 35%)
Severe dysfunction: corresponds to LVEF less than 30%

Version 2.0

Basic Measure Calculation:

$$\frac{(N)}{(D) - (E)} = \%$$

The PCPI strongly recommends that exception rates also be computed and reported alongside performance rates as follows:

Exception Calculation:

$$\frac{(E)}{(D)} = \%$$

Exception Types:
E= E1 (Medical Exceptions) + E2 (Patient Exceptions) + E3 (System Exceptions)
For patients who have more than one valid exception, only one exception should be be counted when calculating the exception rate

Initial Patient Population (IPP)	Denominator (D)	Numerator (N)	Denominator Exceptions (E)
Definition: The initial patient population identifies the general group of patients that the performance measureis designed to address; usually focused on a specific clinical condition (e.g., coronary artery disease, asthma). For example, a patient aged 18 years and older with a diagnosis of CADwho has at least 2 Visits during the measurement period.	**Definition:** The denominator defines the specific group of patients for inclusion in a specific performance measure based on specific criteria (e.g., patient's age, diagnosis, prior MI). In some cases, the denominator may be I dentical to the initial patient population.	**Definition:** The numerator defines the group of patients in the denominator for whom a process or outcome of care occurs (e.g., flu vaccine received).	**Definition:** Denominator exceptions are the valid reasons why patients who are included in the denominator population did not receive a process or outcome of care (described in the numerator). Patients may have Denominator Exceptions for medical reasons (e.g., patient has an egg allergy so they did not receive flu vaccine); patient reasons (e.g., patient declined flu vaccine); or system reasons (e.g., patient did not receive flu Vaccine due to vaccine shortage). These cases are removed from the denominator population for the performance calculation, however the number of patients with valid exceptions should be calculated and reported. This group of patients constitutes the Denominator Exception reporting population – patients for whom the numerator was not achieved and a there is a valid Denominator Exception.
Find the patients who meet the Initial Patient Population criteria (IPP)	Find the patients who qualify for the denominator (D): ○ From the patients within the Patient Population criteria (IPP) select those people who meet Denominator selection criteria. (In some cases the IPP and D are identical).	Find the patients who qualify for the Numerator (N): ○ From the patients within the Denominator (D) criteria, select those people who meet Numerator selection criteria. ○ Validate that the number of patients in the numerator is less than or equal to the number of patients in the denominator	From the patients who did not meet the Numerator criteria, determine if the patient meets any criteria for the Denominator Exception (E1 + E2+E3). If they meet any criteria, they should be removed from the Denominator for performance calculation. As a point of reference, these cases are removed from the denominator population for the performance calculation, however the number of patients with valid exceptions should be calculated and reported.

AMA-PCPI Level I EHR Specifications
Heart Failure - LVEF Assessment (HF-1)

value_set_id	clinical_topic	topic_ indicator	measure_component	standard_concept	standard_category	standard_ taxonomy	code	code_description
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.01	MAL HYP HRT DIS W HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.11	BEN HYP HRT DIS W HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.91	HYP HRT DIS NOS W HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.01	MAL HYP HRT/REN DIS W HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.03	MAL HYP HRT/REN DIS W HF&RF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.11	BEN HYP HRT/REN DIS W HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.13	BEN HYP HRT/REN DIS W HF&RF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.91	HYP HRT/REN DIS W HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.93	MAL HYP HRT/REN DIS W HF&RF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.0	CHF NOS
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.1	LEFT HEART FAILURE
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.20	SYSTOLIC HRT FAILURE NOS
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.21	AC SYSTOLIC HRT FAILURE
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.22	CHR SYSTOLIC HRT FAILURE
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.23	AC ON CHR SYSTOLIC HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.30	DIASTOLC HRT FAILURE NOS
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.31	AC DIASTOLIC HRT FAILURE
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.32	CHR DIASTOLIC HRT FAIL
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.33	AC ON CHR DIASTOLIC HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.40	SYSTOLIC/DIASTOLIC HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.41	AC SYSTOLIC/DIASTOLIC HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.42	CHR SYSTOLIC/DIASTOLIC HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.43	AC/CHR SYSTOLIC/DIASTOLIC HF
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.9	HEART FAILURE NOS
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I11.0	Hypertensive heart disease with heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I13.0	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I13.2	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.1	Left ventricular failure/Cardiac asthma
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.20	Unspecified systolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.21	Acute systolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.22	Chronic systolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.23	Acute on chronic systolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.30	Unspecified diastolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.31	Acute diastolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.32	Chronic diastolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.33	Acute on chronic diastolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.40	Unspecified combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.41	Acute combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.42	Chronic combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.43	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.9	Heart failure, unspecified / Biventricular (heart) failure NOS

AMA-PCPI Level I EHR Specifications
Heart Failure - LVEF Assessment (HF-1)

value_set_id	clinical_topic	topic_ indicator	measure_component	standard_concept	standard_category	standard_ taxonomy	code	code_description
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	364006	acute left-sided heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5053004	cardiac insufficiency due to prosthesis (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5148006	hypertensive heart disease with congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5375005	chronic left-sided congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10091002	high output heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10335000	chronic right-sided heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10633002	acute congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	13839000	Bernheim's syndrome (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	25544003	low output heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	33644002	postvalvulotomy syndrome (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	42343007	congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	43736008	rheumatic left ventricular failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	44313006	right heart failure secondary to left heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	46113002	hypertensive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	48447003	chronic heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	56675007	acute heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	60856006	cardiac insufficiency following cardiac surgery (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	66989003	chronic right-sided congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	74960003	acute left-sided congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	77737007	benign hypertensive heart disease with congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	80479009	acute right-sided congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	82523003	congestive rheumatic heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	83105008	malignant hypertensive heart disease with congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	84114007	heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	85232009	left heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	88805009	chronic congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	92506005	biventricular congestive heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	90727007	pleural effusion due to congestive heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	111283005	chronic left-sided heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	128404006	right heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194767001	benign hypertensive heart disease with congestive cardiac failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194779001	hypertensive heart and renal disease with (congestive) heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194781004	hypertensive heart and renal disease with both (congestive) heart failure and renal failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195111005	Decompensated cardiac failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195112003	compensated cardiac failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195114002	acute left ventricular failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	206586007	congenital cardiac failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	233924009	heart failure as a complication of care (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	277639002	sepsis-associated right ventricular failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	314206003	refractory heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	359617009	acute right-sided heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	359620001	acute right heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	367363000	right ventricular failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	410431009	cardiorespiratory failure (disorder)

AMA-PCPI Level I EHR Specifications
Heart Failure - LVEF Assessment (HF-1)

value_set_id	clinical_topic	topic_ indicator	measure_component	standard_concept	standard_category	standard_ taxonomy	code	code_description
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	417996009	systolic heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	418304008	diastolic heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	424404003	decompensated chronic heart failure (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426012001	right heart failure due to pulmonary hypertension (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426263006	congestive heart failure due to left ventricular systolic dysfunction (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426611007	congestive heart failure due to valvular disease (disorder)
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	441481004	chronic systolic heart failure
000265	HF	1	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	441530006	chronic diastolic heart failure
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99201	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99202	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99203	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99204	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99205	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99212	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99213	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99214	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99215	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99241	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99242	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99243	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99244	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99245	
000002	HF	1	IPP	Encounter -Nursing Facility	Encounter	CPT	99304	
000002	HF	1	IPP	Encounter -Nursing Facility	Encounter	CPT	99305	
000002	HF	1	IPP	Encounter -Nursing Facility	Encounter	CPT	99306	
000002	HF	1	IPP	Encounter -Nursing Facility	Encounter	CPT	99307	
000002	HF	1	IPP	Encounter -Nursing Facility	Encounter	CPT	99308	
000002	HF	1	IPP	Encounter -Nursing Facility	Encounter	CPT	99309	
000002	HF	1	IPP	Encounter -Nursing Facility	Encounter	CPT	99310	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99324	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99325	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99326	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99327	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99328	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99334	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99335	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99336	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99337	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99341	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99342	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99343	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99344	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99345	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99347	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99348	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99349	
000002	HF	1	IPP	Encounter-Outpatient	Encounter	CPT	99350	
000003	HF	1	N (a)	Ejection Fraction	Diagnostic Study	SNM	70822001	CARDIAC EJECTION FRACTION
000003	HF	1	N (a)	Ejection Fraction	Diagnostic Study	SNM	250908004	LEFT VENTRICULAR EJECTION FRACTION
000003	HF	1	N (a)	Ejection Fraction	Diagnostic Study	SNM	250907009	LEFT VENTRICULAR FUNCTION
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78414	

AMA-PCPI Level I EHR Specifications
Heart Failure - LVEF Assessment (HF-1)

value_set_id	clinical_topic	topic_ indicator	measure_component	standard_concept	standard_category	standard_ taxonomy	code	code_description
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78451	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78452	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78453	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78454	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78468	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78472	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78473	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78481	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78483	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78494	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	78496	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93303	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93304	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93306	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93307	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93308	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93312	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93313	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93314	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93315	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93316	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93317	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93350	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93351	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93352	
000004	HF	1	N (a)	LVF Assmt	Diagnostic Study	CPT	93543	
000244	HF	1	N (b)	LVSD	Diagnosis/Condition/Problem	SNM	134401001	
000245	HF	1	N (b)	Severity Status	Result	SNM	255604002	Mild (severity)
000245	HF	1	N (b)	Severity Status	Result	SNM	6736007	Moderate (severity)
000245	HF	1	N (b)	Severity Status	Result	SNM	24484000	Severe (Severity)
000245	HF	1	N (b)	Severity Status	Result	SNM	41647002	no evidence of (qualifier)
000246	HF	1	N (b)	LVEF Result	Diagnostic Study	SNM	438933007	Hyperdynamic Circulation
000246	HF	1	N (b)	LVEF Result	Diagnostic Study	SNM	10189761000046100	Normal left ventricular systolic function (finding)
000246	HF	1	N (b)	LVEF Result	Diagnostic Study	SNM	10189731000046100	Mild left ventricular systolic dysfunction (disorder)
000246	HF	1	N (b)	LVEF Result	Diagnostic Study	SNM	10189741000046100	Moderate left ventricular systolic dysfunction (disorder)
000246	HF	1	N (b)	LVEF Result	Diagnostic Study	SNM	10189751000046100	Severe left ventricular systolic dysfunction (disorder)
000246	HF	1	N (b)	LVEF Result	Diagnostic Study	SNM	395172009	No Evidence of Left Ventricular Systolic Dysfunction

NATIONAL QUALITY FORUM

Measure Evaluation 4.1
December 2009

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The subcriteria and most of the footnotes from the evaluation criteria are provided in Word comments within the form and will appear if your cursor is over the highlighted area. Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized)**:** Complete all yellow highlighted areas of the form. Evaluate the extent to which each subcriterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: *If there is no TAP or workgroup, the SC also evaluates the subcriteria (yellow highlighted areas).*

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the subcriteria, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met
C = Completely (unquestionably demonstrated to meet the criterion)
P = Partially (demonstrated to partially meet the criterion)
M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)
N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)
NA = Not applicable (only an option for a few subcriteria as indicated)

(for NQF staff use) **NQF Review #:** 0081 **NQF Project:** Cardiovascular Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Heart Failure: Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction
De.2 **Brief description of measure**: Percentage of patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% who were prescribed ACE inhibitor or ARB therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge
1.1-2 **Type of Measure:** Process De.3 **If included in a composite or paired with another measure, please identify composite or paired measure** This measure is paired with Heart Failure (HF): Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction.
De.4 **National Priority Partners Priority Area:** Population health De.5 **IOM Quality Domain**: Effectiveness, Equity De.6 **Consumer Care Need:** Living with illness

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	**NQF Staff**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.* A.1 **Do you attest that the measure steward holds intellectual property rights to the measure and the right to use aspects of the measure owned by another entity (e.g., risk model, code set)?** Yes A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:**	**A** **Y**☐ **N**☐

B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section	**B** Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement Accountability	**C** Y☐ N☐
D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is provided. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement. D.1**Testing:** Yes, fully developed and tested D.2 **Have NQF-endorsed measures been reviewed to identify if there are similar or related measures?** Yes	**D** Y☐ N☐
(for NQF staff use**)** **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. *Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.* (evaluation criteria) **1a. High Impact**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Affects large numbers, Leading cause of morbidity/mortality, High resource use, Severity of illness 1a.2 1a.3 **Summary of Evidence of High Impact:** Heart failure is a chronic condition that poses a major and growing threat to the public's health. Improving the effectiveness of care and optimizing patient outcomes will become increasingly important as the population of the United States ages. •Currently, approximately 5.7 million Americans are living with heart failure. •Heart failure incidence approaches 10 per 1000 population after 65 years of age. •A person aged 40 years or older has a 1 in 5 chance of developing heart failure. •Hospital discharges for heart failure rose from 877,000 in 1996 to 1,106,000 in 2006. •80% percent of men and 70% of women less than 65 years of age who have heart failure will die within 8 years. •In 2005, 1 in 8 death certificates (292,214 deaths) in the United States mentioned heart failure. •For 2009, the estimated direct and indirect cost of heart failure in the United States is $37.2 billion, representing a portion of the estimated $475.3 billion for all cardiovascular diseases. 1a.4 **Citations for Evidence of High Impact:** Lloyd-Jones D, Adams RJ, Brown TM, et al., American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics–2010 update: a report from the American Heart Association. Circulation. 2010;126:e46-e215.	**1a** C☐ P☐ M☐ N☐

Comment [KP1]: 1a. The measure focus addresses:
•a specific national health goal/priority identified by NQF's National Priorities Partners; OR
•a demonstrated high impact aspect of healthcare (e.g., affects large numbers, leading cause of morbidity/mortality, high resource use (current and/or future), severity of illness, and patient/societal consequences of poor quality).

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: This measure is aimed at improving the number of patients with HF who are prescribed ACE inhibitor or ARB therapy. Both pharmacologic agents have been shown to decrease the risk of death and hospitalization.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Registry data from the outpatient setting has indicated that the use of ACE inhibitors or ARBs in eligible patients without documented contraindications or intolerance remains suboptimal with an average of 80% of patients receiving the recommended treatment. This use varied widely among participating practices with rates of adherence ranging from 5.9% to 96.3%.(1)

For patients hospitalized with heart failure, registry data indicates a higher rate of adherence with 84% of patients receiving an ACE inhibitor or ARB at discharge.(2) More recent data from October 2007 through September 2008 indicates an even higher rate of adherence with a national average of 92.28% of patients with left ventricular systolic dysfunction being prescribed ACE inhibitor/ARB therapy.(3)

(1)Fonarow GC, Yancy CW, Albert NM, et al. Heart failure care in the outpatient cardiology practice setting: findings from IMPROVE HF. Circ Heart Fail. 2008; 1: 98-106.
(2)Fonarow GC, Abraham WT, Albert NM, et al. Influence of a performance-improvement initiative on quality of care for patients hospitalized with heart failure: results of the Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure (OPTIMIZE-HF). Arch Intern Med. 2007; 167:1493-1502.
(3)Joint Commission on Accreditation of Healthcare Organizations. Quality Check: accessed at http://www.healthcarequalitydata.org. Accessed June 3, 2009.

Please see additional performance data in section 1 of the attached Measure Testing Summary.

1b.3 Citations for data on performance gap:
Please see additional performance data in section 1 and project descriptions at the end of the attached Measure Testing Summary.

1b.4 Summary of Data on disparities by population group:
The 2009 National Healthcare Disparities Report showed that disparities in care for heart failure exist across populations. Although the quality of hospital care for heart failure has improved overall, "care for Whites continues to improve at a higher rate than for minority populations. Thus, quality improvement has not necessarily translated to disparities reduction, which is critical for high-quality care."(1) Recommended hospital care for heart failure was characterized by evaluation of the patient's left ventricular ejection fraction and patient's receipt of an ACE inhibitor for left ventricular systolic dysfunction.
•In 2006, the proportion of Medicare patients with heart failure who received recommended hospital care was higher for Blacks than for Whites (91.4% compared with 90%).(1)
•In 2006, the proportion of Medicare patients with heart failure who received recommended hospital care was lower for American Indians (AI) or Alaska Natives (AN) (86.3%) and Hispanics (89.3%) compared with Whites (90%).(1)
•From 2005 to 2007, disparities in hospital care for heart failure for AI/ANs have been worsening at a rate of 12.4% per year.(1)

A recent analysis of data derived from 14,464 outpatients enrolled from July 2008 through June 2009 into the American College of Cardiology's PINNACLE program concluded that there were no substantial racial or sex differences in compliance for key performance measures for CAD, HF, and atrial fibrillation. (Chan et al, 2010) For patients with heart failure and left ventricular systolic dysfunction, blacks were less likely to receive ACEI or ARB therapy [(84.8% vs. 85.3%; adjusted RR: 0.93 [95% CI: 0.86 to 1.00];p = 0.05)] although the differences were numerically small. Compliance rates between men and women with heart failure and left ventricular systolic dysfunction were generally similar with 84.1% of Men and 86.7% of Women prescribed ACEI or ARB therapy.(2)

(1) Agency for Healthcare Research and Quality. 2009 National Healthcare Disparities Report.

1b
C☐
P☐
M☐
N☐

Comment [KP2]: 1b. Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating considerable variation, or overall poor performance, in the quality of care across providers and/or population groups (disparities in care).

Comment [k3]: 1 Examples of data on opportunity for improvement include, but are not limited to: prior studies, epidemiologic data, measure data from pilot testing or implementation. If data are not available, the measure focus is systematically assessed (e.g., expert panel rating) and judged to be a quality problem.

http://www.ahrq.gov/qual/nhdr09/nhdr09.pdf. Published March 2010. Accessed May 25, 2010.
(2) Chan PS, Oetgen WJ, Buchanan D, et al. Cardiac Performance Measure Compliance in Outpatients, The American College of Cardiology and National Cardiovascular Data Registry's PINNACLE (Practice Innovation And Clinical Excellence) Program, J. Am. Coll. Cardiol. 2010;56;8-14.

1b.5 Citations for data on Disparities:

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** In the absence of contraindications, ACE inhibitors or ARBs are recommended for all patients with symptoms of heart failure and reduced left ventricular systolic function. ACE inhibitors remain the first choice for inhibition of the renin-angiotensin system in chronic heart failure, but ARBs can now be considered a reasonable alternative. Both pharmacologic agents have been shown to decrease the risk of death and hospitalization. Additional benefits of ACE inhibitors include the alleviation of symptoms and the improvement of clinical status and overall sense of well-being of patients with heart failure.14

1c.2-3. Type of Evidence: Evidence-based guideline

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
"Angiotensin converting enzyme inhibitors have been evaluated in more than 7000 patients with HF who participated in more than 30 placebo-controlled
clinical trials."

"Analysis of this collective experience indicates that ACEIs can alleviate symptoms, improve clinical status, and enhance the overall sense of well-being of patients with HF. In addition, ACEIs can reduce the risk of death and the combined risk of death or hospitalization. These benefits of ACE inhibition were seen in patients with mild, moderate, or severe symptoms and in patients with or without coronary artery disease."

Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343–82.

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom*)**:**
Level A (Data derived from multiple randomized clinical trials or meta-analyses) and Level B (Data derived from a single randomized trial or nonrandomized studies as noted by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines)

1c.6 Method for rating evidence: Levels of Evidence are classified as follows:
-Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses
-Level of Evidence B: Data derived from a single randomized trial or nonrandomized studies
-Level of Evidence C: Only consensus opinion of experts, case studies, or standard-of-care

1c.7 Summary of Controversy/Contradictory Evidence:

1c.8 Citations for Evidence (*other than guidelines*)**:**

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number*)**:**
Angiotensin converting enzyme inhibitors are recommended for all patients with current or prior symptoms of [heart failure] and reduced LVEF, unless contraindicated. (Class I, Level of Evidence: A) (ACCF/AHA, 2009)

Treatment with an [ACE inhibitor] should be initiated at low doses [see excerpt from guideline table below],

1c
C ☐
P ☐
M ☐
N ☐

Rating: C=Completely; P=Partially; M=Minimally; N=Not at all; NA=Not applicable

Comment [k4]: 1c. The measure focus is:
•an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed;
OR
•if an intermediate outcome, process, structure, etc., there is **evidence** that supports the specific measure focus as follows:
oIntermediate outcome – evidence that the measured intermediate outcome (e.g., blood pressure, Hba1c) leads to improved health/avoidance of harm or cost/benefit.
oProcess – evidence that the measured clinical or administrative process leads to improved health/avoidance of harm and
if the measure focus is on one step in a multi-step care process, it measures the step that has the greatest effect on improving the specified desired outcome(s).
oStructure – evidence that the measured structure supports the consistent delivery of effective processes or access that lead to improved health/avoidance of harm or cost/benefit.
oPatient experience – evidence that an association exists between the measure of patient experience of health care and the outcomes, values and preferences of individuals/ the public.
oAccess – evidence that an association exists between access to a health service and the outcomes of, or experience with, care. ... [1]

Comment [k5]: 4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., mammography) or measures for multiple care processes that affect a single outcome.

Comment [k6]: 3 The strength of the body of evidence for the specific measure focus should be systematically assessed and rated (e.g., USPSTF grading system http://www.ahrq.gov/clinic/uspstf07/methods/benefit.htm). If the USPSTF grading system was not used, the grading system is explained including how it relates to the USPSTF grades or why it does not. However, evidence is not limited to quantitative studies and the best type of evidence depends upon the question being studied (e.g., randomized controlled trials appropriate for studying drug efficacy are not well suited for complex system changes). When qualitative studies are used, appropriate qualitative research criteria are used to judge the strength of the evidence.

followed by gradual increments in dose if lower doses have been well tolerated… Clinicians should attempt to use doses that have been shown to reduce the risk of cardiovascular events in clinical trials. If these target doses of an [ACE inhibitor] cannot be used or are poorly tolerated, intermediate doses should be used with the expectation that there are likely to be only small differences in efficacy between low and high doses. (ACCF/AHA, 2009)

An ARB should be administered to post-[myocardial infarction (MI)] patients without [heart failure] who are intolerant of [ACE inhibitors] and have a low LVEF. (Class I, Level of Evidence: B) (ACCF/AHA, 2009)

Angiotensin II receptor blockers are reasonable to use as alternatives to [ACE inhibitors] as first-line therapy for patients with mild to moderate [heart failure] and reduced LVEF, especially for patients already taking ARBs for other indications. (Class IIa, Level of Evidence: A) (ACCF/AHA, 2009)

For the hospitalized patient:
In patients with reduced ejection fraction experiencing a symptomatic exacerbation of [heart failure] requiring hospitalization during chronic maintenance treatment with oral therapies known to improve outcomes, particularly ACE inhibitors or ARBs and beta-blocker therapy, it is recommended that these therapies be continued in most patients in the absence of hemodynamic instability or contraindications. (Class I, Level of Evidence: C) (ACCF/AHA, 2009)
In patients hospitalized with [heart failure] with reduced ejection fraction not treated with oral therapies known to improve outcomes, particularly ACE inhibitors or ARBs and beta-blocker therapy, initiation of these therapies is recommended in stable patients prior to hospital discharge. Initiation of beta-blocker therapy is recommended after optimization of volume status and successful discontinuation of intravenous diuretics, vasodilators, and inotropic agents. Beta-blocker therapy should be initiated at a low dose and only in stable patients. Particular caution should be used when initiating beta-blockers in patients who have required inotropes during their hospital course. (Class I, Level of Evidence: B) (ACCF/AHA, 2009)

1c.10 **Clinical Practice Guideline Citation:** Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343– 82.
1c.11 **National Guideline Clearinghouse or other URL:**
http://content.onlinejacc.org/cgi/reprint/53/15/e1.pdf

1c.12 **Rating of strength of recommendation (***also provide narrative description of the rating and by whom***):**
Class I (Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines)

1c.13 **Method for rating strength of recommendation** (*If different from USPSTF system, also describe rating and how it relates to USPSTF*)**:**
Classifications of Recommendations are classified as follows:
Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective.
Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment.
Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.
Class IIb: Usefulness/efficacy is less well established by evidence/opinion.
Class III: Conditions for which there is evidence and/or general agreement that a procedure/treatment is not useful/effective and in some cases may be harmful.

1c.14 **Rationale for using this guideline over others:**
It is the PCPI policy to use guidelines, which are evidence-based, applicable to physicians and other healthcare providers, and developed by a national specialty organization or government agency. In addition, the PCPI has now expanded what is acceptable as the evidence base for measures to included documented quality improvement (QI) initiatives or implementation projects that have demonstrated improvement in

Comment [k7]: USPSTF grading system **http://www.ahrq.gov/clinic/uspstf/grades.htm**: **A -** The USPSTF recommends the service. There is high certainty that the net benefit is substantial. **B -** The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. **C -** The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is at least moderate certainty that the net benefit is small. Offer or provide this service only if other considerations support the offering or providing the service in an individual patient. **D -** The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. **I -** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

the quality of care.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report***, met?** **Rationale:**	**1** **Y☐** **N☐**
2. SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES	
Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** Patients who were prescribed* ACE inhibitor or ARB therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge *Prescribed may include 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 **2a.2 Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** Once during the measurement period (outpatient/nursing home) OR at each hospital discharge **2a.3 Numerator Details (***All information required to collect/calculate the numerator, including all codes, logic, and definitions***):** See attached for EHR Specifications. For Claims/Administrative: Report CPT Category II Code 4009F- Angiotensin converting enzyme (ACE) inhibitor or Angiotensin Receptor Blocker (ARB) therapy prescribed.	
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):** 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 **2a.5 Target population gender:** Female, Male **2a.6 Target population age range:** 18 years of age and older **2a.7 Denominator Time Window (***The time period in which cases are eligible for inclusion in the denominator***):** 12 consecutive months **2a.8 Denominator Details (***All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):** Note: For the inpatient setting (CPT 99239, 99239), the diagnosis refers to the principal discharge diagnosis. The principal diagnosis is typically the first listed on the inpatient claim form with secondary or attributed diagnoses to follow in descending order of importance. ICD-9-CM Diagnosis Code: Note: Although this measure is limited to patients with left ventricular systolic dysfunction, diastolic ICD-9-	**2a-specs** **C☐** **P☐** **M☐** **N☐**

Comment [KP8]: 2a. The measure is well defined and precisely specified so that it can be implemented consistently within and across organizations and allow for comparability. The required data elements are of high quality as defined by NQF's Health Information Technology Expert Panel (HITEP) .

CM codes are included to provide invariability in coding among measures.
See attached for EHR Specifications.
For Claims/Administrative: See coding tables attached for coding (ICD-9-CM, ICD-10-CM, CPT)
AND
Report CPT Category II Code (in development)
3021F- Left ventricular ejection fraction (LVEF) < 40% or qualitative documentation of moderate dysfunction or severe dysfunction

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):**
Documentation of medical reason(s) for not prescribing ACE inhibitor or ARB therapy; Append modifier to CPT II code 4009F-1P
Documentation of patient reason(s) for not prescribing ACE inhibitor or ARB; Append modifier to CPT II code 4009F-2P
Documentation of system reason(s) for not prescribing ACE inhibitor or ARB; Append modifier to CPT II code 4009F-3P

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
See attached for EHR specifications.
For Claims/Administrative: See coding tables attached for coding (ICD-9-CM, ICD-10-CM, SNOMED, CPT)

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**

2a.12-13 Risk Adjustment Type: No risk adjustment necessary

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**

2a.15-17 Detailed risk model available Web page URL or attachment:

2a.18-19 Type of Score: Rate/proportion
2a.20 Interpretation of Score: Better quality = Higher score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
See attached for calculation algorithm

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**

2a.23 Sampling (Survey) Methodology *If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate)*:

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Paper medical record/flow-sheet, Electronic administrative data/claims, Electronic clinical data, Electronic Health/Medical Record, Registry data

2a.25 Data source/data collection instrument (*Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.***):**
This measure, in its previous specifications, is currently being used in the ACCF PINNACLE registry for the outpatient office setting.

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL www.pinnacleregistry.org

2a.29-31 Data dictionary/code table web page URL or attachment: Attachment NQF 0081_PCPI_HF-7_ACE ARB for LVSD.pdf

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*

Comment [k9]: 11 Risk factors that influence outcomes should not be specified as exclusions.
12 Patient preference is not a clinical exception to eligibility and can be influenced by provider interventions.

Clinicians: Individual, Clinicians: Group

2a.36-37 **Care Settings (***Check the setting(s) for which the measure is specified and tested)*
Home, Ambulatory Care: Office, Hospital, Ambulatory Care: Clinic, Nursing home (NH) /Skilled Nursing Facility (SNF), Ambulatory Care: Hospital Outpatient, Assisted Living, Group homes

2a.38-41 **Clinical Services** (*Healthcare services being measured, check all that apply*)
Clinicians: PA/NP/Advanced Practice Nurse, Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 **Data/sample** *(description of data/sample and size)***:** Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary.

2b.2 **Analytic Method** *(type of reliability & rationale, method for testing)***:**
Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary.

2b.3 **Testing Results** *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)***:**
Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary.

2b
C☐
P☐
M☐
N☐

2c. Validity testing

2c.1 **Data/sample** *(description of data/sample and size)***:**

2c.2 **Analytic Method** *(type of validity & rationale, method for testing)***:**
All PCPI performance measures are assessed for content validity by expert work group members during the development process. Additional input on the content validity of draft measures is obtained through a 30-day public comment period and by also soliciting comments from a panel of consumer, purchaser, and patient representatives convened by the PCPI specifically for this purpose. All comments received are reviewed by the expert work group and the measures adjusted as needed. Other external review groups (eg, focus groups) may be convened if there are any remaining concerns related to the content validity of the measures.

2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)***:**

2c
C☐
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N☐

2d. Exclusions Justified

2d.1 **Summary of Evidence supporting exclusion(s):**
The PCPI support the consideration of exceptions or exclusions on a measure by measure basis. There must be clear rationale to permit an exception for a medical, patient, or system reason based on whether or not that reason is significant and occurs frequently enough. The PCPI also support systematic review and analysis of each physician´s exceptions data to identify practice patterns and opportunities for quality improvement.

The Heart Failure Work Group agreed to include a medical reason exception so that clinicians can exclude patients for whom the prescription of ACE inhibitors or ARB therapy may not be indicated or contraindicated (eg, hypotensive patients who are at immediate risk of cardiogenic shock, hospitalized patients who have experienced marked azotemia) - see
verbatim guidelines statements below. A patient reason exception has been included for patients who might decline this particular pharmacologic treatment. Additionally, a system reason exception has been included to account for potential financial constraints that would inhibit use/prescription of ACE inhibitors or ARB therapy.

"Angiotensin converting enzyme inhibitors should be prescribed to all patients with HF due to LV systolic dysfunction with reduced LVEF unless they have a contraindication to their use or have been shown to be

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Comment [KP10]: 2b. Reliability testing demonstrates the measure results are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period.

Comment [k11]: 8 Examples of reliability testing include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing may address the data items or final measure score.

Comment [KP12]: 2c. Validity testing demonstrates that the measure reflects the quality of care provided, adequately distinguishing good and poor quality. If face validity is the only validity addressed, it is systematically assessed.

Comment [k13]: 9 Examples of validity testing include, but are not limited to: determining if measure scores adequately distinguish between providers known to have good or poor quality assessed by another valid method; correlation of measure scores with another valid indicator of quality for the specific topic; ability of measure scores to predict scores on some other related valid measure; content validity for multi-item scales/tests. Face validity is a subjective assessment by experts of whether the measure reflects the quality of care (e.g., whether the proportion of patients with BP < 140/90 is a marker of quality). If face validity is the only validity addressed, it is systematically assessed (e.g., ratings by relevant stakeholders) and the measure is judged to represent quality care for the specific topic and that the measure focus is the most important aspect of quality for the specific topic.

Comment [KP14]: 2d. Clinically necessary measure exclusions are identified and must be:
•supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;
AND
•a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;
AND
•precisely defined and specified:
–if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of cases excluded, exclusion rates by type of exclusion);
if patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category ... [2]

Comment [k15]: 10 Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, sensitivity analyses with and without the exclusion, and variability of exclusions across providers.

unable to tolerate treatment with these drugs."

"Patients should not be given an ACEI if they have experienced life-threatening adverse reactions (angioedema or anuric renal failure) during previous exposure to the drug or if they are pregnant. They should take an ACEI with caution if they have very low systemic blood pressures (systolic blood pressure less than 80 mm Hg), markedly increased serum levels of creatinine (greater than 3 mg per dL) [ie renal insufficiency], bilateral renal artery stenosis, or elevated levels of serum potassium (greater than 5.5 mEq per liter). Finally, treatment with an ACEI should not be initiated in hypotensive patients who are at immediate risk of cardiogenic shock."

"Many of the considerations with ARB are similar to those with initiation of an ACEI, as discussed above."

2d.2 Citations for Evidence:
Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343–82.

2d.3 Data/sample *(description of data/sample and size)*: Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary.

2d.4 Analytic Method *(type analysis & rationale)*:
Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary.

2d.5 Testing Results *(e.g., frequency, variability, sensitivity analyses)*:
Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary.

2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 Data/sample *(description of data/sample and size)*:

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)*:
This is a process measure; risk adjustment is not indicated.

2e.3 Testing Results *(risk model performance metrics)*:

2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:

2e
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2f. Identification of Meaningful Differences in Performance

2f.1 Data/sample from Testing or Current Use *(description of data/sample and size)*: Please see additional information in section 1 of the attached Measure Testing Summary.

2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance *(type of analysis & rationale)*:
Please see additional information in section 1 of the attached Measure Testing Summary.

2f.3 Provide Measure Scores from Testing or Current Use *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*:
Please see additional information in section 1 of the attached Measure Testing Summary.

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2g. Comparability of Multiple Data Sources/Methods

2g.1 Data/sample *(description of data/sample and size)*: Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary.

2g.2 Analytic Method *(type of analysis & rationale)*:

2g
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Comment [KP16]: 2e. For outcome measures and other measures (e.g., resource use) when indicated:
•an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care;[Error! Bookmark not defined.] OR rationale/data support no risk adjustment.

Comment [k17]: 13 Risk models should not obscure disparities in care for populations by including factors that are associated with differences/inequalities in care such as race, socioeconomic status, gender (e.g., poorer treatment outcomes of African American men with prostate cancer, inequalities in treatment for CVD risk factors between men and women). It is preferable to stratify measures by race and socioeconomic status rather than adjusting out differences.

Comment [KP18]: 2f. Data analysis demonstrates that methods for scoring and analysis of the specified measure allow for identification of statistically significant and practically/clinically meaningful differences in performance.

Comment [k19]: 14 With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74% v. 75%) is clinically meaningful; or whether a statistically significant difference of $25 in cost for an episode of care (e.g., $5,000 v. $5,025) is practically meaningful. Measures with overall poor performance may not demonstrate much variability across providers.

Comment [KP20]: 2g. If multiple data sources/methods are allowed, there is demonstration they produce comparable results.

Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary.

2g.3 **Testing Results** *(e.g., correlation statistics, comparison of rankings)***:**
Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary.

2h. Disparities in Care

2h.**1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)***:**

2h.2 **If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:**
The ACCF, AHA, and PCPI advocate that performance measure data should, where possible, be stratified by race, ethnicity, and primary language to assess disparities and initiate subsequent quality improvement activities addressing identified disparities, consistent with recent national efforts to standardize the collection of race and ethnicity data. A 2008 NQF report endorsed 45 practices including stratification by the aforementioned variables.(1) A 2009 IOM report "recommends collection of the existing Office of Management and Budget (OMB) race and Hispanic ethnicity categories as well as more fine-grained categories of ethnicity (referred to as granular ethnicity and based on one's ancestry) and language need (a rating of spoken English language proficiency of less than very well and one's preferred language for health-related encounters)."(2)

References
(1)National Quality Forum Issue Brief (No.10). Closing the Disparities Gap in Healthcare Quality with Performance Measurement and Public Reporting. Washington, DC: NQF, August 2008.

(2)Race, Ethnicity, and Language Data: Standardization for Health Care Quality Improvement. March 2010. AHRQ Publication No. 10-0058-EF. Agency for Healthcare Research and Quality, Rockville, MD. Available at: http://www.ahrq.gov/research/iomracereport. Accessed May 25, 2010.

2h
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NA☐

Comment [KP21]: 2h. If disparities in care have been identified, measure specifications, scoring, and analysis allow for identification of disparities through stratification of results (e.g., by race, ethnicity, socioeconomic status, gender);OR rationale/data justifies why stratification is not necessary or not feasible.

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*

2

Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties***, met?**
Rationale:

2
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3. USABILITY

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)

Eval Rating

3a. Meaningful, Understandable, and Useful Information

3a.1 **Current Use:** In use

3a.2 **Use in a public reporting initiative (disclosure of performance results to the public at large)** (*If used in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years*)**:**
This measure is not yet used in any public reporting initiative. The measure will, however, be eligible for inclusion in the CMS PQRS and other government programs in 2012 and would thus provide information about clinician participation to the public. The ACCF, AHA, and PCPI believe that the reporting of such participation information is a beneficial first step on a trajectory toward the public reporting of performance results, which is most appropriate after the measures are thoroughly tested and the reliability of the performance data has been validated. Continued NQF endorsement will facilitate our ongoing progress toward this public reporting objective.

3a.3 **If used in other programs/initiatives (***If used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years***):**
All PCPI measures are suitable for use in quality improvement initiatives and are made freely available on

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Comment [KP22]: 3a. Demonstration that information produced by the measure is meaningful, understandable, and useful to the intended audience(s) for both public reporting (e.g., focus group, cognitive testing) and informing quality improvement (e.g., quality improvement initiatives). An important outcome that may not have an identified improvement strategy still can be useful for informing quality improvement by identifying the need for and stimulating new approaches to improvement.

the PCPI website and through the implementation efforts of medical specialty societies and other PCPI members. The PCPI strongly encourages the use of its measures in QI initiatives and seeks to provide information on such initiatives to PCPI members.

The American Heart Association's Get With The Guidelines®-Outpatient (GWTG-O) is a virtual performance improvement program that will improve adherence to evidence-based care in the outpatient setting, including specialist practices, general healthcare practices and health clinics. GWTG-Outpatient has had a long history of quality improvement for cardiovascular care. They have published 65 publications over the past 10 years. This program is designed to assist healthcare professionals in the outpatient setting to provide the best possible care to patients. This program collects a number of clinical measures for primary and secondary prevention. Clinical measure sets include those developed by American Heart Association, including those co-developed with other organizations, such as the American College of Cardiology Foundation and the American Medical Association, as well as other National Quality Forum endorsed measures.

Through this program, data is collected on clinical measures affecting a number of cardiovascular related conditions including, atrial fibrillation, coronary artery disease, heart failure, hypertension, diabetes, and preventative care. The primary analytical system used is Duke Clinical Research Institute. Get With The Guidelines®-Outpatient is a quality improvement program that can be utilized for Maintenance of Certification (MOC) with groups like American Board of Internal Medicine (ABIM) and American Board of Family Medicine (ABFM). ABIM has confirmed that the reports received from Get With The Guidelines-Outpatient can be utilized in completion of their Self-Directed Practice Improvement Module (PIM). The Self-Directed PIM provides one pathway for earning practice performance credit in ABIM's MOC program. This program includes several integral components: A preliminary Continuing Education (CE) course for the care team, data submission and reporting that is integrated with existing Electronic Health Records (EHRs)/health technology platforms, corresponding professional and provider education including webinars, online tools and resources, digital access to reference materials and videos through the Get With The Guidelines®-Outpatient website (http://outpatient.heart.org). The free continuing education activity titled, Outpatient Quality Improvement Focus, addresses the quality chasm and treatment gap, presents the benefits of quality improvement and identifies the steps necessary for implementation in the practice setting. This continuing education activity is certified for physicians, nurses and pharmacists.

Since its debut in 2005, Get With The Guidelines-Heart Failure® (GWTG-HF) has helped hospital teams across the nation provide evidence-based heart failure treatment consistent with up-to-date scientific guidelines from the American Heart Association. GWTG-HF historically has had a long history of quality improvement for heart failure patient care. To date 17 peer-reviewed publications have been derived from data directly taken from GWTG-HF. This program is designed to assist healthcare professionals in the inpatient setting to provide the best possible care to patients with heart failure, by reducing the likelihood of recurring events, and allowing heart failure patients not only survive but reclaim their quality of life after hospitalization.

Hospitals, physicians, nurses and other healthcare providers who use GWTG-HF have access to patient-specific guideline information and immediate access to clinical decision support through the American Heart Association's Patient Management Tool™* (PMT), an online, interactive assessment and reporting system, through our vendor Outcome Sciences Inc. Using the PMT, hospitals can track their program performance and pinpoint areas for improvement.
GWTG-HF collects a number of clinical heart failure measures, including ejection fraction. Clinical measure sets include those developed by American Heart Association, including those co-developed with other organizations, such as the American College of Cardiology Foundation and the American Medical Association, as well as National Quality Forum. Through this program, we collect relevant medical history and more than 20 other elements, including symptoms, vital signs, exams, labs, medications, procedures, discharge status, ejection fraction, post discharge information, and many other data elements. More information on GWTG-HF is available at heart.org/getwiththeguidelines.

The American Heart Association has amassed a wealth of robust heart failure-related resources, newly aligned into a comprehensive offering to help take the failure out of heart failure.

One of our newest initiatives, known as "Target: Heart Failure" is intended to help medical professionals

address the growing challenge by organizing the American Heart Association's wealth of robust heart failure-related resources into a comprehensive offering. The campaign provides healthcare professional with easy access to free educational tools, prevention programs, treatment guidelines, outcomes-based programs and quality initiatives,
including a downloadable toolkit containing awareness and prevention materials. Target: Heart Failure is an initiative to help healthcare professionals advance heart failure awareness, prevention, treatment and recovery. More information on Target: Heart Failure is available at www.heart.org/targethf

The American College of Cardiology Foundation's Cardiology Practice Improvement Pathway (CPIP) uses clinical measure sets that are developed and specified by the American College of Cardiology Foundation with the American Heart Association and the American Medical Association's Physician Consortium for Performance Improvement for Hypertension, Stable Coronary Artery Disease, Heart Failure, and Atrial Fibrillation/Atrial Flutter. This program is intended as an approved quality improvement product that can be applied toward ABIM's Part IV practice performance requirement for Maintenance of Certification (ABIM AQI application submitted). They are in the process of creating a homepage on the Cardiosource.org homepage. The URL will be cardiosource.org/cpip. The web-based tool will be available after spring 2011. Through an online webinar hosted in November 2010, CPIP anticipates enrolling 50 - 100 practices during 2011 which will provide data from about 500-1,000 cardiologists. This ACCF initiative has contracted with the NY QIO: IPRO to analyze and scores based on thresholds. Of the 100 points needed to achieve recognition in the program, 70 come directly from clinical points such as the Heart Failure measures that are being submitted to NQF for consideration. IPRO will audit 5% of practices who submit their data for recognition evaluation.

The American College of Cardiology Foundation's has an Performance Improvement program entitled "A New Era" which is an educational format approved for credit by the American Medical Association (AMA) and the American Nursing Credentialing Center. This continuing medical education program blends both quality improvement and educational methodologies to provide a high quality learning experience that impacts changes to practice. These activities are structured, long-term processes in which a healthcare professional learns about the heart failure specific performance metrics, uses metrics to retrospectively assess his practice, applies these metrics prospectively over a useful interval, and reevaluates his performance. As part of this process, clinicians set goals for change and engage in structured learning activities to improve their performance. As of December 6th, 2010:
- 425 clinicians have enrolled in A New ERA
- The data is generated from all but four states (Montana, New Hampshire, South Dakota, and Wyoming)
- 82% are physicians
- 90% agreed or strongly agreed that performance metric data were valuable
- 80% agreed or strongly agreed that performance metric data review would help them improve their practice
- No one has finished the program, as it takes several months to do so

In 2008, the American College of Cardiology Foundation launched the PINNACLE program (formerly known as the Improving Continuous Cardiac Care or IC3). This was the first, national, prospective, outpatient based cardiac QI registry in the US. While participation is voluntary, this registry collects a variety of longituditional patient data at the point of service, including patients' symptoms, vital signs, medication, and recent hospitalizations. Jointly developed ACCF/AHA/PCPI measures for Coronary Artery Disease, Heart Failure, and Atrial Fibrillation. Data collection is achieved in 2 ways for the practices: paper forms or practice's electronic medical record data collection systems. The primary analytical system used is St. Luke's Mid America Heart Institute. The ACCF registry, PINNACLE, pulls data from outpatient facilities via paper flowsheets or 14 EHR vendors. As of December 10, 2010, there are 47 practices collecting data at 200 sites with 276,000 unique patients representing 1 million documented encounters.

Testing of Interpretability (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*)
3a.4 Data/sample *(description of data/sample and size)***:**

3a.5 Methods *(e.g., focus group, survey, QI project)***:**

3a.6 **Results** *(qualitative and/or quantitative results and conclusions)*:	
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:** NQF# 0162 - Heart Failure: Angiotensin converting enzyme inhibitor (ACEI) for left ventricular systolic dysfunction (LVSD)	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
3b. Harmonization If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source or different topic but same target population): 3b.2 **Are the measure specifications harmonized? If not, why?** The ICD-9 codes to determine patient eligibility are harmonized with NQF# 0162.	**3b** C☐ P☐ M☐ N☐ NA☐
3c. Distinctive or Additive Value 3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** NQF#0162 focuses on the inpatient setting with the facility as the level of measurement/analysis. This measure addresses both the inpatient and outpatient setting with the individual clinician or facility as the defined level of measurement/analysis. For purposes of NQF consideration and to avoid competing measures, we are only requesting endorsement consideration for the individual clinician level of measurement/analysis. 5.1 **If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the same target population), Describe why it is a more valid or efficient way to measure quality:**	**3c** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, **met?** **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**
4a. Data Generated as a Byproduct of Care Processes 4a.1-2 **How are the data elements that are needed to compute measure scores generated?** Data generated as byproduct of care processes during care delivery (Data are generated and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition), Coding/abstraction performed by someone other than person obtaining original information (E.g., DRG, ICD-9 codes on claims, chart abstraction for quality measure or registry)	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** C☐ P☐ M☐ N☐
4c. Exclusions	**4c** C☐

Comment [KP23]: 3b. The measure specifications are harmonized with other measures, and are applicable to multiple levels and settings.

Comment [k24]: 16 Measure harmonization refers to the standardization of specifications for similar measures on the same topic (e.g., *influenza immunization* of patients in hospitals or nursing homes), or related measures for the same target population (e.g., eye exam and HbA1c for *patients with diabetes*), or definitions applicable to many measures (e.g., age designation for children) so that they are uniform or compatible, unless differences are dictated by the evidence. The dimensions of harmonization can include numerator, denominator, exclusions, and data source and collection instructions. The extent of harmonization depends on the relationship of the measures, the evidence for the specific measure focus, and differences in data sources.

Comment [KP25]: 3c. Review of existing endorsed measures and measure sets demonstrates that the measure provides a distinctive or additive value to existing NQF-endorsed measures (e.g., provides a more complete picture of quality for a particular condition or aspect of healthcare, is a more valid or efficient way to measure).

Comment [KP26]: 4a. For clinical measures, required data elements are routinely generated concurrent with and as a byproduct of care processes during care delivery. (e.g., BP recorded in the electronic record, not abstracted from the record later by other personnel; patient self-assessment tools, e.g., depression scale; lab values, meds, etc.)

Comment [KP27]: 4b. The required data elements are available in electronic sources. If the required data are not in existing electronic sources, a credible, near-term path to electronic collection by most providers is specified and clinical data elements are specified for transition to the electronic health record.

Comment [KP28]: 4c. Exclusions should not require additional data sources beyond what is required for scoring the measure (e.g., numerator and denominator) unless justified as supporting measure validity.

4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications? No **4c.2 If yes, provide justification.**	**P☐ M☐ N☐ NA☐**
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences **4d.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results.** Although we are not currently aware of any unintended consequences related to this measure, we plan through an active redesign of the PCPI website to facilitate the collection of information on unintended consequences from the users of PCPI measures.	**4d C☐ P☐ M☐ N☐**
4e. Data Collection Strategy/Implementation **4e.1 Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data/missing data, timing/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/ implementation issues:** Please see additional information in section 3 of the attached Measure Testing Summary. **4e.2 Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** Costs to implement the measure have not been calculated. **4e.3 Evidence for costs:** **4e.4 Business case documentation:**	**4e C☐ P☐ M☐ N☐**
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility*?	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, **met?** **Rationale:**	**4 C☐ P☐ M☐ N☐**
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited ☐**
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y☐ N☐ A☐**
CONTACT INFORMATION	
Co.1 Measure Steward (Intellectual Property Owner) **Co.1 Organization** American Medical Association, 515 N State St, Chicago, Illinois, 60654 **Co.2 Point of Contact** Mark, Antman, mark.antman@ama-assn.org, 312-464-5056-	
Measure Developer If different from Measure Steward **Co.3 Organization** American Medical Association, 515 N State St, Chicago, Illinois, 60654	

Comment [KP29]: 4d. Susceptibility to inaccuracies, errors, or unintended consequences and the ability to audit the data items to detect such problems are identified.

Comment [KP30]: 4e. Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, etc.) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use).

Co.4 Point of Contact
Mark, Antman, mark.antman@ama-assn.org, 312-464-5056-

Co.5 Submitter If different from Measure Steward POC
Mark, Antman, mark.antman@ama-assn.org, 312-464-5056-, American Medical Association

Co.6 Additional organizations that sponsored/participated in measure development
American College of Cardiology Foundation/American Heart Association

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.
Robert O. Bonow, MD, MACC, FAHA, FACP (Co-Chair) (cardiology)
Theodore G. Ganiats, MD (Co-Chair) (family medicine; measure methodology)
Craig T. Beam, CRE (patient representative)
Kathleen Blake, MD (cardiac electrophysiology)
Donald E. Casey, Jr., MD, MPH, MBA, FACP (internal medicine)
Sarah J. Goodlin, MD (geriatrics, palliative medicine)
Kathleen L. Grady, PhD, APN, FAAN, FAHA (cardiac surgery)
Randal F. Hundley, MD, FACC (cardiology, health plan representative)
Mariell Jessup, MD, FACC, FAHA, FESC (cardiology, heart failure)
Thomas E. Lynn, MD (family medicine, measure implementation)
Frederick A. Masoudi, MD, MSPH (cardiology)
David Nilasena MD, MSPH, MS (general preventive medicine, public health, measure implementation)
Paul D. Rockswold, MD, MPH (family medicine)
Ileana L. Piña, MD, FACC (cardiology, heart failure)
Lawrence B. Sadwin (patient representative)
Joanna D. Sikkema, MSN, ANP-BC, FAHA (cardiology)
Carrie A. Sincak, PharmD, BCPS (pharmacy)
John Spertus, MD, MPH (cardiology)
Patrick J. Torcson, MD, FACP, MMM (hospital medicine)
Elizabeth Torres, MD (internal medicine)
Mark V. Williams, MD, FHM (hospital medicine)
John B Wong, MD (internal medicine)

PCPI measures are developed through cross-specialty, multi-disciplinary work groups. All medical specialties and other health care professional disciplines participating in patient care for the clinical condition or topic under study must be equal contributors to the measure development process. In addition, the PCPI strives to include on its work groups individuals representing the perspectives of patients, consumers, private health plans, and employers. This broad-based approach to measure development ensures buy-in on the measures from all stakeholders and minimizes bias toward any individual specialty or stakeholder group. All work groups have at least two co-chairs who have relevant clinical and/or measure development expertise and who are responsible for ensuring that consensus is achieved and that all perspectives are voiced.

Ad.2 If adapted, provide name of original measure: Heart Failure (HF) : ACE/ ARB Therapy
Ad.3-5 If adapted, provide original specifications URL or attachment

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 Year the measure was first released: 2003
Ad.7 Month and Year of most recent revision: 12, 2010
Ad.8 What is your frequency for review/update of this measure? Every 3 years or as new evidence becomes available that materially affects the measures.
Ad.9 When is the next scheduled review/update for this measure? 12, 2013

Ad.10 Copyright statement/disclaimers: This Physician Performance Measurement Set (PPMS) and related data specifications were developed by the Physician Consortium for Performance Improvement® (the Consortium) including the American College of Cardiology (ACC), the American Heart Association (AHA) and the American Medical Association (AMA) to facilitate quality improvement activities by physicians. The performance measures

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Limited proprietary coding is contained in the measure specifications for convenience. Users of the proprietary code sets should obtain all necessary licenses from the owners of these code sets. The AMA, the ACC, the AHA, the Consortium and its members disclaim all liability for use or accuracy of any Current Procedural Terminology (CPT®) or other coding contained in the specifications.

Ad.11 -13 Additional Information web page URL or attachment: Attachment Testing Summary HF NQF Final_2_10_2011-634329406527993420.pdf

Date of Submission (*MM/DD/YY*)**:** 03/16/2011

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1c. The measure focus is:

- an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed;

OR

- if an intermediate outcome, process, structure, etc., there is **evidence** that supports the specific measure focus as follows:
  - Intermediate outcome – evidence that the measured intermediate outcome (e.g., blood pressure, Hba1c) leads to improved health/avoidance of harm or cost/benefit.
  - Process – evidence that the measured clinical or administrative process leads to improved health/avoidance of harm and
    if the measure focus is on one step in a multi-step care process, it measures the step that has the greatest effect on improving the specified desired outcome(s).
  - Structure – evidence that the measured structure supports the consistent delivery of effective processes or access that lead to improved health/avoidance of harm or cost/benefit.
  - Patient experience – evidence that an association exists between the measure of patient experience of health care and the outcomes, values and preferences of individuals/ the public.
  - Access – evidence that an association exists between access to a health service and the outcomes of, or experience with, care.
  - Efficiency – demonstration of an association between the measured resource use and level of performance with respect to one or more of the other five IOM aims of quality.

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2d. Clinically necessary measure exclusions are identified and must be:

- supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;

AND

- a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;

AND

- precisely defined and specified:
  - if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of cases excluded, exclusion rates by type of exclusion);

if patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately).

PCPI Performance Measure Testing Results – Heart Failure

The PCPI Testing Protocol outlines the comprehensive set of tests that should be conducted in different practice settings, using different data sources, for each performance measurement set. The PCPI recognizes that multiple testing projects will be needed to achieve the required test results for each measurement set. Moreover, testing and surveillance should be part of continued evaluation and updating of the measures.

This document presents results for the American College of Cardiology (ACC)/American Heart Association (AHA)/ PCPI Heart Failure Physician Performance Measures from the CMS PQRI program, the DOQ program, a peer-reviewed study, and the Cardio-HIT project.

1. Where are the measures used and what are the documented performance rates ?

Performance rates for individual measures are found to vary across the measure reporting and testing programs. This is expected, in that the performance rates are derived from different data sources, different practice sites, and variation in both the program implementation of the measures and approaches to implementation of the measures at individual practices or by the physicians in the practice sites included in the testing project. Variation in performance rates across practice sites suggests that the measure is able to differentiate among practices. In addition, no single relatively high value of performance for a measure should be used as an indication of that measure being "topped out", and hence no longer important or meaningful to measure.

PCPI #	**NQF endorsed (#)**	**Measure**	**CMS PQRI[1]** (years, data source, performance 2007, 2008)	**Performance CMS DOQ-IT** (2008) (performance mean)	**Performance Baker[2] (EHR-only v. hybrid)** (2007) (performance)	**PCPI Cardio-HIT Incubator Group[3]** (EHRs) (2009) (performance)	**PINNACLE Registry Multi Month Comparison** (2010) (performance)[4]	**Performance Persell[5] Quality Improvement System** (surrogate testing) (2007-2009)
HF-1	0079	Left ventricular function assessment		**85.48%**		**23.3%**	**64.7%**	
HF-2	0085	Weight measurement		**97.85%**		**54.4%**		
HF-3		Blood pressure measurement		**98.92%**		**81.7%**		
HF-4	0078	Assessment of Clinical Symptoms of Volume Overload (Excess)					**50.17%**	
HF-5	0077	Assessment of Activity Level						
HF-8	0083	Beta-blocker therapy	PQRI# 8 2007: **52.29%** claims 2008: **48.66%** claims	**86.34%**	**90.9% - 92.8%**		**88.81%**	**81.4% - 90.2%**
HF-9	0081	ACEI/ARB therapy	PQRI# 5 2007: **49.26%** claims 2008: **37.20%** claims	**80.38%**	**93.9% - 98.7%**		**79.48**%	**84.9% - 89.3%**
HF-10	0084	Warfarin therapy – patients with afib	n/a	**67.03%**	**70.4% - 93.6%**	**77.8%**		**66.7% - 85.3%**

Performance ranges found in the PINNACLE project are as follows:

Measure	25th percentile	Median	75th percentile	90th percentile	Mean (St Dev)
LVEF HF-1	42.5%	74.2%	92.7%	99.5%	66.2% (+/– 31.4%)
ACE/ARB HF-9	73.9%	81.9%	90%	92.7%	81.8% (+/- 8.8%)
BB HF-8	77.3%	89.5%	94.4%	98.9%	85.5% (+/- 11.9%)
Assessment HF 4-5	0.3%	72.6%	93.3%	100%	53.7% (+/- 41.3%)

What are the reported exception rates? (# patients with valid exceptions / (# patients in denominator)

It is expected that reported exception rates will vary across measures and across the measure reporting and testing programs. This is primarily due to differences in the types of measure (eg, medications versus screening), data sources examined in testing, variation among the practice sites where the measures were implemented, and the types and number of reasons included in the measure specification (ie, medical reason, patient reason, and system reason). Any one value for a reported exception rate, in of itself, should not be interpreted as indication of gaming or patient selection behavior.

	CMS PQRI 2007	CMS PQRI 2008	PCPI Cardio-HIT Incubator Group 2009
Beta-blocker therapy	**2.82%**	**0.0%***	**5.39%**
ACEI/ARB therapy	**5.81%**	**4.15%**	**6.17%**
Warfarin therapy	na	na	**5.26%**

*Unable to calculate.

2. **Which tests have been carried out in which settings or data sources?** Tests of feasibility/ implementation, reliability, validity, and unintended consequences conducted in a variety of practice settings including (eg solo practices, large practices, academic practices, safety-net practices, single- and multi-specialty groups).

Setting / Data Source	Medical Record (Gold Standard) (Paper or Electronic)	EHR Reporting	Registry	Administrative Data (single source)	Administrative Data (multiple sources)	Administrative Data Plus Clinical Data
Solo Practice	• Feasibility • Inter-Rater Reliability	• Feasibility • Parallel forms Reliability				
Specialty Practice	• Feasibility • Inter-Rater Reliability		• Feasibility • Parallel-forms Reliability			
Safety-net practice						
Academic Setting						
Community Setting						

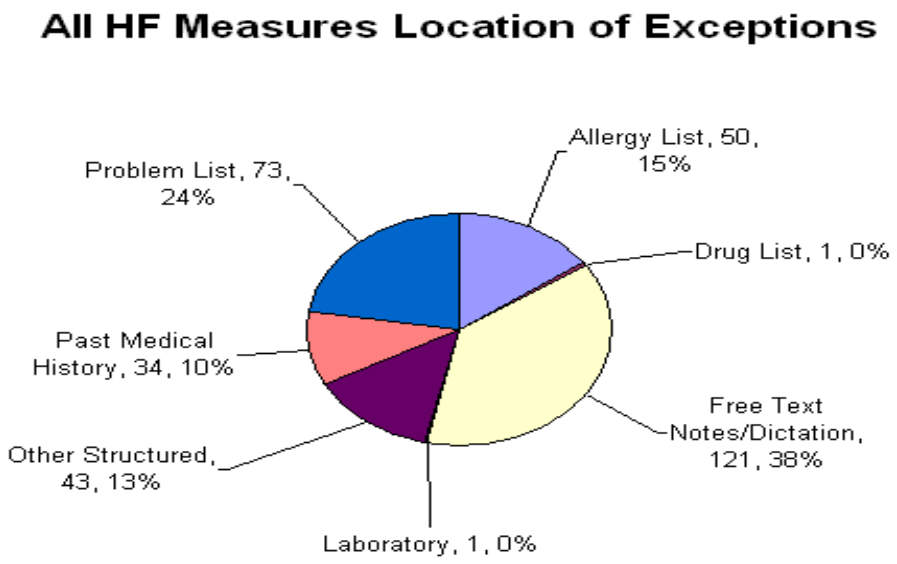
Feasibility Testing	**3. How confident are we that practices can accurately collect and report these measures in a sustainable fashion?** These measures have been tested and found to be generally feasible in EHR, paper, and claims data sources. Results from a study published by Persell, the AMA-sponsored Cardio-HIT project, and the CMS Doctors' Office Quality (DOQ) IT Project, as well as use in CMS's PGP Demonstration project and EHR demonstration project revealed that the heart failure measures are feasible to collect, as currently specified. The feasibility of a PCPI performance measure/measure set refers to: • Whether or not data are stored in a codified field • Which clinical codes sets are utilized/available • Where in the record the data are found • Necessary clarifications needed to implement the measure • Documentation of challenges to measure implementation • The extent to which clinical practices are able to interpret measure definitions and technical specifications, and a) integrate them into existing workflows and health information systems to collect, manage, and manipulate data elements; b) compute performance measures; and c) generate performance reports within a reasonable time frame and budget. **AMA PCPI Testing Project: Cardio-HIT** Data Source 5 physician offices with 5 different EHRS, in use for at least 4 years at time of project 13,985 eligible patients Methods Translated integrated measure specifications to data fields within practice EHRs Location of data (eg, problem list, medication summary) was recorded for data elements as well as whether or not the data was codified using a standard code set such as LOINC or SNOMED • Exported de-identified patient data to a warehouse for measure calculation -- successfully completed by all sites. • Location of exception data useful to inform EHR design, CDS design. Results • Each of the practice sites mapped the data elements required for each of the HF measures to their individual EHR and determined the additional system and work flow modifications required to integrate any additional data elements needed. • Since each practice had a unique set of data fields, individual mapping of the data elements at the practice level was required. Each EHR required the development of additional data fields in order to achieve the functionality required to query and report on all data elements for all measures. • An interface template was developed for each practice EHR which contains the unique set of data fields, validation requirements and acceptable values associated with ACC/AHA/PCPI measures. Using the interface template, each practice queried its EHR database to compile the data elements required for each measure. To assure consistent capture of data across a disperse set of EHR systems, the interface template identifies the submission of the prescribed coding system or standardized medical vocabulary as defined per the ACC/AHA/PCPI measure. • It was not required that each data element be sent to the data warehouse using a specific coding system or standardized coding language but rather that each site would determine what specificity of data was feasible based on the current structure of data in their EHR. The consensus of the Cardio-HIT team was to

provide industry accepted coded values (as identified by HITSP) if available. Examples include LOINC coding for lab tests, ICD for diagnoses and NDC for medications.

- In cases where the EHR was unable to support a medical vocabulary, an acceptable alternative was to substitute a "Y/N" value for those fields. For example, some sites were able to capture the prescription of a medication through the use of NDC codes but other sites determined that the use of Yes/No, medication prescribed (no CPT-II codes sent for medicaitons; CPT-II codes were sent for exceptions) was more feasible.

Percent of HF Exceptions Found in Codified Data

	Problem List	Past Medical History	Free Text Notes/ Dictation	Other Structured Text	Allergy List	Drug List	Laboratory
All 3 HF Measures: Beta Blocker, ACE/ARB, Warfarin	**24%**	**10%**	**38%**	**13%**	**15%**	**0%**	**0%**



Baker, et al. – EHRs

Observational study compared automated review of EHRs data with automated review followed by manual review of electronic notes for patients with apparent quality deficits (hybrid review).

- Performance based on automated review of EHRs data was similar to that based on hybrid review for the three drug-related measures studied, though performance was better in the hybrid review for all cases.
- For the warfarin measure, the hybrid review improved performance from 70.4% to 93.6%, primarily because contraindications to prescribing warfarin were not detected in the automated review.
- Failure to recognize contraindications to medications documented only in provider notes caused performance on medication-based quality measures to be underestimated.

Doctor's Office Quality (DOQ) Project

Data Source

National feasibility study, the CMS Doctors' Office Quality[6] (DOQ) Project

Methods

Reviewers assessed the feasibility of use of the ACC/AHA/PCPI measures in offices by performing retrospective audits of paper medical records and electronic health records

Results

The results revealed that 4 of the 6 measures studied from the HF set are feasible to collect, as currently specified. As part of the DOQ project, reviewers assessed the feasibility of use of the ACC/AHA/PCPI measures in offices by performing retrospective audits of paper medical records and electronic health records.

Limitations to feasibility were as follows:

DENOMINATOR IDENTIFICATION:

- ICD-9 coding was not sufficient in identifying patients with LVSD

NUMERATOR IDENTIFICATION:

- Left Ventricular Function Assessment, and Left Ventricular Function Testing
  - Site 1: Feasible with limitations.
    - LVSD data cannot be retrieved, but this functionality is expected with the new cardiology system being implemented
  - Site 2: Feasible
- Weight Measurement
  - Site 1: Feasible
  - Site 2: Feasible
- Blood Pressure Screening
  - Site 1: Feasible
  - Site 2: Feasible
- Beta Blocker Therapy
  - Site 1: Feasible with limitations.
    - The EHR currently stores results/interpretation as text only and not discrete values, and only indicates whether an order has been completed or not, but this additional functionality is expected with the new cardiology system being implemented
  - Site 2: not tested
- ACE inhibitor therapy
  - Site 1: Feasible with limitations.
    - The EHR currently stores results/interpretation as text only and not discrete values, and only indicates whether an order has been completed or not, but this additional functionality is expected with the new cardiology system being implemented
  - Site 2: not tested
- Warfarin Therapy for Patients with Afib
  - Site 1: Feasible
  - Site 2: Feasible

CMS PQRI –2008 –Claims

- Two HF measures, PQRI #5 and #8, were included in 2007 and 2008 PQRI..
- The rate of submissions accepted as appropriately coded were (2008):
  - Beta-blocker therapy for LVSD **77.30** %
    - **13.43** % of submissions were rejected due to an incorrect DX code
  - ACE inhibitor or ARB therapy for LVSD **67.57** %
    - **25.48** % of submissions were rejected due to an incorrect DX code
- Denominator mismatch rates (% rejected due to incorrect matching of quality code and denominator) were (2008):

- Beta-blocker therapy for LVSD **22.7** %
  - **13.43** % of submissions were rejected due to an incorrect DX code
- ACE inhibitor or ARB therapy for LVSD **32.43** %
  - **25.48** % of submissions were rejected due to an incorrect DX code

Pinnacle Registry Multi Month Comparison
Patient cohorts were created by analyzing one month of submissions to the PINNACLE registry. The first cohort is made up of encounters during October 2009 and the second cohort is made up of encounters during September 2010, made up of 22 and 23 practices, respectively, representing approximately 191 sites. There are 10,627 patient records in the first cohort and 11,692 patients in the second cohort, 83.9% of which are unique. Submissions to the registry are voluntary, and demonstrate feasibility by the number of records which were submitted.

Reliability Testing

4. How confident are we that the measures accurately and consistently assess the performance of physicians providing the care assessed in the measure?

Reliability is whether two abstractors, reviewing the same data from the same data source, would come to the same conclusion as to the patient meeting the measure, not meeting the measure, or qualifying as an exception.

Baker, et al. – EHRs
Inter-rater reliability was not conducted. Parallel forms reliability was conducted.
Baker, et al. did not calculate Kappa statistics for inter-rater reliability.

Cardio-HIT – Multi-site EHRs
Inter-rater reliability was not conducted. Parallel forms reliability was conducted.
Cardio-HIT did not calculate Kappa statistics for inter-rater reliability.

Doctor's Office Quality Pilot Project

Data Source:
2 practices sites with electronic health records
Methods
Abstractor responses were compared with "gold standard" responses determined by two abstractors familiar with the data definitions and who were responsible for abstractor training.
Results

Measure	Doctor's Office Quality (DOQ) Project (agreement %, Trial 1, Trial 2)
LVF Assessment Recorded	45 / 48 **94** % 4 / 4 **100** %
LVF Testing for Hospitalized Patients	30 / 48 **63** % 4 / 4 **100** %
Visits with Weights Recorded	449 / 464 **97** % 36 /455 **80** %
Visits with Blood Pressure Recorded	452 / 464 **97** % 36 / 45 **80** %
Beta-Blocker Therapy (with LVSD)	44 / 48 **92** % 4 / 4 **100** %
ACE Inhibitor Therapy (with LVSD)	45 / 48 **94** % 4 / 4 **100** %
Warfarin Therapy (with afib)	45 / 48 **94** % 4 / 4 **100** %

Measure reliability can also be tested by taking two comparable, independent samples from a set of data, and determining if the performance in both samples is not statistically different.

Pinnacle Registry Multi Month Comparison

Using these assumptions, then, PINNACLE analysts established two patient cohorts separated by eleven months. The first cohort is from October 2009 and the second patient cohort is from September 2010. Analysis of the two cohorts shows that 83.9% of the patients in the sample are primary cases and thus the cohorts contain sufficient uniqueness to assess the reliability of measures with a test-retest methodology. Furthermore, the HF population in each cohort presents consistently with near identical clinical descriptors, including the distribution of LVEF values [severely reduced (9.5%, 8.9%), moderately reduced (11.7%, 4.8%), mildly reduced (12.5%, 12.1%), normal (66.2%, 67.9%)] and New York Heart Association class [Class I (39.1%, 35.6%), Class II (41.8%, 43.3%), Class III (17.3%, 19.0%), Class IV (1.8%, 2.1%)].

Once the cohorts were defined, performance was calculated at the individual physician level and the practice level. These rates were then aggregated to calculate the mean and standard deviation by cohort. Means were compared using the independent sample t-test to demonstrate that it is not possible to reject the null hypothesis at the .05 level.

Note: A 2 tailed t-test was conducted. Because the p value is greater than the α level there is no significant difference between the measures of the two cohorts. Practice is the unit of measure for the t test. Some N's are unequal because a practice was missing one or more data elements needed to calculate the performance measure.

Measure	October 2009 Mean Performance (n, std dev)	September 2010 Mean Performance (n, std dev)	t	p	alpha	Statistically Different?
LVS Function Assessment	63.14% (22, 0.315)	64.70% (23, 0.316)	-0.166	0.869	0.05	No (p>alpha)
ACE or ARB for patients with LVSD	81.90% (21, 0.159)	79.48% (21, 0.210)	0.423	0.674	0.05	No (p>alpha)
Assessment of Clinical Symptoms of Volume Overload (Excess) AND Assessment of Activity Level	51.86% (22, 0.410)	50.17% (23, 0.431)	0.468	0.893	0.05	No (p>alpha)
Beta blocker therapy	83.86% (21, 0.156)	88.81% (21, 0.113)	1.180	0.245	0.05	No (p>alpha)

NOTE: n is measured at the level of practice sites

We interpret this finding to indicate the performance measure is reliable for the following reasons:

1. We have demonstrated that the two cohorts are largely unique, with 83.9% of the sample populations composed of non-overlapping patients.
2. We have also demonstrated that despite this uniqueness, the HF population attributes are highly consistent, as expected with large sample sizes and expected mean regression.
3. We have asserted based on experience and detailed registry analysis that absent major scientific change or aggressive PI or QI interventions, physician performance is both non-stochastic and consistent over time.
4. Thus, the fact that physician performance was statistically non-differentiable between the two cohorts indicates measure repeatability and hence reliability.

Measure Exceptions Validated

(and specific exception reasons documented to inform measure maintenance)

5. Are exceptions clinically appropriate and consistently documented?

Exceptions found for these measures were clinically appropriate.

AMA PCPI Testing Project: Cardio-HIT

Data Source

5 physician offices with 5 different EHRs, in use for at least 4 years at time of project
13,985 eligible patients

Methods

- Translated integrated measure specifications to data fields within practice EHRs
- Manual review of 5 EHRs compared to automated exporting of data to a data warehouse for measure calculation.
- Agreement was determined by comparing an exception that was reported to the data warehouse, which, upon manual abstraction of the EHRs, was confirmed to be appropriate when compared to an a priori list (predetermined list of medical, patient, or system reasons) developed by the clinical experts on the project team and review of clinical guidelines.

Results

- Reported exceptions were validated upon manual review of the medical record, against an a priori list generated by expert opinion. Measure exceptions were validated 95.32% of the time.
- Top medical exception reasons reported were:
  - Beta-blocker therapy: Lung/pulmonary contraindication was the exception reason for 31.04% of exceptions.
  - ACEI/ARB therapy: Renal contraindication was the medical exception reason for 66.36% of exceptions.
  - Warfarin therapy: Gastrointestinal tract contraindication was the exception reason for 20.41% of the exceptions.

All Exceptions – Weighted Data Abstraction Sample	Medical Reason	Clinical Contraindication	Drug Allergy	Drug Interaction	Drug Intolerance
Overall (n=306)	98.2%	85.23%	4.7%	0.0%	10.1%
Beta Blocker Therapy (n=118)	98.0%	74.7%	3.5%	0.0%	21.8%
ACE inhibitor/ARB Therapy (n=127)	99.5%	89.8%	5.9%	0.00%	4.2%
Warfarin Therapy (n=61)	96.1%	95.8%	4.2%	0.0%	0.0%

Beta Blocker Therapy Weighted Sample Data- All Exceptions		
Exceptions	Frequency (%) †	Frequency (n)
Adverse Reaction to Beta Blockers	5.66%	0.275
Doc. of bradycardia/< 50 bpm/correlation for NOT Rx beta-blockers	5.66%	0.275
End of Life Issues	6.47%	0.315
Fatigue	5.66%	0.275
Lung/Pulmonary	58.78%	2.860
Other doc. by pract. for not prescribing therapy	12.12%	0.590
Uncompensated CHF	5.66%	0.275

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure
Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

ACE Inhibitor or ARB Therapy Weighted Sample Data- All Exceptions

Exceptions	Frequency (%) †	Frequency (n)
Adverse reaction to ACE inhibitor or ARB therapy	3.61%	0.987
Allergy/intolerance (e.g., cough) to ACE inhibitor or ARB therapy	7.38%	2.018
End of Life Issues	3.72%	1.016
Hyperkalemia	3.72%	1.016
Hypotension	13.94%	3.811
Moderate or severe aortic stenosis subaortic stenosis	1.26%	0.343
Other doc. by pract. for not prescribing therapy	4.92%	1.345
Patient Refusal	9.02%	2.466
Renal	52.43%	14.331

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

Warfarin Therapy Weighted Sample Data- All Exceptions

Exceptions	Frequency (%) †	Frequency (n)
Bleeding Risk	6.54%	4.113
Dementia/advanced dementia	5.17%	3.248
End of life issues	6.76%	4.247
GI Tract	12.92%	8.123
Hematologic Abnormalities	5.82%	3.657
Hepatic/Liver	6.54%	4.113
Non-compliance with INR follow-up/medication management	0.50%	0.315
Other doc. by pract. for not prescribing therapy	23.62%	14.847
Other significant bleeding	8.54%	5.371
Patient Refusal	12.08%	7.596
Risk for Falls	11.51%	7.235

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

Location and Codification of Exceptions

	Allergy List		Drug List	
Measure	# Included	% Coded	# Included	% Coded
All HF Measures	46	4.35%	0	0.00%
Beta-blocker Therapy	14	7.14%	0	0.00%
ACE/ARB Therapy	19	5.26%	0	0.00%
Warfarin Therapy	13	0.00%	0	0.00%

	Free Text Notes/Dictation		Laboratory	
Measure	# Included	% Coded	# Included	% Coded
All HF Measures	126	11.11%	1	0.00%
Beta-blocker Therapy	39	12.82%	0	0.00%
ACE/ARB Therapy	46	6.52%	1	0.00%
Warfarin Therapy	41	14.63%	0	0.00%

Measure	Other Structured		Past Medical History	
	# Included	% Coded	# Included	% Coded
All HF Measures	45	17.78%	31	9.68%
Beta-blocker Therapy	15	20.00%	13	0.00%
ACE/ARB Therapy	17	11.76%	10	10.00%
Warfarin Therapy	13	23.08%	8	25.00%

Measure	Problem List		TOTAL
	# Included	% Coded	
All HF Measures	75	86.67%	324
Beta-blocker Therapy	23	91.30%	104
ACE/ARB Therapy	32	93.75%	125
Warfarin Therapy	20	70.00%	95

Top Medical Reasons for Exceptions –Beta Blocker Therapy (Weighted Sample Data)

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Adverse Reaction to Beta Blockers	5.13%	6.029		
Allergy List			6.029	0.00%
Doc. of bradycardia/< 50 bpm/correlation for NOT Rx beta-blockers	11.00%	12.931		
Allergy List			1.381	0.00%
Discharge Sumary			1.381	0.00%
Free Notes			5.522	0.00%
Past Medical History			2.761	0.00%
Problem List			1.887	100.00%
End of Life Issues	1.17%	1.381		
Free Text			1.381	0.00%
Fatigue	17.82%	20.947		
Allergy List			0.994	0.00%
Assessment List			2.761	0.00%
Free Text			8.403	0.00%
Past Medical History			2.761	0.00%
Problem List			4.648	70.30%
Stress Test			1.381	0.00%
History of 2nd or 3rd Degree AV block without permanent pacemaker	4.37%	5.135		
Consultation			0.994	0.00%
Free Text			1.381	100.00%
Problem List			2.761	100.00%
Hypotension	17.84%	20.967		
Allergy List			1.381	0.00%
ED notes			1.887	0.00%
Free Text			12.177	0.00%
Past Medical History			2.761	0.00%
Problem List			2.761	100.00%
Lung/Pulmonary	31.04%	36.490		
Allergy List			2.761	50.00%
Assessment List			3.368	59.01%
Free Text			8.642	34.72%

Past Medical History			9.277	0.00%
Problem List			12.443	88.90%
Other doc. by pract. for not prescribing therapy	10.03%	11.790		
Allergy List			5.135	0.00%
Assessment List			0.994	100.00%
Free Text			4.280	0.00%
Problem List			1.381	100.00%
Uncompensated CHF	1.61%	1.887		
Discharge Summary			0.506	0.00%
H&P			1.381	0.00%
† Frequencies are given as a percent of the total number of Medical Exceptions for this measure				

Top Medical Reasons for Exceptions – ACE Inhibitor or ARB Therapy (Weighted Sample Data)

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Adverse reaction to ACE inhibitor or ARB therapy	4.30%	5.483		
Allergy List			5.483	0.00%
Allergy/intolerance (e.g., cough) to ACE inhibitor or ARB therapy	3.58%	4.557		
Allergy List			4.139	0.00%
Free Text			0.418	0.00%
End of Life Issues	1.02%	1.302		
Free Text			1.302	0.00%
Hyperkalemia	9.61%	12.241		
Allergy List			1.995	0.00%
Discharge Summary			1.344	0.00%
Free Text			6.214	0.00%
Lab			1.344	0.00%
Problem List			1.344	100.00%
Hypotension	8.34%	10.622		
Discharge Summary			1.344	0.00%
Free Text			9.278	0.00%
Moderate or severe aortic stenosis subaortic stenosis	1.89%	2.413		
Past Medical History			0.418	0.00%
Problem List			1.995	67.38%
Other doc. by pract. for not prescribing therapy	4.90%	6.240		
Allergy List			2.795	0.00%
Free Text			3.445	0.00%
Renal	66.36%	84.542		
Allergy List			4.758	28.25%
Assessment List			11.172	0.00%
Discharge Summary			2.832	22.98%
Free Text			25.394	18.44%
H&P			0.418	0.00%
Past Medical History			10.167	13.22%
Problem List			29.801	97.82%
† Frequencies are given as a percent of the total number of Medical Exceptions for this measure				

Top Medical Reasons for Exceptions – ACE Inhibitor or Warfarin Therapy

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Allergy or intolerance	3.01%	1.850		
Allergy List			1.850	0.00%
Bleeding Risk	6.30%	3.871		
Free Text Notes/Dictation			3.255	0.00%
Problem List			0.617	0.00%
Dementia/advanced dementia	2.64%	1.624		
Free Text Notes/Dictation			1.173	61.60%
Problem List			0.451	0.00%
End of life issues	1.91%	1.173		
Free Text Notes/Dictation			1.173	0.00%
GI Tract	20.41%	12.534		
Allergy List			1.233	0.00%
Free Text Notes/Dictation			5.058	37.48%
H&P			0.451	0.00%
Past Medical History			2.598	32.66%
Problem List			3.195	73.44%
Hematologic Abnormalities	20.13%	12.362		
Assessment List			3.394	0.00%
Free Text Notes/Dictation			2.996	43.36%
H&P			0.451	0.00%
Past Medical History			0.451	0.00%
Problem List			5.070	91.11%
Hepatic/Liver	8.82%	5.416		
Assessment List			1.697	50.00%
Free Text Notes/Dictation			0.849	0.00%
Problem List			2.870	54.74%
Non-compliance with INR follow-up/medication management	1.38%	0.849		
Free Text Notes/Dictation			0.849	0.00%
Other doc. by pract. for not prescribing therapy	5.74%	3.527		
Allergy List			2.062	0.00%
Free Text Notes/Dictation			1.465	0.00%
Other significant bleeding	14.43%	8.863		
Free Text Notes/Dictation			7.239	6.22%
Past Medical History			0.901	50.00%
Problem List			0.723	100.00%
Risk for falls	15.22%	9.346		
Allergy List			2.466	0.00%
Assessment List			0.849	0.00%
Discharge Summary			0.451	0.00%
Free Text Notes/Dictation			5.130	16.54%
Past Medical History			0.451	0.00%

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Comparison of Data Sources *Note: in these projects it is recommended to always compare the secondary data source to the current gold standard of manual abstraction of the medical record.	**6. Is measure collection from different data sources comparable? How does automated measure calculation compare to manual measure abstraction?** **AMA PCPI Testing Project: Cardio-HIT** Data Source 5 physician offices with 5 different EHRs, in use for at least 4 years at time of project 13,985 eligible patients Methods • Translated integrated measure specifications to data fields within practice EHRs • Accuracy of heart failure data elements were verified by comparing automated measure abstraction and calculation against manual abstraction of an EHRs • For three samples of patients, researchers completed a manual review of each patient's electronic chart o Sample 1: patients who appeared to meet the numerator of the quality measure o Sample 2: patients who appeared to fail the quality measure (did not meet numerator nor have exception) o Sample 3: patients who appeared to not meet the numerator and have an exception to the quality measure Results Performance rates calculated automatically by the data warehouse compared to the rates of performance, opportunities for improvement and misclassification rates determined with manually abstracted data samples. • Automated review alone: Overall performance for the three measures was 76.84% and varied among the measures: ▪ Beta-blocker therapy: 86.34% ▪ ACEI/ARB therapy: 80.38% ▪ Warfarin therapy: 67.03% • Manual review alone: 22.35% of the cases were identified as failing to meet the measure (opportunities for improvement): ▪ Beta-blocker therapy: 9.30% ▪ ACEI/ARB therapy: 19.53% ▪ Warfarin therapy: 27.69% • Discrepancies between performance measures based on EHRs automated review alone and those based on automated review plus manual review were due to two types of misclassification: ▪ identify performance among true, eligible patients ▪ failure to correctly exclude patients • The overall rate of misclassification in the automatic calculation (identified from manual review) was 10.23% and varied across the measures: ▪ Beta-blocker therapy: 22.35% ▪ ACEI/ARB therapy: 14.34% ▪ Warfarin therapy: 4.54% **7. If automated reporting identifies a patient as meeting the measure, what likelihood is there that manual review will validate that finding?** Patient samples from populations identified by the automated reporting as Measure Mets, Opportunities for Improvement or Exceptions were validated upon manual review of the medical record for the six HF measures

Measure Mets

- Automated review: 89.90% of patients met the numerator
  - Left ventricular function: 85.48%
  - Weight measurement: 97.85%
  - Blood pressure screening: 98.92%
  - Beta-blocker therapy: 86.34%
  - ACEI/ARB therapy: 80.38%
  - Warfarin therapy: 67.03%
- Upon manual validation of the patient sample: 82.88% met the numerator
  - Left ventricular function: 59.57%
  - Weight measurement: 88.35%
  - Blood pressure screening: 98.53%
  - Beta-blocker therapy: 95.82%
  - ACEI/ARB therapy: 75.52%
  - Warfarin therapy: 80.21%

Opportunities for Improvement

- Automated review: 9.96% of patients were opportunities for improvement
  - Left ventricular function: 14.52%
  - Weight measurement: 2.15%
  - Blood pressure screening: 1.08%
  - Beta-blocker therapy: 12.93%
  - ACEI/ARB therapy: 18.41%
  - Warfarin therapy: 31.24%
- Upon manual validation of the patient sample 44.14% of the opportunities for improvement remained opportunities for improvement
  - Left ventricular function: 65.12%
  - Weight measurement: 77.85%
  - Blood pressure screening: 59.63%
  - Beta-blocker therapy: 9.30%
  - ACEI/ARB therapy: 19.53%
  - Warfarin therapy: 27.69%
- Upon manual validation of the above patient sample
  - 34.31% were found to meet the numerator of the measure
  - 16.37% were found to have an exception
  - 5.18% were found to meet the numerator and had an exception

Exceptions (only the 3 drug measures reported exceptions)

- Automated review: 5.57% of patients had an exception
  - Beta-blocker therapy: 5.39%
  - ACEI/ARB therapy: 6.17%
  - Warfarin therapy: 5.26%
- Upon manual validation of the exception patient sample, the overall agreement rate was 94.05%
  - Beta-blocker therapy: 84.20%
  - ACEI/ARB therapy: 100.00%
  - Warfarin therapy: 95.66%

8. Are the individual parts of the measure (numerator, denominator, exceptions) reliably calculated, as compared to the overall measure?

Over the 3 drug measures analyzed, the agreement rates were:

- Numerator: 76.84%
- Denominator: 94.43%
- Exception: 66.19%
- Overall: 72.18%

9. What proportion of patients that met the measure are correctly identified?

Sensitivity: 74.75%

10. What proportion of patients that do not meet the measure are correctly identified?

AMA PCPI Testing Project: Cardio-HIT

Specificity: 70.10%

Patients Automatically Identified as Exceptions	Agreement			
Measure	Mean Rate	S.E.	95% C.I.	N
All HF Measures	87.312%	2.026%	83.16%, 91.47%	270
Beta-blocker Therapy	76.221%	3.839%	68.29%, 84.15%	123
ACE/ARB Therapy	97.793%	1.506%	94.32%, 100%	95
Warfarin Therapy	94.384%	3.198%	87.15%, 100%	52

Patients Automatically Identified as Opportunities for Improvement	Agreement				
Measure	Mean Rate	S.E.	95 % C.I.	N - num	N - den
All HF Measures	44.14%	2.17%	39.80% ,48.48%	232	526
Left Ventricular Function	65.12%	3.32%	58.38% ,71.87%	134	206
Weight Measurement	77.85%	7.20%	62.25% ,93.46%	26	33
Blood Pressure Screening	59.63%	10.46%	36.87% ,82.40%	13	22
Beta-blocker Therapy	9.30%	4.13%	0.18% ,18.41%	5	49
ACE/ARB Therapy	19.53%	4.89%	9.18% ,29.87%	13	66
Warfarin Therapy	27.69%	3.66%	20.18% ,35.21%	41	149

False Positive Opportunities for Improvement - Numerator Actually Met					
Measure	Mean Rate	S.E.	95% C.I.	N - num	N - den
All HF Measures	34.31%	2.07%	30.16% ,38.46%	180	526
Left Ventricular Function	34.88%	3.32%	28.13% ,41.62%	72	206
Weight Measurement	7.53%	4.57%	0.00% ,18.00%	3	33
Blood Pressure Screening	40.37%	10.46 %	17.605% ,63.13%	9	22
Beta-blocker Therapy	59.06%	7.00%	44.34% ,73.79%	29	49
ACE/ARB Therapy	31.88%	5.75%	19.86% ,43.91%	21	66
Warfarin Therapy	31.47%	3.80%	23.68% ,39.26%	47	149
Left Ventricular Function	34.31%	2.07%	30.16% ,38.46%	180	526

Measure	Mean Rate	S.E.	95% C.I.	N - num	N - den
All HF Measures	16.37%	1.61%	13.12% ,19.63%	86	526
Left Ventricular Function	0.00%	0.00%	0.00%, 0.24%	0	206
Weight Measurement	14.62%	6.12%	1.12% ,28.11%	5	33
Blood Pressure Screening	0.00%	0.00%	0.00%, 2.27%	0	22
Beta-blocker Therapy	9.30%	4.13%	0.18% ,18.41%	5	49
ACE/ARB Therapy	34.25%	5.85%	22.02% ,46.49%	23	66
Warfarin Therapy	36.30%	3.94%	28.25% ,44.35%	54	149
Left Ventricular Function	16.37%	1.61%	13.12% ,19.63%	86	526

EHR "In Silo" Verification

Note: initially this may be of limited usefulness until EHR functionality and use progresses

11. Can EHR products reliably identify data elements and calculate these measures?

A "dummy" data set of patient data will be provided to several EHR vendors along with EHR measure specifications. The vendors will use this test file to determine if their system can reliably calculate the measures based on intended documentation patterns.

This test has not yet been performed for this measure set.

Predictive Validity

12. Does high performance on these measures lead to better patient outcomes?

If the scientific evidence regarding the process of care is strong and widely accepted in the field, no formal evaluation of predictive validity is necessary. If the evidence is less strong, however, it is desirable to show that high performance leads to better patient outcomes.

This test has not yet been performed for this measure set. It should be noted that the Persell study shows that targeted QI projects can improve performance on the process measures.

Unintended Consequences

13. Have monitoring and testing uncovered unexpected consequences of measurement?

Testing should be performed for anticipated unintended consequences. Unanticipated unintended consequences should be monitored for on a long term basis as they may only occur in later stages and widespread adoption.
This test has not yet been performed for this measure set.

Project Descriptions

Doctor's Office Quality Pilot Project

Data was captured at two large physician practice groups who use two distinct EHR systems. The study population of group 1 was their fee-for service Medicare patients. The study population was all non-Medicare patients for Group 2. Once the DOQ clinical measures were developed, the practices were given technical specifications to use to capture the quality measures from their EHR system. Feasibility was assessed for all measures, and some measures were implemented.

Baker, et al (EHRs-only v. hybrid)

The objective of the study was to evaluate the accuracy of an automated system that used EHRs data and specifications from national organizations to measure quality of care for outpatients with heart failure. The research was designed as an observational study comparing success rates on quality measures based on automated review of EHRs data compared to automated review followed by manual review of physician notes for apparent failures (hybrid review).
A single site setting at an academic general internal medicine clinic with several years experience using a commercial EHRs. The researchers measured the left ventricular ejection fraction (LVEF), prescription of a beta blocker and an angiotensin converting enzyme

inhibitor (ACEI) for patients with left ventricular systolic dysfunction (LVEF < 0.40), and prescription of warfarin for patients with comorbid atrial fibrillation.
Adult patients, 517 records, with a qualifying ICD-9 diagnosis of heart failure and two or more clinic visits over the last 18 months. Success rates based only on automated review of EHRs data versus hybrid review were similar for LVEF measurement (94.6% vs. 97.3%) and beta blocker prescription (90.9% vs. 92.8%). However, success rates based on automated review of EHRs data were substantially lower than hybrid review for prescription of ACEI (93.9% vs. 98.6%) and warfarin for atrial fibrillation (70.4% vs. 93.5%).
The studied concluded that using EHRs data alone to measure quality remains problematic because exclusion criteria are often documented only in physicians' notes. EHRs vendors and national quality organizations should collaboratively develop systems to facilitate collection of the data required to routinely assess quality of care.

Cardio-HIT Project

The AMA received funding for Phase II of the Cardio-HIT project from the Agency for Healthcare Research and Quality (AHRQ). The AMA in collaboration with five (5) physician practice sites, the Iowa Foundation for Medical Care, and the National Committee for Quality Assurance, conducted a 2-year, observational study of exception reporting, building on the prior work under Cardio-HIT, a research collaborative of six (6) EHRs-enabled independent group practices that collected data and reported on nationally recognized physician performance measures for coronary artery disease and heart failure.
In Cardio-HIT Phase II, we: (1) empirically documented the prevalence and patterns of exception reporting in these measures; (2) assessed the feasibility and accuracy of exception reporting by validating a sample of reported exceptions against manual EHRs record review; and (3) analyzed and addressed stakeholder perspectives on exception reporting to refine existing principles in the design of physician performance measures.

Pinnacle Registry Multi Month Comparison

Two cohorts of patient encounters for patients aged 18 years and older with a diagnosis of heart failure were created by analyzing two distinct months of data submissions to the PINNACLE Registry™. The first cohort is made up of encounters during October 2009 and the second cohort is made up of encounters during September 2010, made up of 22 and 23 practices, respectively, representing approximately 191 sites. There are 10,627 patient records in the first cohort and 11,692 patients in the second cohort, 83.9% of which are unique.
Overview
Assessing the reliability of measures in large scale electronic databases being sourced by disparate EHR systems requires the application of novel techniques. While we expect coding for commonly used data elements to become more standardized in the medium to long term, the proliferation of EHR vendors and the predisposition toward practice-level customization precipitated by stimulus funding has only exacerbated the variation in electronic documentation in the short term. As a result, registries like PINNACLE must rely on a layered normalization and data quality approach to ensure reliability. PINNACLE presently applies four layers of quality control: 1) custom data mapping with multi-iteration, multi-stakeholder validation, 2) a formal Data Quality Report utility and tight XSD schema, and 3) continuous aggregate data quality review. In addition, for the purposes of this application, PINNACLE analysts have applied statistical sampling techniques (described below) to replicate at scale (tens of thousands of records) more traditional, small scale chart audits.

Custom Data Mapping with Multi-Iteration, Multi-Stakeholder Validation
The System Integration technology employed by the PINNACLE Registry is partially automatic and partially manual. The automatic portions of the process rely on standard data maps that correspond with the data structure of individual EHR products and versions. Relatively straightforward data elements, such as date of birth and heart failure diagnosis, are

generally structured consistently across practices with similar EHRs and can thus be identified and mapped automatically with software. More complex or less common elements, NYHA class for example, must be identified and mapped manually. This process relies on clinical and technical experts from the practice working with PINNACLE project managers and engineers to locate, and potentially normalize, the relevant data element. While potentially time consuming, this process ensures that multiple, highly-trained stakeholders (providers, practice technologists, PINNACLE project managers, engineers, and clinical staff) are reviewing and concurring on the accuracy of the data maps.
Furthermore, at multiple stages during the integration process practices and providers are reviewing both raw data pulls and calculated performance measures on test data extracts, full data extracts, and production extracts. Only after mapping is completed and the practice and PINNACLE staff have signed off on the accuracy of the data maps is the system placed into production.

Data Quality Report utility and XSD Schema
Production-level data extraction occurs on a massive scale. Initial production data extracts to generate baseline performance in the registry for even a single large practice can number in the hundreds of thousands of patient encounters. More routine monthly and quarterly extracts can generate thousands, or even tens of thousands, of encounters per practice. At that volume, human validation of inbound data quality is impossible. Instead PINNACLE deploys a two layered automated data quality validation process. The first layer is a data quality utility, called the DQR, which applies 65 unique tests to inbound data. These tests include valid range checks, parent child relationships, data completeness, and coding accuracy. The utility then generates a report alerting PINNACLE engineers, EHR vendors, or sometimes the practices themselves, to data errors. Depending on the scale of error, files may either be rejected in their entirety for revision and re-submittal or individual records may be segregated from the data load. After the file clears the DQR it must then pass a final XSD validation before being loaded into the data warehouse for production reporting.

Continuous Aggregate Data Quality Review
Once data has been calculated and aggregated at the practice and national level it then becomes possible and appropriate to reapply human scrutiny to data quality and measure reliability management. PINNACLE employs highly skilled professional assets, including the former chief data quality analyst for the 2010 United States Census, to be continuously reviewing and evaluating the accuracy of PINNACLE's reporting. In addition to evaluating data completeness, PINNACLE data quality resources also monitor inter- and intra-practice and provider, as well as inter-temporal, performance variability. PINNACLE is now of sufficient maturity that patterns in provider and practice level performance can be quickly interpreted to indentify 1) failures in data mapping, 2) failures in physician documentation (especially exclusion documentation), and 3) accurate assessments of performance.

Statistical Sampling Techniques for Assessment of Measure Reliability
Due to the scale of the PINNACLE Registry, as well as a series of outstanding methodological questions as to the value of EHR chart audits for validating information that was extracted from the same electronic source data, PINNACLE has not conducted such analyses. Instead, PINNACLE analysts use the scale of the registry itself to create smaller sample cohorts to assess the reliability and stability of measures. This approach requires certain assumptions, which we believe have prima facie validity and are confirmed from large scale analysis of the registry. The assumptions are as follows:
1. Physician performance is non-stochastic over time
2. Physician performance is statistically stable over modest time intervals absent exogenous shocks (i.e. major new scientific findings or direct performance improvement interventions)
3. At large patient population sizes, independent AF populations present consistently and

	normally **Persell, et al (Quality Improvement System)** This study was a time series analysis at a large internal medicine practice using a commercial EHR. Subjects included all adult patients eligible for each measure (range approximately 100-7500 patients). Measures included were modified versions of the national measures, which were updated to allow for extraction from the EHR and local workflow patterns. During the year before the intervention, performance improved significantly for 14 measures. Implementation of a multifaceted QI intervention using EHR tools to improve quality measurement and the accuracy and timeliness of clinician feedback improved performance and/or accelerated the rate of improvement for multiple measures simultaneously. For some measures clinical care changed, and for others, documentation was improved.

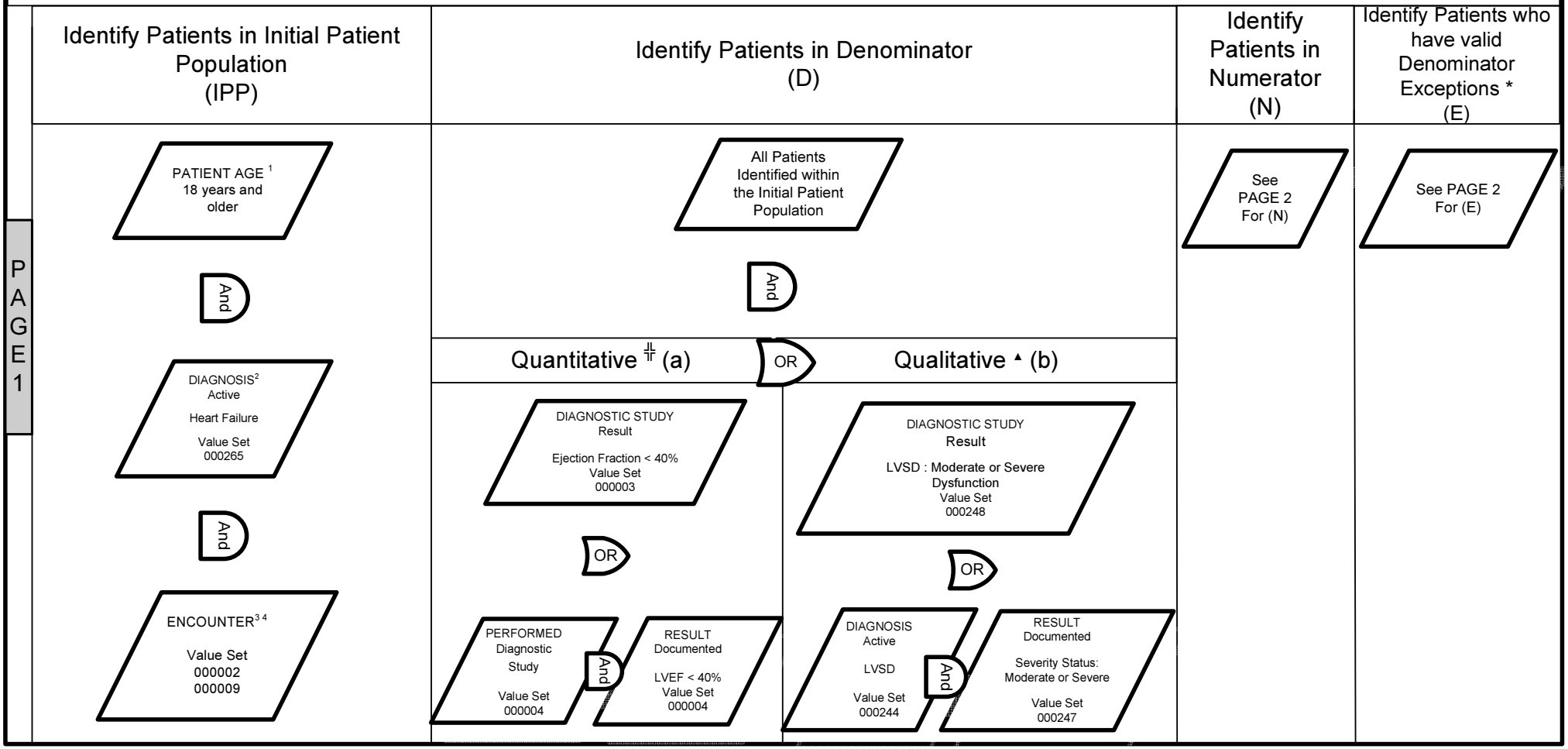
Clinical Topic	Heart Failure
Measure Title	**Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction**
Measure #	**PCPI HF-7 / NQF 0081 / PQRI 5**
Measure Description	Percentage of patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% who were prescribed ACE inhibitor or ARB therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge
Measurement Period	Twelve consecutive months
Initial Patient Population	Patient Age: Patients aged 18 years and older before the start of the measurement period Diagnosis Active: Patient has a diagnosis of Heart Failure before or simultaneously to encounter date Encounter: At least two visits (or at least one inpatient discharge) with the physician, physician's assistant, or nurse practitioner during the measurement period
Denominator Statement	All patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% *NOTE: LVEF < 40% corresponds to qualitative documentation of moderate dysfunction or severe dysfunction*
Numerator Statement	Patients who were prescribed* ACE inhibitor or ARB therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge *Prescribed may include 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
Denominator Exceptions	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, not indicated, contraindicated, other medical reason) Documentation of patient reason(s) for not prescribing ACE inhibitor or ARB therapy (eg, patient declined, social, religious, other patient reason) Documentation of system reason(s) for not prescribing ACE inhibitor or ARB therapy (eg, resources to perform the services not available, insurance coverage, other reason attributable to health care delivery system)

Measure Logic for Heart Failure: Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction

Measure Description: Percentage of patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% who were prescribed ACE inhibitor or ARB therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge

Measurement Period: 12 consecutive months

PCPI # HF-7 / NQF # 0081 / PQRI # 5



PARAMETER SPECIFICATIONS (Value Sets are found in the Coding Appendices):

IPP: [1] Patient Age: 18 years and older before the start of measurement period; [2]Diagnosis Active: before or simultaneously to encounter date; [3] Encounter, Value Set 000002-≥ to 2 visits during measurement period; [4] Encounter, Value Set 000009-at each hospital discharge during the measurement period;

D: All in (D) occurring before or simultaneously to measurement period;

╬The results will be documented as numerical values represented as a percentage

▲ Qualitative results correspond to numeric equivalents as follows (Crosswalk):
Hyperdynamic: corresponds to LVEF greater than 70%
Normal: corresponds to LVEF 50% to 70% (midpoint 60%)
Mild dysfunction: corresponds to LVEF 40% to 49% (midpoint 45%)
Moderate dysfunction: corresponds to LVEF 30% to 39% (midpoint 35%)
Severe dysfunction: corresponds to LVEF less than 30%

Measure Logic for Heart Failure: Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction

Measure Description: Percentage of patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% who were prescribed ACE inhibitor or ARB therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge

Measurement Period: 12 consecutive months

PCPI # HF-7 / NQF # 0081 / PQRI # 5

PAGE 2

Identify Patients in Initial Patient Population (IPP)	Identify Patients in Denominator (D)	Identify Patients in Numerator (N)	Identify Patients who have valid Denominator Exceptions * (E)
See PAGE 1 For (IPP)	See PAGE 1 For (D)	All Patients Identified within the Denominator And MEDICATION Prescribed [5] ACE or ARB Therapy Value Set 000008	All Patients Identified within the Denominator And Not All Patients identified within the Numerator And MEDICATION Allergy [6] Value Set 000008 OR MEDICATION Intolerance [7] Value Set 000008 OR MEDICATION Adverse effects [8] Value Set 000008 OR MEDICAL EXCEPTION [9] Value Set 000160 000263 000213 000264 000250 000249∞ OR PATIENT EXCEPTION [10] Value Set 000174 000212 OR SYSTEM EXCEPTION [11] Value Set 000200

PARAMETER SPECIFICATIONS (Value Sets are found in the Coding Appendices):

N: [5] Medication, Prescribed-active or ordered during the measurement period;

E: [6,7,8,10,11] in (E) occurring before or simultaneously to measurement period; [9] Medical Exception-value sets 000160, 000213, 000250, 000263 occurring before or simultaneously to measurement period and 000264, 000249 occurring during measurement period; [6,7,8] Medication Allergy, Intolerance, Adverse Effects-the Value Set listed references the medications to which the allergy, intolerance or adverse effect exist;

* Coded examples are NOT intended to be an exhaustive list. Exceptions will vary for each patient and situation.

∞ Medical Exception, Azotemia: only applicable to Encounter Inpatient Value Set 000009;

Basic Measure Calculation:

$$\frac{(N)}{(D) - (E)} = \%$$

The PCPI strongly recommends that exception rates also be computed and reported alongside performance rates as follows:

Exception Calculation:

$$\frac{(E)}{(D)} = \%$$

Exception Types:
E= E1 (Medical Exceptions) + E2 (Patient Exceptions) + E3 (System Exceptions)
For patients who have more than one valid exception, only one exception should be be counted when calculating the exception rate

Initial Patient Population (IPP)	Denominator (D)	Numerator (N)	Denominator Exceptions (E)
Definition: The initial patient population identifies the general group of patients that the performance measureis designed to address; usually focused on a specific clinical condition (e.g., coronary artery disease, asthma). For example, a patient aged 18 years and older with a diagnosis of CADwho has at least 2 Visits during the measurement period.	**Definition:** The denominator defines the specific group of patients for inclusion in a specific performance measure based on specific criteria (e.g., patient's age, diagnosis, prior MI). In some cases, the denominator may be I dentical to the initial patient population.	**Definition:** The numerator defines the group of patients in the denominator for whom a process or outcome of care occurs (e.g., flu vaccine received).	**Definition:** Denominator exceptions are the valid reasons why patients who are included in the denominator population did not receive a process or outcome of care (described in the numerator). Patients may have Denominator Exceptions for medical reasons (e.g., patient has an egg allergy so they did not receive flu vaccine); patient reasons (e.g., patient declined flu vaccine); or system reasons (e.g., patient did not receive flu Vaccine due to vaccine shortage). These cases are removed from the denominator population for the performance calculation, however the number of patients with valid exceptions should be calculated and reported. This group of patients constitutes the Denominator Exception reporting population – patients for whom the numerator was not achieved and a there is a valid Denominator Exception.
Find the patients who meet the Initial Patient Population criteria (IPP)	Find the patients who qualify for the denominator (D): ○ From the patients within the Patient Population criteria (IPP) select those people who meet Denominator selection criteria. (In some cases the IPP and D are identical).	Find the patients who qualify for the Numerator (N): ○ From the patients within the Denominator (D) criteria, select those people who meet Numerator selection criteria. ○ Validate that the number of patients in the numerator is less than or equal to the number of patients in the denominator	From the patients who did not meet the Numerator criteria, determine if the patient meets any criteria for the Denominator Exception (E1 + E2+E3). If they meet any criteria, they should be removed from the Denominator for performance calculation. As a point of reference, these cases are removed from the denominator population for the performance calculation, however the number of patients with valid exceptions should be calculated and reported.

AMA - PCPI Level I EHR Specifications
Heart Failure - ACE/ARB Therapy for LVSD (HF-7)

value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.01	MAL HYP HRT DIS W HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.11	BEN HYP HRT DIS W HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.91	HYP HRT DIS NOS W HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.01	MAL HYP HRT/REN DIS W HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.03	MAL HYP HRT/REN DIS W HF&RF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.11	BEN HYP HRT/REN DIS W HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.13	BEN HYP HRT/REN DIS W HF&RF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.91	HYP HRT/REN DIS W HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.93	MAL HYP HRT/REN DIS W HF&RF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.0	CHF NOS
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.1	LEFT HEART FAILURE
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.20	SYSTOLIC HRT FAILURE NOS
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.21	AC SYSTOLIC HRT FAILURE
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.22	CHR SYSTOLIC HRT FAILURE
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.23	AC ON CHR SYSTOLIC HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.30	DIASTOLC HRT FAILURE NOS
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.31	AC DIASTOLIC HRT FAILURE
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.32	CHR DIASTOLIC HRT FAIL
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.33	AC ON CHR DIASTOLIC HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.40	SYSTOLIC/DIASTOLIC HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.41	AC SYSTOLIC/DIASTOLIC HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.42	CHR SYSTOLIC/DIASTOLIC HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.43	AC/CHR SYSTOLIC/DIASTOLIC HF
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.9	HEART FAILURE NOS
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I11.0	Hypertensive heart disease with heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I13.0	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I13.2	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.1	Left ventricular failure/Cardiac asthma
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.20	Unspecified systolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.21	Acute systolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.22	Chronic systolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.23	Acute on chronic systolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.30	Unspecified diastolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.31	Acute diastolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.32	Chronic diastolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.33	Acute on chronic diastolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.40	Unspecified combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.41	Acute combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.42	Chronic combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.43	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.9	Heart failure, unspecified / Biventricular (heart) failure NOS

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	364006	acute left-sided heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5053004	cardiac insufficiency due to prosthesis (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5148006	hypertensive heart disease with congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5375005	chronic left-sided congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10091002	high output heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10335000	chronic right-sided heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10633002	acute congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	13839000	Bernheim's syndrome (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	25544003	low output heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	33644002	postvalvulotomy syndrome (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	42343007	congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	43736008	rheumatic left ventricular failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	44313006	right heart failure secondary to left heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	46113002	hypertensive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	48447003	chronic heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	56675007	acute heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	60856006	cardiac insufficiency following cardiac surgery (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	66989003	chronic right-sided congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	74960003	acute left-sided congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	77737007	benign hypertensive heart disease with congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	80479009	acute right-sided congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	82523003	congestive rheumatic heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	83105008	malignant hypertensive heart disease with congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	84114007	heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	85232009	left heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	88805009	chronic congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	92506005	biventricular congestive heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	90727007	pleural effusion due to congestive heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	111283005	chronic left-sided heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	128404006	right heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194767001	benign hypertensive heart disease with congestive cardiac failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194779001	hypertensive heart and renal disease with (congestive) heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194781004	hypertensive heart and renal disease with both (congestive) heart failure and renal failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195111005	Decompensated cardiac failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195112003	compensated cardiac failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195114002	acute left ventricular failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	206586007	congenital cardiac failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	233924009	heart failure as a complication of care (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	277639002	sepsis-associated right ventricular failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	314206003	refractory heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	359617009	acute right-sided heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	359620001	acute right heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	367363000	right ventricular failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	410431009	cardiorespiratory failure (disorder)

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	417996009	systolic heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	418304008	diastolic heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	424404003	decompensated chronic heart failure (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426012001	right heart failure due to pulmonary hypertension (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426263006	congestive heart failure due to left ventricular systolic dysfunction (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426611007	congestive heart failure due to valvular disease (disorder)
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	441481004	chronic systolic heart failure
000265	HF	7	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	441530006	chronic diastolic heart failure
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99201	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99202	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99203	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99204	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99205	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99212	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99213	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99214	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99215	
000009	HF	7	IPP	Encounter-Inpatient Discharge	Encounter	CPT	99238	
000009	HF	7	IPP	Encounter-Inpatient Discharge	Encounter	CPT	99239	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99241	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99242	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99243	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99244	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99245	
000002	HF	7	IPP	Encounter -Nursing Facility	Encounter	CPT	99304	
000002	HF	7	IPP	Encounter -Nursing Facility	Encounter	CPT	99305	
000002	HF	7	IPP	Encounter -Nursing Facility	Encounter	CPT	99306	
000002	HF	7	IPP	Encounter -Nursing Facility	Encounter	CPT	99307	
000002	HF	7	IPP	Encounter -Nursing Facility	Encounter	CPT	99308	
000002	HF	7	IPP	Encounter -Nursing Facility	Encounter	CPT	99309	
000002	HF	7	IPP	Encounter -Nursing Facility	Encounter	CPT	99310	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99324	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99325	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99326	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99327	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99328	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99334	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99335	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99336	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99337	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99341	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99342	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99343	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99344	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99345	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99347	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99348	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99349	
000002	HF	7	IPP	Encounter-Outpatient	Encounter	CPT	99350	

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000003	HF	7	D (a)	Ejection Fraction	Diagnostic Study	SNM	70822001	CARDIAC EJECTION FRACTION
000003	HF	7	D (a)	Ejection Fraction	Diagnostic Study	SNM	250908004	LEFT VENTRICULAR EJECTION FRACTION
000003	HF	7	D (a)	Ejection Fraction	Diagnostic Study	SNM	250907009	LEFT VENTRICULAR FUNCTION
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78414	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78451	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78452	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78453	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78454	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78468	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78472	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78473	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78481	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78483	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78494	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	78496	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93303	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93304	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93306	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93307	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93308	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93312	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93313	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93314	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93315	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93316	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93317	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93350	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93351	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93352	
000004	HF	7	D (a)	LVF Assessment	Diagnostic Study	CPT	93543	
000248	HF	7	D (b)	LVSD : Moderate or Severe Dysfunction	Diagnostic Study	SNM	10189741000046100	Moderate left ventricular systolic dysfunction (disorder)
000248	HF	7	D (b)	LVSD : Moderate or Severe Dysfunction	Diagnostic Study	SNM	10189751000046100	Severe left ventricular systolic dysfunction (disorder)
000244	HF	7	D (b)	LVSD	Diagnosis/Condition/Problem	SNM	134401001	
000247	HF	7	D (b)	Severity Status	Result	SNM	6736007	Moderate (severity)
000247	HF	7	D (b)	Severity Status	Result	SNM	24484000	Severe (Severity)
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	744874	Amlodipine 10 MG / benazepril 20 MG Oral Capsule [Lotrel 10/20]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	744882	Amlodipine 2.5 MG / benazepril 10 MG Oral Capsule [Lotrel 2.5/10]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	744886	Amlodipine 5 MG / benazepril 10 MG Oral Capsule [Lotrel 5/10]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	744890	Amlodipine 5 MG / benazepril 20 MG Oral Capsule [Lotrel 5/20]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308608	benazepril 10 MG / Hydrochlorothiazide 12.5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207887	benazepril 10 MG / Hydrochlorothiazide 12.5 MG Oral Tablet [Lotensin HCT]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308607	benazepril 10 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207780	benazepril 10 MG Oral Tablet [Lotensin]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308610	benazepril 20 MG / Hydrochlorothiazide 12.5 MG Oral Tablet

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value_set_id	clinical_topic	topic_indicator	measure_component	standard_concept	standard_category	standard_taxonomy	code	code_description
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	209012	benazepril 20 MG / Hydrochlorothiazide 12.5 MG Oral Tablet [Lotensin HCT]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308611	benazepril 20 MG / Hydrochlorothiazide 25 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207917	benazepril 20 MG / Hydrochlorothiazide 25 MG Oral Tablet [Lotensin HCT]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308609	benazepril 20 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207792	benazepril 20 MG Oral Tablet [Lotensin]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308612	benazepril 40 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207800	benazepril 40 MG Oral Tablet [Lotensin]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	313866	benazepril 5 MG / Hydrochlorothiazide 6.25 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207881	benazepril 5 MG / Hydrochlorothiazide 6.25 MG Oral Tablet [Lotensin HCT]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308613	benazepril 5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207820	benazepril 5 MG Oral Tablet [Lotensin]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	805863	candesartan cilexetil 16 MG / Hydrochlorothiazide 12.5 MG Oral Tablet [Atacand HCT 16/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	639539	candesartan cilexetil 16 MG Oral Tablet [Atacand]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	805859	candesartan cilexetil 32 MG / Hydrochlorothiazide 12.5 MG Oral Tablet [Atacand HCT 32/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	639543	candesartan cilexetil 32 MG Oral Tablet [Atacand]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	577785	candesartan cilexetil 4 MG Oral Tablet [Atacand]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	577787	candesartan cilexetil 8 MG Oral Tablet [Atacand]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308962	Captopril 100 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	210994	Captopril 100 MG Oral Tablet [Capoten]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308963	Captopril 12.5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	201370	Captopril 12.5 MG Oral Tablet [Capoten]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	197436	Captopril 25 MG / Hydrochlorothiazide 15 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	211053	Captopril 25 MG / Hydrochlorothiazide 15 MG Oral Tablet [Capozide 25/15]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	197437	Captopril 25 MG / Hydrochlorothiazide 25 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	211072	Captopril 25 MG / Hydrochlorothiazide 25 MG Oral Tablet [Capozide 25/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	317173	Captopril 25 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	201372	Captopril 25 MG Oral Tablet [Capoten]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	197438	Captopril 50 MG / Hydrochlorothiazide 15 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	790297	Captopril 50 MG / Hydrochlorothiazide 15 MG Oral Tablet [Capozide 50/15]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	197439	Captopril 50 MG / Hydrochlorothiazide 25 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	790296	Captopril 50 MG / Hydrochlorothiazide 25 MG Oral Tablet [Capozide 50/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	308964	Captopril 50 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	201374	Captopril 50 MG Oral Tablet [Capoten]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	846148	Diltiazem Hydrochloride 180 MG / Enalapril Maleate 5 MG Extended Release Tablet [Teczem]

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858823	Enalapril Maleate 1.25 MG/ML Injectable Solution [Vasotec]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858828	Enalapril Maleate 10 MG / Hydrochlorothiazide 25 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858830	Enalapril Maleate 10 MG / Hydrochlorothiazide 25 MG Oral Tablet [Vaseretic]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858817	Enalapril Maleate 10 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858819	Enalapril Maleate 10 MG Oral Tablet [Vasotec]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858804	Enalapril Maleate 2.5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858806	Enalapril Maleate 2.5 MG Oral Tablet [Vasotec]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858810	Enalapril Maleate 20 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858812	Enalapril Maleate 20 MG Oral Tablet [Vasotec]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858884	Enalapril Maleate 5 MG / Felodipine 2.5 MG Extended Release Tablet [Lexxel 5/2.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858892	Enalapril Maleate 5 MG / Felodipine 5 MG Extended Release Tablet [Lexxel 5/5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858824	Enalapril Maleate 5 MG / Hydrochlorothiazide 12.5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858827	Enalapril Maleate 5 MG / Hydrochlorothiazide 12.5 MG Oral Tablet [Vaseretic]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858813	Enalapril Maleate 5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	858815	Enalapril Maleate 5 MG Oral Tablet [Vasotec]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	204404	Enalaprilat 1.25 MG/ML Injectable Solution
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	261300	eprosartan 400 MG Oral Tablet [Teveten]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	352335	eprosartan 600 MG / Hydrochlorothiazide 12.5 MG Oral Tablet [Teveten HCT]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	261301	eprosartan 600 MG Oral Tablet [Teveten]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857166	Fosinopril Sodium 10 MG / Hydrochlorothiazide 12.5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857182	Fosinopril Sodium 10 MG / Hydrochlorothiazide 12.5 MG Oral Tablet [Monopril-HCT 10/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857169	Fosinopril Sodium 10 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857171	Fosinopril Sodium 10 MG Oral Tablet [Monopril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857174	Fosinopril Sodium 20 MG / Hydrochlorothiazide 12.5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857183	Fosinopril Sodium 20 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857185	Fosinopril Sodium 20 MG Oral Tablet [Monopril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857187	Fosinopril Sodium 40 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	857189	Fosinopril Sodium 40 MG Oral Tablet [Monopril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823934	Hydrochlorothiazide 12.5 MG / irbesartan 150 MG Oral Tablet [Avalide 150/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823938	Hydrochlorothiazide 12.5 MG / irbesartan 300 MG Oral Tablet [Avalide 300/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	197885	Hydrochlorothiazide 12.5 MG / Lisinopril 10 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207961	Hydrochlorothiazide 12.5 MG / Lisinopril 10 MG Oral Tablet [Prinzide]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823986	Hydrochlorothiazide 12.5 MG / Lisinopril 10 MG Oral Tablet [Zestoretic 10/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	197886	Hydrochlorothiazide 12.5 MG / Lisinopril 20 MG Oral Tablet

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207963	Hydrochlorothiazide 12.5 MG / Lisinopril 20 MG Oral Tablet [Prinzide]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823982	Hydrochlorothiazide 12.5 MG / Lisinopril 20 MG Oral Tablet [Zestoretic 20/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823954	Hydrochlorothiazide 12.5 MG / Losartan 100 MG Oral Tablet [Hyzaar 100/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823958	Hydrochlorothiazide 12.5 MG / Losartan 50 MG Oral Tablet [Hyzaar 50/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	891618	Hydrochlorothiazide 12.5 MG / moexipril 15 MG Oral Tablet [Uniretic 15/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	891622	Hydrochlorothiazide 12.5 MG / moexipril 7.5 MG Oral Tablet [Uniretic 7.5/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	847060	Hydrochlorothiazide 12.5 MG / Olmesartan medoxomil 20 MG Oral Tablet [Benicar HCT 20/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	847055	Hydrochlorothiazide 12.5 MG / Olmesartan medoxomil 40 MG Oral Tablet [Benicar HCT 40/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	809854	Hydrochlorothiazide 12.5 MG / quinapril 10 MG Oral Tablet [Accuretic 10/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	802035	Hydrochlorothiazide 12.5 MG / quinapril 10 MG Oral Tablet [Quinaretic 12.5/10]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	809858	Hydrochlorothiazide 12.5 MG / quinapril 20 MG Oral Tablet [Accuretic 20/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	802039	Hydrochlorothiazide 12.5 MG / quinapril 20 MG Oral Tablet [Quinaretic 12.5/20]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	749833	Hydrochlorothiazide 12.5 MG / telmisartan 40 MG Oral Tablet [Micardis-HCT 40/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	749837	Hydrochlorothiazide 12.5 MG / telmisartan 80 MG Oral Tablet [Micardis-HCT 80/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	809018	Hydrochlorothiazide 12.5 MG / valsartan 160 MG Oral Tablet [Diovan HCT 160/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	809014	Hydrochlorothiazide 12.5 MG / valsartan 80 MG Oral Tablet [Diovan HCT 80/12.5]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823942	Hydrochlorothiazide 25 MG / irbesartan 300 MG Oral Tablet [Avalide 300/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	197887	Hydrochlorothiazide 25 MG / Lisinopril 20 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207965	Hydrochlorothiazide 25 MG / Lisinopril 20 MG Oral Tablet [Prinzide]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823971	Hydrochlorothiazide 25 MG / Lisinopril 20 MG Oral Tablet [Zestoretic 20/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	823963	Hydrochlorothiazide 25 MG / Losartan 100 MG Oral Tablet [Hyzaar 100/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	891626	Hydrochlorothiazide 25 MG / moexipril 15 MG Oral Tablet [Uniretic 15/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	847042	Hydrochlorothiazide 25 MG / Olmesartan medoxomil 40 MG Oral Tablet [Benicar HCT 40/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	882559	Hydrochlorothiazide 25 MG / quinapril 20 MG Oral Tablet [Accuretic 20/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	802043	Hydrochlorothiazide 25 MG / quinapril 20 MG Oral Tablet [Quinaretic 25/20]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	749841	Hydrochlorothiazide 25 MG / telmisartan 80 MG Oral Tablet [Micardis-HCT 80/25]

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	809022	Hydrochlorothiazide 25 MG / valsartan 160 MG Oral Tablet [Diovan HCT 160/25]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	153666	irbesartan 150 MG Oral Tablet [Avapro]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	153667	irbesartan 300 MG Oral Tablet [Avapro]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	153665	irbesartan 75 MG Oral Tablet [Avapro]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	314076	Lisinopril 10 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206765	Lisinopril 10 MG Oral Tablet [Prinivil]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	104377	Lisinopril 10 MG Oral Tablet [Zestril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	311353	Lisinopril 2.5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206763	Lisinopril 2.5 MG Oral Tablet [Prinivil]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	104375	Lisinopril 2.5 MG Oral Tablet [Zestril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	314077	Lisinopril 20 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206766	Lisinopril 20 MG Oral Tablet [Prinivil]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	104378	Lisinopril 20 MG Oral Tablet [Zestril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	205326	Lisinopril 30 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	213482	Lisinopril 30 MG Oral Tablet [Zestril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	197884	Lisinopril 40 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206770	Lisinopril 40 MG Oral Tablet [Prinivil]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206771	Lisinopril 40 MG Oral Tablet [Zestril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	311354	Lisinopril 5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206764	Lisinopril 5 MG Oral Tablet [Prinivil]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	104376	Lisinopril 5 MG Oral Tablet [Zestril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	261209	Losartan 100 MG Oral Tablet [Cozaar]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206256	Losartan 25 MG Oral Tablet [Cozaar]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	108725	Losartan 50 MG Oral Tablet [Cozaar]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	311734	moexipril 15 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206277	moexipril 15 MG Oral Tablet [Univasc]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	311735	moexipril 7.5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	206313	moexipril 7.5 MG Oral Tablet [Univasc]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	352200	Olmesartan medoxomil 20 MG Oral Tablet [Benicar]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	352201	Olmesartan medoxomil 40 MG Oral Tablet [Benicar]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	352199	Olmesartan medoxomil 5 MG Oral Tablet [Benicar]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	854986	Perindopril Erbumine 2 MG Oral Tablet [Aceon]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	854990	Perindopril Erbumine 4 MG Oral Tablet [Aceon]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	854927	Perindopril Erbumine 8 MG Oral Tablet [Aceon]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	312748	quinapril 10 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207892	quinapril 10 MG Oral Tablet [Accupril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	312749	quinapril 20 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207893	quinapril 20 MG Oral Tablet [Accupril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	314203	quinapril 40 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207895	quinapril 40 MG Oral Tablet [Accupril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	312750	quinapril 5 MG Oral Tablet
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	207891	quinapril 5 MG Oral Tablet [Accupril]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	845489	Ramipril 1.25 MG Oral Capsule [Altace]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	260333	Ramipril 10 MG Oral Capsule [Altace]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	104384	Ramipril 2.5 MG Oral Capsule [Altace]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	104385	Ramipril 5 MG Oral Capsule [Altace]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	284531	telmisartan 20 MG Oral Tablet [Micardis]

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	213431	telmisartan 40 MG Oral Tablet [Micardis]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	213432	telmisartan 80 MG Oral Tablet [Micardis]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	847662	trandolapril 1 MG / Verapamil 240 MG Extended Release Tablet [Tarka 1/240]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	210671	trandolapril 1 MG Oral Tablet [Mavik]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	847658	trandolapril 2 MG / Verapamil 180 MG Extended Release Tablet [Tarka 2/180]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	210672	trandolapril 2 MG Oral Tablet [Mavik]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	847672	trandolapril 4 MG / Verapamil 240 MG Extended Release Tablet [Tarka 4/240]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	210673	trandolapril 4 MG Oral Tablet [Mavik]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	153080	valsartan 160 MG Oral Capsule [Diovan]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	351762	valsartan 160 MG Oral Tablet [Diovan]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	352001	valsartan 320 MG Oral Tablet [Diovan]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	352274	valsartan 40 MG Oral Tablet [Diovan]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	153079	valsartan 80 MG Oral Capsule [Diovan]
000008	HF	7	N	ACE inhibitor or ARB	Medication	RxNorm	351761	valsartan 80 MG Oral Tablet [Diovan]
000160	HF	7	E	Medical reason	Negation Rationale	HL7	21745	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	21747	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	21703	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	21704	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	22855	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	21990	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	21738	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	22259	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	21815	
000160	HF	7	E	Medical reason	Negation Rationale	HL7	22261	
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.0	ORTHOSTATIC HYPOTENSION
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.1	CHRONIC HYPOTENSION
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.29	IATROGENC HYPOTENSION
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.8	HYPOTENSION NEC
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.9	HYPOTENSION NOS
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	R03.1	Nonspecific low blood-pressure reading
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	I95.0	Idiopathic hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	I95.1	Orthostatic hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	I95.2	Hypotension due to drugs
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	I95.8	Other hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	45007003	Low blood pressure
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	77545000	Chronic hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	286963007	Chronic hypotension - idiopathic
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	75181005	Chronic orthostatic hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	84438001	Pure autonomic failure
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	234171009	Drug-induced hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	429561008	Exertional hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	408667000	Hemodialysis-associated hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	67763001	Hypotensive episode
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	195506001	Idiopathic hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	271870002	Low blood pressure reading
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	88887003	Maternal hypotension syndrome

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	200112003	Maternal hypotension syndrome - delivered with postnatal problem
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	200111005	Maternal hypotension syndrome - delivered
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	200113008	Maternal hypotension syndrome with antenatal problem
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	200114002	Maternal hypotension syndrome with postnatal problem
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	28651003	Orthostatic hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	75181005	Chronic orthostatic hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	84438001	Pure autonomic failure
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	61933008	Hyperadrenergic postural hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	70247006	Hypoadrenergic postural hypotension
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	371073003	Postural orthostatic tachycardia syndrome
000250	HF	7	E	Hypotension	Diagnosis/Condition/Problem	SNM	230664009	Sympathotonic orthostatic hypotension
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	ICD-9	790.6	Other abnormal blood chemistry
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	ICD-10	R79	Other abnormal findings of blood chemistry
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	ICD-10	R79.0	Abnormal level of blood mineral
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	ICD-10	R79.8	Other specified abnormal findings of blood chemistry
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	ICD-10	R79.81	Abnormal blood-gas level
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	ICD-10	R79.82	Elevated C-reactive protein (CRP)
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	ICD-10	R79.89	Other specified abnormal findings of blood chemistry
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	ICD-10	R79.9	Abnormal finding of blood chemistry, unspecified
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	SNM	371019009	Renal azotemia (disorder)
000249	HF	7	E	Azotemia	Diagnosis/Condition/Problem	SNM	55655006	Prerenal uremia syndrome (disorder)
000174	HF	7	E	Patient reason	Negation Rationale	HL7	19729	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	21741	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	21746	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	21743	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	21710	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	21708	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	22851	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	14880	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	22260	
000174	HF	7	E	Patient reason	Negation Rationale	HL7	15985	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22168	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22169	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22165	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22166	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22167	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21493	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19731	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19730	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19733	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19735	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19734	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19736	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21744	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22024	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22023	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21706	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21709	

AMA - PCPI Level I EHR Specifications
Heart Failure - ACE/ARB Therapy for LVSD (HF-7)

value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000200	HF	7	E	System Reason	Negation Rationale	HL7	21707	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21732	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21706	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21731	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21733	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21728	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21729	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21730	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21734	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22867	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21735	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22866	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22865	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21568	
000200	HF	7	E	System Reason	Negation Rationale	HL7	21408	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22907	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22909	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22911	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22913	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22912	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22858	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22857	
000200	HF	7	E	System Reason	Negation Rationale	HL7	22859	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19989	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19990	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19988	
000200	HF	7	E	System Reason	Negation Rationale	HL7	19987	
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.5	Acute renal failure with lesion of tubular necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.6	Acute renal failure with lesion of renal cortical necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.7	Acute renal failure with lesion of renal medullary [papillary] necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.8	Acute renal failure with other specified pathological lesion in kidney
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.9	Acute renal failure, unspecified
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	586	Renal failure, unspecified
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	788.5	Oliguria and anuria
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N17.1	Acute kidney failure with acute cortical necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N17.2	Acute kidney failure with medullary necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N17.8	Other acute kidney failure
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N17.9	Acute kidney failure unspecified
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N99.0	Acute renal failure, postprocedural
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	42399005	renal failure syndrome (disorder)
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	236433006	acute-on-chronic renal failure (disorder)
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	298015003	acute renal papillary necrosis with renal failure (disorder)
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	307309005	transient acute renal failure (disorder)
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	I70.1	Atherosclerosis of renal artery
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N17.0	Acute renal failure with tubular necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N17.1	Acute renal failure with acute cortical necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N17.2	Acute renal failure with medullary necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N17.8	Other acute renal failure

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000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	N18.6	End stage renal disease /Chronic kidney disease requiring chronic dialysis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I10	R34	Anuria and oliguria
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.9	Acute kidney failure, unspecified
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.6	Acute renal failure, with lesion of renal cortical necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.5	Acute kidney failure with lesion of tubular necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.8	Acute kidney failure with other specified pathological lesion in kidney
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	I9	584.7	Acute kidney failure with lesion of renal medullary (papillary) necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	14669001	Acute renal failure syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	23697004	Crush syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	31005002	Hepatorenal syndrome due to a procedure
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	36225005	Acute renal failure due to procedure
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	55655006	Prerenal uremia syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	62216007	Familial arthrogryposis-cholestatic hepatorenal syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	78209002	Hemolytic uremic syndrome, adult type
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	111407006	Hemolytic uremic syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	213231008	Hepatorenal syndrome as a complication of care
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	236428007	Nephrotoxic acute renal failure
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	236429004	Acute drug-induced renal failure
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	236431008	Traumatic anuria - crush syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	236432001	Pulmonary renal syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	269257004	Acute renal failure due to crush syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	301814009	Post-renal renal failure
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	307309005	Transient acute renal failure
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	373421000	Diarrhea-associated hemolytic uremic syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	373422007	Diarrhea-negative hemolytic uremic syndrome
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	422593004	Acute renal failure due to ACE inhibitor
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	423533009	Acute renal failure due to ischemia
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	429224003	Acute renal failure due to acute cortical necrosis
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	429489008	Acute renal failure due to obstruction
000263	HF	7	E	Renal Failure due to ACE or ARB	Diagnosis/Condition/Problem	SNM	430535006	Acute renal failure with oliguria
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	633.11	Tubal pregnancy with intrauterine pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	633.21	Ovarian pregnancy with intrauterine pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	633.81	Other ectopic pregnancy with intrauterine pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	633.91	Unspecified ectopic pregnancy with intrauterine pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	640.01	Threatened abortion unspecified as to episode of care
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	640.03	Threatened abortion delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.13	Hemorrhage from placenta previa antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.21	Premature separation of placenta with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.23	Premature separation of placenta antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.31	Antepartum hemorrhage associated with coagulation defects with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.33	Antepartum hemorrhage associated with coagulation defects
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.81	Other antepartum hemorrhage with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.83	Other antepartum hemorrhage

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.91	Unspecified antepartum hemorrhage with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	641.93	Unspecified antepartum hemorrhage
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.01	Benign essential hypertension with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.02	Benign essential hypertension with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.03	Antepartum benign essential hypertension
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.11	Hypertension secondary to renal disease with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.12	Hypertension secondary to renal disease with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.13	Hypertension secondary to renal disease antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.21	Other pre-existing hypertension with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.22	Other pre-existing hypertension with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.23	Other pre-existing hypertension antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.31	Transient hypertension of pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.32	Transient hypertension of pregnancy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.33	Antepartum transient hypertension
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.62	Eclampsia with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.63	Eclampsia antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.71	Pre-eclampsia or eclampsia superimposed on pre-existing hypertension with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.72	Pre-eclampsia or eclampsia superimposed on pre-existing hypertension with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.73	Pre-eclampsia or eclampsia superimposed on pre-existing hypertension antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.91	Unspecified hypertension with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.92	Unspecified hypertension with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	642.93	Unspecified antepartum hypertension
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	643.01	Mild hyperemesis gravidarum delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	643.03	Mild hyperemesis gravidarum antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	643.81	Other vomiting complicating pregnancy delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	643.91	Unspecified vomiting of pregnancy delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	643.93	Unspecified vomiting of pregnancy antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	644.03	Threatened premature labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	644.13	Other threatened labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	644.21	Early onset of delivery delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	645.11	Post term pregnancy delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	645.13	Post term pregnancy antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	645.21	Prolonged pregnancy delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	645.23	Prolonged pregnancy antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.01	Papyraceous fetus delivered with or without antepartum condition

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.03	Papyraceous fetus antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.11	Edema or excessive weight gain in pregnancy with delivery with or without antepartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.12	Edema or excessive weight gain in pregnancy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.13	Antepartum edema or excessive weight gain
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.21	Unspecified renal disease in pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.22	Unspecified renal disease in pregnancy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.23	Unspecified antepartum renal disease
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.31	Habitual aborter delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.33	Habitual aborter antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.41	Peripheral neuritis in pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.42	Peripheral neuritis in pregnancy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.43	Antepartum peripheral neuritis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.51	Asymptomatic bacteriuria in pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.52	Asymptomatic bacteriuria in pregnancy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.53	Antepartum asymptomatic bacteriuria
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.61	Infections of genitourinary tract in pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.62	Infections of genitourinary tract in pregnancy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.63	Antepartum infections of genitourinary tract
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.71	Liver disorders in pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.73	Antepartum liver disorders
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.81	Other specified complications of pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.82	Other specified complications of pregnancy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.83	Other specified antepartum complications
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.91	Unspecified complication of pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	646.93	Unspecified antepartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.01	Syphilis of mother complicating pregnancy with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.02	Syphilis of mother complicating pregnancy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.03	Antepartum syphilis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.11	Gonorrhea of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.12	Gonorrhea of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.13	Antepartum gonorrhea
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.21	Other venereal diseases of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.22	Other venereal diseases of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.23	Other antepartum venereal diseases
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.31	Tuberculosis of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.32	Tuberculosis of mother with delivery with postpartum complication

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.33	Antepartum tuberculosis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.41	Malaria of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.42	Malaria of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.43	Antepartum malaria
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.51	Rubella of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.52	Rubella of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.53	Antepartum rubella
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.61	Other viral diseases of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.62	Other viral diseases of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.63	Other antepartum viral diseases
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.81	Other specified infectious and parasitic diseases of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.82	Other specified infectious and parasitic diseases of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.83	Other specified infectious and parasitic diseases of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.91	Unspecified infection or infestation of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.92	Unspecified infection or infestation of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	647.93	Unspecified infection or infestation of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.01	Diabetes mellitus of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.02	Diabetes mellitus of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.03	Antepartum diabetes mellitus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.11	Thyroid dysfunction of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.12	Thyroid dysfunction of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.13	Antepartum thyroid dysfunction
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.21	Anemia of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.22	Anemia of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.23	Antepartum anemia
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.31	Drug dependence of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.32	Drug dependence of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.33	Antepartum drug dependence
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.41	Mental disorders of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.42	Mental disorders of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.43	Antepartum mental disorders of mother
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.51	Congenital cardiovascular disorders of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.52	Congenital cardiovascular disorders of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.53	Congenital cardiovascular disorders of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.61	Other cardiovascular diseases of mother with delivery

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.62	Other cardiovascular diseases of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.63	Other cardiovascular diseases of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.71	Bone and joint disorders of back pelvis and lower limbs of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.72	Bone and joint disorders of back pelvis and lower limbs of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.73	Bone and joint disorders of back pelvis and lower limbs of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.81	Abnormal glucose tolerance of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.82	Abnormal glucose tolerance of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.83	Abnormal glucose tolerance of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.91	Other current conditions classifiable elsewhere of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.92	Other current conditions classifiable elsewhere of mother with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	648.93	Other current conditions classifiable elsewhere of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.01	Tobacco use disorder complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.02	Tobacco use disorder complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.03	Tobacco use disorder complicating pregnancy, childbirth, or the puerperium, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.11	Obesity complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.12	Obesity complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.13	Obesity complicating pregnancy, childbirth, or the puerperium, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.21	Bariatric surgery status complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.22	Bariatric surgery status complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.23	Bariatric surgery status complicating pregnancy, childbirth, or the puerperium, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.31	Coagulation defects complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.32	Coagulation defects complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.33	Coagulation defects complicating pregnancy, childbirth, or the puerperium, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.41	Epilepsy complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.42	Epilepsy complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.43	Epilepsy complicating pregnancy, childbirth, or the puerperium, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.51	Spotting complicating pregnancy, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.53	Spotting complicating pregnancy, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.61	Uterine size date discrepancy, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.62	Uterine size date discrepancy, delivered, with mention of postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.63	Uterine size date discrepancy, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.71	Cervical shortening, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	649.73	Cervical shortening, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.01	Twin pregnancy delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.03	Twin pregnancy antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.11	Triplet pregnancy delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.13	Triplet pregnancy antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.21	Quadruplet pregnancy delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.23	Quadruplet pregnancy antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.31	Twin pregnancy with fetal loss and retention of one fetus delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.33	Twin pregnancy with fetal loss and retention of one fetus antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.41	Triplet pregnancy with fetal loss and retention of one or more fetus(es) delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.43	Triplet pregnancy with fetal loss and retention of one or more fetus(es) antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.51	Quadruplet pregnancy with fetal loss and retention of one or more fetus(es) delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.53	Quadruplet pregnancy with fetal loss and retention of one or more fetus(es) antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.61	Other multiple pregnancy with fetal loss and retention of one or more fetus(es) delivered with or without antepartum condition

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.63	Other multiple pregnancy with fetal loss and retention of one or more fetus(es) antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.71	Multiple gestation following (elective) fetal reduction, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.73	Multiple gestation following (elective) fetal reduction, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.81	Other specified multiple gestation delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.83	Other specified multiple gestation antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.91	Unspecified multiple gestation delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	651.93	Unspecified multiple gestation antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.01	Unstable lie delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.03	Unstable lie antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.11	Breech or other malpresentation successfully converted to cephalic presentation delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.13	Breech or other malpresentation successfully converted to cephalic presentation antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.21	Breech presentation without version delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.23	Breech presentation without version antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.31	Transverse or oblique presentation delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.33	Transverse or oblique presentation antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.41	Face or brow presentation delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.43	Face or brow presentation antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.51	High head at term delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.53	High head at term antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.61	Multiple gestation with malpresentation of one fetus or more delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.63	Multiple gestation with malpresentation of one fetus or more antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.71	Prolapsed arm of fetus delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.73	Prolapsed arm antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.81	Other specified malposition or malpresentation delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.83	Other specified malposition or malpresentation antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.91	Unspecified malposition or malpresentation delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	652.93	Unspecified malposition or malpresentation antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.01	Major abnormality of bony pelvis not further specified delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.03	Major abnormality of bony pelvis not further specified antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.11	Generally contracted pelvis delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.13	Generally contracted pelvis antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.21	Inlet contraction of pelvis delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.23	Inlet contraction of pelvis antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.31	Outlet contraction of pelvis delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.33	Outlet contraction of pelvis antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.41	Fetopelvic disproportion delivered

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.43	Fetopelvic disproportion antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.51	Unusually large fetus causing disproportion delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.53	Unusually large fetus causing disproportion antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.61	Hydrocephalic fetus causing disproportion delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.63	Hydrocephalic fetus causing disproportion antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.71	Other fetal abnormality causing disproportion delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.73	Other fetal abnormality causing disproportion antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.81	Disproportion of other origin delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.83	Disproportion of other origin antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.91	Unspecified disproportion delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	653.93	Unspecified disproportion antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.01	Congenital abnormalities of uterus with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.02	Congenital abnormalities of uterus delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.03	Congenital abnormalities of uterus antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.11	Tumors of body of uterus with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.12	Tumors of body of uterus delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.13	Tumors of body of uterus antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.21	Previous cesarean delivery with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.23	Previous cesarean delivery antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.31	Retroverted and incarcerated gravid uterus delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.32	Retroverted and incarcerated gravid uterus delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.33	Retroverted and incarcerated gravid uterus antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.41	Other abnormalities in shape or position of gravid uterus and of neighboring structures delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.42	Other abnormalities in shape or position of gravid uterus and of neighboring structures delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.43	Other abnormalities in shape or position of gravid uterus and of neighboring structures antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.51	Cervical incompetence with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.52	Cervical incompetence delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.53	Cervical incompetence antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.61	Other congenital or acquired abnormality of cervix with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.62	Other congenital or acquired abnormality of cervix delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.63	Other congenital or acquired abnormality of cervix antepartum condition or complication

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.71	Congenital or acquired abnormality of vagina with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.72	Congenital or acquired abnormality of vagina delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.73	Congenital or acquired abnormality of vagina antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.81	Congenital or acquired abnormality of vulva with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.82	Congenital or acquired abnormality of vulva delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.83	Congenital or acquired abnormality of vulva antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.91	Other and unspecified abnormality of organs and soft tissues of pelvis with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.92	Other and unspecified abnormality of organs and soft tissues of pelvis delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	654.93	Other and unspecified abnormality of organs and soft tissues of pelvis antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.01	Central nervous system malformation in fetus with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.03	Central nervous system malformation in fetus antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.11	Chromosomal abnormality in fetus affecting management of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.13	Chromosomal abnormality in fetus affecting management of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.21	Hereditary disease in family possibly affecting fetus affecting management of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.23	Hereditary disease in family possibly affecting fetus affecting management of mother antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.31	Suspected damage to fetus from viral disease in the mother affecting management of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.33	Suspected damage to fetus from viral disease in the mother affecting management of mother antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.41	Suspected damage to fetus from other disease in the mother affecting management of mother with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.43	Suspected damage to fetus from other disease in the mother affecting management of mother antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.51	Suspected damage to fetus from drugs affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.53	Suspected damage to fetus from drugs affecting management of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.61	Suspected damage to fetus from radiation affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.63	Suspected damage to fetus from radiation affecting management of mother antepartum condition or complication

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.71	Decreased fetal movements affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.73	Decreased fetal movements affecting management of mother antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.81	Other known or suspected fetal abnormality not elsewhere classified affecting management of mother with delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.83	Other known or suspected fetal abnormality not elsewhere classified affecting management of mother antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.91	Unspecified suspected fetal abnormality affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	655.93	Unspecified suspected fetal abnormality affecting management of mother antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.01	Fetal-maternal hemorrhage with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.03	Fetal-maternal hemorrhage antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.11	Rhesus isoimmunization affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.13	Rhesus isoimmunization affecting management of mother antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.21	Isoimmunization from other and unspecified blood-group incompatibility affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.23	Isoimmunization from other and unspecified blood-group incompatibility affecting management of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.31	Fetal distress affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.33	Fetal distress affecting management of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.41	Intrauterine death affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.43	Intrauterine death affecting management of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.51	Poor fetal growth affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.53	Poor fetal growth affecting management of mother antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.61	Excessive fetal growth affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.73	Other placental conditions affecting management of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.81	Other specified fetal and placental problems affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.83	Other specified fetal and placental problems affecting management of mother antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.91	Unspecified fetal and placental problem affecting management of mother delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	656.93	Unspecified fetal and placental problem affecting management of mother antepartum

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	657.01	Polyhydramnios with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	657.03	Polyhydramnios antepartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.01	Oligohydramnios delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.03	Oligohydramnios antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.11	Premature rupture of membranes delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.13	Premature rupture of membranes antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.21	Delayed delivery after spontaneous or unspecified rupture of membranes delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.23	Delayed delivery after spontaneous or unspecified rupture of membranes antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.31	Delayed delivery after artificial rupture of membranes delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.33	Delayed delivery after artificial rupture of membranes antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.41	Infection of amniotic cavity delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.43	Infection of amniotic cavity antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.81	Other problems associated with amniotic cavity and membranes delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.83	Other problems associated with amniotic cavity and membranes antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.91	Unspecified problem associated with amniotic cavity and membranes delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	658.93	Unspecified problem associated with amniotic cavity and membranes antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.01	Failed mechanical induction of labor delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.03	Failed mechanical induction of labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.11	Failed medical or unspecified induction of labor delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.13	Failed medical or unspecified induction of labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.21	Unspecified type maternal pyrexia during labor delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.23	Unspecified type maternal pyrexia antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.31	Generalized infection during labor delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.33	Generalized infection during labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.41	Grand multiparity with current pregnancy delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.43	Grand multiparity with current pregnancy antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.51	Elderly primigravida delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.53	Elderly primigravida antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.61	Other advanced maternal age delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.63	Other advanced maternal age antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.71	Abnormality in fetal heart rate or rhythm delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.73	Abnormality in fetal heart rate or rhythm antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.81	Other specified indications for care or intervention related to labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.83	Other specified indications for care or intervention related to labor and delivery antepartum

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.91	Unspecified indication for care or intervention related to labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	659.93	Unspecified indication for care or intervention related to labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.01	Obstruction caused by malposition of fetus at onset of labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.03	Obstruction caused by malposition of fetus at onset of labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.11	Obstruction by bony pelvis during labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.13	Obstruction by bony pelvis during labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.21	Obstruction by abnormal pelvic soft tissues during labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.23	Obstruction by abnormal pelvic soft tissues during labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.31	Deep transverse arrest and persistent occipitoposterior position with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.33	Deep transverse arrest and persistent occipitoposterior position antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.41	Shoulder (girdle) dystocia with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.43	Shoulder (girdle) dystocia antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.51	Locked twins with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.53	Locked twins antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.61	Unspecified failed trial of labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.63	Unspecified failed trial of labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.71	Unspecified failed forceps or vacuum extractor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.73	Unspecified failed forceps or vacuum extractor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.81	Other causes of obstructed labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.83	Other causes of obstructed labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.91	Unspecified obstructed labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	660.93	Unspecified obstructed labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.01	Primary uterine inertia with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.03	Primary uterine inertia antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.11	Secondary uterine inertia with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.13	Secondary uterine inertia antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.21	Other and unspecified uterine inertia with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.23	Other and unspecified uterine inertia antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.31	Precipitate labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.33	Precipitate labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.41	Hypertonic incoordinate or prolonged uterine contractions with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.43	Hypertonic incoordinate or prolonged uterine contractions antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.91	Unspecified abnormality of labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	661.93	Unspecified abnormality of labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	662.01	Prolonged first stage of labor delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	662.03	Prolonged first stage of labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	662.11	Unspecified type prolonged labor delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	662.13	Unspecified type prolonged labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	662.21	Prolonged second stage of labor delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	662.23	Prolonged second stage of labor antepartum

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	662.31	Delayed delivery of second twin triplet etc. delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	662.33	Delayed delivery of second twin triplet etc. antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.01	Prolapse of cord complicating labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.03	Prolapse of cord complicating labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.11	Cord around neck with compression complicating labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.13	Cord around neck with compression complicating labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.21	Other and unspecified cord entanglement with compression complicating labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.23	Other and unspecified cord entanglement with compression complicating labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.31	Other and unspecified cord entanglement without compression complicating labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.33	Other and unspecified cord entanglement without compression complicating labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.41	Short cord complicating labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.43	Short cord complicating labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.51	Vasa previa complicating labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.61	Vascular lesions of cord complicating labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.63	Vascular lesions of cord complicating labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.81	Other umbilical cord complications during labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.83	Other umbilical cord complications during labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.91	Unspecified umbilical cord complication during labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	663.93	Unspecified umbilical cord complication during labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	664.01	First-degree perineal laceration with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	664.11	Second-degree perineal laceration with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	664.21	Third-degree perineal laceration with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	664.31	Fourth-degree perineal laceration with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	664.51	Vulvar and perineal hematoma with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	664.61	Anal sphincter tear complicating delivery, not associated with third-degree perineal laceration, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	664.81	Other specified trauma to perineum and vulva with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	664.91	Unspecified trauma to perineum and vulva with delivery

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.01	Rupture of uterus before onset of labor with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.03	Rupture of uterus before onset of labor antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.11	Rupture of uterus with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.31	Laceration of cervix with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.41	High vaginal laceration with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.51	Other injury to pelvic organs with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.61	Damage to pelvic joints and ligaments with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.71	Pelvic hematoma with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.72	Pelvic hematoma delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.81	Other specified obstetrical trauma with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.83	Other specified obstetrical trauma antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.91	Unspecified obstetrical trauma with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.92	Unspecified obstetrical trauma delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	665.93	Unspecified obstetrical trauma antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	666.02	Third-stage postpartum hemorrhage with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	666.12	Other immediate postpartum hemorrhage with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	666.22	Delayed and secondary postpartum hemorrhage with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	666.32	Postpartum coagulation defects with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	667.02	Retained placenta without hemorrhage with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	667.12	Retained portions of placenta or membranes without hemorrhage delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.01	Pulmonary complications of anesthesia or other sedation in labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.02	Pulmonary complications of anesthesia or other sedation in labor and delivery delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.03	Pulmonary complications of anesthesia or other sedation in labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.11	Cardiac complications of anesthesia or other sedation in labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.12	Cardiac complications of anesthesia or other sedation in labor and delivery delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.13	Cardiac complications of anesthesia or other sedation in labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.21	Central nervous system complications of anesthesia or other sedation in labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.22	Central nervous system complications of anesthesia or other sedation in labor and delivery delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.23	Central nervous system complications of anesthesia or other sedation in labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.81	Other complications of anesthesia or other sedation in labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.82	Other complications of anesthesia or other sedation in labor and delivery delivered with postpartum complication

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value_set_id	clinical_topic	topic_indicator	measure_component	standard_concept	standard_category	standard_taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.83	Other complications of anesthesia or other sedation in labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.91	Unspecified complication of anesthesia or other sedation in labor and delivery delivered
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.92	Unspecified complication of anesthesia or other sedation in labor and delivery delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	668.93	Unspecified complication of anesthesia or other sedation in labor and delivery antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.01	Maternal distress with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.02	Maternal distress with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.03	Maternal distress complicating labor and delivery antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.11	Obstetric shock with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.12	Obstetric shock with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.13	Antepartum obstetric shock
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.51	Forceps or vacuum extractor delivery without indication delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.61	Breech extraction without indication delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.71	Cesarean delivery without indication delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.81	Other complications of labor and delivery delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.82	Other complications of labor and delivery delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.83	Other complications of labor and delivery antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.91	Unspecified complication of labor and delivery with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.92	Unspecified complication of labor and delivery with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	669.93	Unspecified complication of labor and delivery antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	670.02	Major puerperal infection delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.01	Varicose veins of legs with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.02	Varicose veins of legs with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.03	Antepartum varicose veins of legs
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.11	Varicose veins of vulva and perineum with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.12	Varicose veins of vulva and perineum with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.13	Antepartum varicose veins of vulva and perineum

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value_set_id	clinical_topic	topic_indicator	measure_component	standard_concept	standard_category	standard_taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.21	Superficial thrombophlebitis with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.22	Superficial thrombophlebitis with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.23	Antepartum superficial thrombophlebitis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.31	Deep phlebothrombosis antepartum with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.33	Deep phlebothrombosis antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.42	Deep phlebothrombosis postpartum with delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.51	Other phlebitis and thrombosis with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.52	Other phlebitis and thrombosis with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.53	Other antepartum phlebitis and thrombosis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.81	Other venous complications with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.82	Other venous complications with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.83	Other antepartum venous complications
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.91	Unspecified venous complication with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.92	Unspecified venous complication with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	671.93	Unspecified antepartum venous complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	672.02	Puerperal pyrexia of unknown origin delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.01	Obstetrical air embolism with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.02	Obstetrical air embolism with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.03	Obstetrical air embolism antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.11	Amniotic fluid embolism with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.12	Amniotic fluid embolism with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.13	Amniotic fluid embolism antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.21	Obstetrical blood-clot embolism with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.22	Obstetrical blood-clot embolism with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.23	Obstetrical blood-clot embolism antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.31	Obstetrical pyemic and septic embolism with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.32	Obstetrical pyemic and septic embolism with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.33	Obstetrical pyemic and septic embolism antepartum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.81	Other obstetrical pulmonary embolism with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	673.82	Other obstetrical pulmonary embolism with delivery with postpartum complication

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.01	Cerebrovascular disorders with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.02	Cerebrovascular disorders with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.03	Antepartum cerebrovascular disorders
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.12	Disruption of cesarean wound with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.22	Disruption of perineal wound with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.32	Other complications of obstetrical surgical wounds with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.42	Placental polyp with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.51	Peripartum cardiomyopathy with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.52	Peripartum cardiomyopathy with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.53	Peripartum cardiomyopathy with antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.82	Other complications of puerperium with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	674.92	Unspecified complications of puerperium with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.01	Infections of nipple associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.02	Infections of nipple associated with childbirth delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.03	Antepartum infections of nipple
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.11	Abscess of breast associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.12	Abscess of breast associated with childbirth delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.13	Antepartum abscess of breast
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.21	Nonpurulent mastitis associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.22	Nonpurulent mastitis associated with childbirth delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.23	Antepartum nonpurulent mastitis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.81	Other specified infections of the breast and nipple associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.82	Other specified infections of the breast and nipple associated with childbirth delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.83	Other specified antepartum infections of the breast and nipple
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.91	Unspecified infection of the breast and nipple associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.92	Unspecified infection of the breast and nipple associated with childbirth delivered with postpartum complication

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	675.93	Unspecified antepartum infection of the breast and nipple
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.01	Retracted nipple associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.02	Retracted nipple associated with childbirth delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.03	Retracted nipple associated with childbirth antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.11	Cracked nipple associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.12	Cracked nipple associated with childbirth delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.13	Cracked nipple associated with childbirth antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.21	Engorgement of breasts associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.22	Engorgement of breasts associated with childbirth delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.23	Antepartum engorgement of breasts associated with childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.31	Other and unspecified disorder of breast associated with childbirth delivered with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.32	Other and unspecified disorder of breast associated with childbirth delivered with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.41	Failure of lactation with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.42	Failure of lactation with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.43	Failure of lactation antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.51	Suppressed lactation unspecified as to episode of care
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.52	Suppressed lactation with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.53	Suppressed lactation antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.61	Galactorrhea with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.62	Galactorrhea with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.63	Galactorrhea antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.81	Other disorders of lactation with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.82	Other disorders of lactation with delivery with postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.83	Other disorders of lactation antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.91	Unspecified disorder of lactation with delivery with or without antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.92	Unspecified disorder of lactation with delivery with postpartum complication

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	676.93	Unspecified disorder of lactation antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	678.01	Fetal hematologic conditions, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	678.03	Fetal hematologic conditions, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	678.11	Fetal conjoined twins, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	678.13	Fetal conjoined twins, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	679.01	Maternal complications from in utero procedure, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	679.02	Maternal complications from in utero procedure, delivered, with mention of postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	679.03	Maternal complications from in utero procedure, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	679.11	Fetal complications from in utero procedures, delivered, with or without mention of antepartum condition
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	679.12	Fetal complications from in utero procedures, delivered, with mention of postpartum complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	679.13	Fetal complications from in utero procedures, antepartum condition or complication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V22.2	PREG STATE, INCIDENTAL
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.0	PREG W HX OF INFERTILITY
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.1	PREG W HX-TROPHOBLASTIC DIS
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.2	PREG W HX OF ABORTION
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.3	GRAND MULTIPARITY
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.4	Pregnancy with other poor obstetric history
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.41	PREG W HX PRE-TERM LABOR
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.49	PREG W POOR OBS HX NEC
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.5	PREG W POOR REPRODUCT HX
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.7	INSUFFICENT PRENATAL CARE
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I9	V23.8	Other high-risk pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.4	Supervision of pregnancy with grand multiparity
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.40	Supervision of pregnancy with grand multiparity, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.41	Supervision of pregnancy with grand multiparity, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.42	Supervision of pregnancy with grand multiparity, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.43	Supervision of pregnancy with grand multiparity, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.5	Supervision of elderly primigravida and multigravida
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.51	Supervision of elderly multigravida, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.511	Supervision of elderly primigravida, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.512	Supervision of elderly primigravida, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.513	Supervision of elderly primigravida, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.519	Supervision of elderly primigravida, unspecified trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.52	Supervision of elderly multigravida
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.521	Supervision of elderly multigravida, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.522	Supervision of elderly multigravida, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.523	Supervision of elderly multigravida, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O09.529	Supervision of elderly primigravida
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.1	Pre-existing hypertensive heart disease complicating pregnancy, childbirth and the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.11	Pre-existing hypertensive heart disease complicating pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.111	Pre-existing hypertensive heart disease complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.112	Pre-existing hypertensive heart disease complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.113	Pre-existing hypertensive heart disease complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.119	Pre-existing hypertensive heart disease complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.12	Pre-existing hypertensive heart disease complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.13	Pre-existing hypertensive heart disease complicating the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.211	Pre-existing hypertensive chronic kidney disease complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.212	Pre-existing hypertensive chronic kidney disease complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.213	Pre-existing hypertensive chronic kidney disease complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.219	Pre-existing hypertensive chronic kidney disease complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.22	Pre-existing hypertensive chronic kidney disease complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.411	Pre-existing secondary hypertension complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.412	Pre-existing secondary hypertension complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.413	Pre-existing secondary hypertension complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.419	Pre-existing secondary hypertension complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.42	Pre-existing secondary hypertension complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.911	Unspecified pre-existing hypertension complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.912	Unspecified pre-existing hypertension complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.913	Unspecified pre-existing hypertension complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.919	Unspecified pre-existing hypertension complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O10.92	Unspecified pre-existing hypertension complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O15.00	Eclampsia in pregnancy, unspecified trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O15.02	Eclampsia in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O15.03	Eclampsia in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O15.9	Eclampsia, unspecified as to time period
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O16.1	Unspecified maternal hypertension, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O16.2	Unspecified maternal hypertension, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O16.3	Unspecified maternal hypertension, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O16.9	Unspecified maternal hypertension, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O20.0	Threatened abortion
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O20.8	Other hemorrhage in early pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O20.9	Hemorrhage in early pregnancy, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O21.0	Mild hyperemesis gravidarum
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O21.2	Late vomiting of pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O21.8	Other vomiting complicating pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O21.9	Vomiting of pregnancy, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.0	Varicose veins of lower extremity in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.00	Varicose veins of lower extremity in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.01	Varicose veins of lower extremity in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.02	Varicose veins of lower extremity in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.03	Varicose veins of lower extremity in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.1	Genital varices in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.10	Genital varices in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.11	Genital varices in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.12	Genital varices in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.13	Genital varices in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.2	Superficial thrombophlebitis in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.20	Superficial thrombophlebitis in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.21	Superficial thrombophlebitis in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.22	Superficial thrombophlebitis in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.23	Superficial thrombophlebitis in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.3	Deep phlebothrombosis in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.30	Deep phlebothrombosis in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.31	Deep phlebothrombosis in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.32	Deep phlebothrombosis in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.33	Deep phlebothrombosis in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.5	Cerebral venous thrombosis in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.50	Cerebral venous thrombosis in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.51	Cerebral venous thrombosis in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.52	Cerebral venous thrombosis in pregnancy, second trimester

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.53	Cerebral venous thrombosis in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.8	Other venous complications in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.8x	Other venous complications in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.8x1	Other venous complications in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.8x2	Other venous complications in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.8x3	Other venous complications in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O22.8x9	Other venous complications in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O23.40	Unspecified infection of urinary tract in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O23.41	Unspecified infection of urinary tract in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O23.42	Unspecified infection of urinary tract in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O23.43	Unspecified infection of urinary tract in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O23.90	Unspecified genitourinary tract infection in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O23.91	Unspecified genitourinary tract infection in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O23.92	Unspecified genitourinary tract infection in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O23.93	Unspecified genitourinary tract infection in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O24.911	Unspecified diabetes mellitus in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O24.912	Unspecified diabetes mellitus in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O24.913	Unspecified diabetes mellitus in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O24.919	Unspecified diabetes mellitus in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O24.92	Unspecified diabetes mellitus in childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.00	Excessive weight gain in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.01	Excessive weight gain in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.02	Excessive weight gain in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.03	Excessive weight gain in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.20	Pregnancy care of habitual aborter, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.21	Pregnancy care of habitual aborter, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.22	Pregnancy care of habitual aborter, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.23	Pregnancy care of habitual aborter, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.611	Liver disorders in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.612	Liver disorders in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.613	Liver disorders in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.619	Liver disorders in pregnancy, unspecified trimester

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value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.811	Pregnancy related exhaustion and fatigue, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.812	Pregnancy related exhaustion and fatigue, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.813	Pregnancy related exhaustion and fatigue, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.819	Pregnancy related exhaustion and fatigue, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.821	Pregnancy related peripheral neuritis, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.821	Pregnancy related peripheral neuritis, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.822	Pregnancy related peripheral neuritis, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.823	Pregnancy related peripheral neuritis, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.829	Pregnancy related peripheral neuritis, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.831	Pregnancy related renal disease, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.832	Pregnancy related renal disease, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.833	Pregnancy related renal disease, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.839	Pregnancy related renal disease, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.84	Uterine size-date discrepancy complicating pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.841	Uterine size-date discrepancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.842	Uterine size-date discrepancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.843	Uterine size-date discrepancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.849	Uterine size-date discrepancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.85	Spotting complicating pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.851	Spotting complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.852	Spotting complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.853	Spotting complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.859	Spotting complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.87	Cervical shortening
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.872	Cervical shortening, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.873	Cervical shortening, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.879	Cervical shortening, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.891	Other specified pregnancy related conditions, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.892	Other specified pregnancy related conditions, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.893	Other specified pregnancy related conditions, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.899	Other specified pregnancy related conditions, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.90	Pregnancy related conditions, unspecified, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.91	Pregnancy related conditions, unspecified, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.92	Pregnancy related conditions, unspecified, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O26.93	Pregnancy related conditions, unspecified, third trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.0	Twin pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.001	Twin pregnancy, unspecified, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.002	Twin pregnancy, unspecified, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.003	Twin pregnancy, unspecified, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.009	Twin pregnancy, unspecified, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.02	Conjoined twins
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.021	Conjoined twins, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.022	Conjoined twins, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.023	Conjoined twins, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.029	Conjoined twins, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.1	Triplet pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.10	Triplet pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.11	Triplet pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.12	Triplet pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.13	Triplet pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.2	Quadruplet pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.20	Quadruplet pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.21	Quadruplet pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.22	Quadruplet pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O30.23	Quadruplet pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.000	Papyraceous fetus, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.001	Papyraceous fetus, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.002	Papyraceous fetus, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.003	Papyraceous fetus, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.004	Papyraceous fetus, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.005	Papyraceous fetus, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.009	Papyraceous fetus, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.010	Papyraceous fetus, first trimester, not applicable or unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.011	Papyraceous fetus, first trimester, fetus 1
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.012	Papyraceous fetus, first trimester, fetus 2
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.013	Papyraceous fetus, first trimester, fetus 3
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.014	Papyraceous fetus, first trimester, fetus 4
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.015	Papyraceous fetus, first trimester, fetus 5
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.019	Papyraceous fetus, first trimester, other fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.020	Papyraceous fetus, second trimester,first trimester, not applicable or unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.021	Papyraceous fetus, second trimester,fetus 1
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.022	Papyraceous fetus, second trimester, fetus 2
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.023	Papyraceous fetus, second trimester, fetus 3
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.024	Papyraceous fetus, second trimester, fetus 4
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.025	Papyraceous fetus, second trimester, fetus 5
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.029	Papyraceous fetus, second trimester, other fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.030	Papyraceous fetus, third trimester,first trimester, not applicable or unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.031	Papyraceous fetus, third trimester,fetus 1
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.032	Papyraceous fetus, third trimester, fetus 2
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.033	Papyraceous fetus, third trimester, fetus 3
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.034	Papyraceous fetus, third trimester, fetus 4
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.035	Papyraceous fetus, third trimester,fetus 5
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.039	Papyraceous fetus, third trimester, other fetus

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.2	Continuing pregnancy after intrauterine death of one fetus or more
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.20	Continuing pregnancy after intrauterine death of one fetus or more, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.21	Continuing pregnancy after intrauterine death of one fetus or more, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.22	Continuing pregnancy after intrauterine death of one fetus or more, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.23	Continuing pregnancy after intrauterine death of one fetus or more, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.3	Continuing pregnancy after elective fetal reduction of one fetus or more
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.30	Continuing pregnancy after elective fetal reduction of one fetus or more, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.31	Continuing pregnancy after elective fetal reduction of one fetus or more, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.32	Continuing pregnancy after elective fetal reduction of one fetus or more, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.33	Continuing pregnancy after elective fetal reduction of one fetus or more, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.8	Other complications specific to multiple gestation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.8	Other complications specific to multiple gestation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.8x	Other complications specific to multiple gestation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.8x	Other complications specific to multiple gestation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.8x1	Other complications specific to multiple gestation, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.8x2	Other complications specific to multiple gestation, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.8x3	Other complications specific to multiple gestation, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O31.8x9	Other complications specific to multiple gestation, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.8	Maternal care for other specified fetal problems
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.81	Decreased fetal movements
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.812	Decreased fetal movements, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.813	Decreased fetal movements, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.819	Decreased fetal movements, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.82	Fetal anemia and thrombocytopenia
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.821	Fetal anemia and thrombocytopenia, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.822	Fetal anemia and thrombocytopenia, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.823	Fetal anemia and thrombocytopenia, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.829	Fetal anemia and thrombocytopenia, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.89	Maternal care for other specified fetal problems
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.891	Maternal care for other specified fetal problems, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.892	Maternal care for other specified fetal problems, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.893	Maternal care for other specified fetal problems, third trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.899	Maternal care for other specified fetal problems, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.9	Maternal care for fetal problem, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.90	Maternal care for fetal problem, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.91	Maternal care for fetal problem, unspecified, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.92	Maternal care for fetal problem, unspecified, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O36.93	Maternal care for fetal problem, unspecified, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O40	Polyhydramnios
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O40.1	Polyhydramnios, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O40.2	Polyhydramnios, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O40.3	Polyhydramnios, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O40.9	Polyhydramnios, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.0	Oligohydramnios
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.00	Oligohydramnios, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.01	Oligohydramnios, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.02	Oligohydramnios, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.03	Oligohydramnios, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.1	Infection of amniotic sac and membranes
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.10	Infection of amniotic sac and membranes, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.101	Infection of amniotic sac and membranes, unspecified, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.102	Infection of amniotic sac and membranes, unspecified, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.103	Infection of amniotic sac and membranes, unspecified, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.109	Infection of amniotic sac and membranes, unspecified, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.12	Chorioamnionitis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.121	Chorioamnionitis, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.122	Chorioamnionitis, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.123	Chorioamnionitis, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.129	Chorioamnionitis, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.14	Placentitis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.141	Placentitis, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.142	Placentitis, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.143	Placentitis, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.149	Placentitis, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.8	Other specified disorders of amniotic fluid and membranes
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.8x	Other specified disorders of amniotic fluid and membranes
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.8x1	Other specified disorders of amniotic fluid and membranes, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.8x2	Other specified disorders of amniotic fluid and membranes, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.8x3	Other specified disorders of amniotic fluid and membranes, third trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.8x9	Other specified disorders of amniotic fluid and membranes, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.9	Disorder of amniotic fluid and membranes, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.90	Disorder of amniotic fluid and membranes, unspecified, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.91	Disorder of amniotic fluid and membranes, unspecified, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.92	Disorder of amniotic fluid and membranes, unspecified, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O41.93	Disorder of amniotic fluid and membranes, unspecified, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O42	Premature rupture of membranes
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O42.0	Premature rupture of membranes, onset of labor within 24 hours of rupture
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O42.00	Premature rupture of membranes, onset of labor within 24 hours of rupture, unspecified weeks of gestation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O42.01	Preterm premature rupture of membranes, onset of labor within 24 hours of rupture
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O42.011	Preterm premature rupture of membranes, onset of labor within 24 hours of rupture, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O42.012	Preterm premature rupture of membranes, onset of labor within 24 hours of rupture, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O42.013	Preterm premature rupture of membranes, onset of labor within 24 hours of rupture, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O42.019	Preterm premature rupture of membranes, onset of labor within 24 hours of rupture, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O44.00	Placenta previa specified as without hemorrhage, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O44.01	Placenta previa specified as without hemorrhage, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O44.02	Placenta previa specified as without hemorrhage, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O44.03	Placenta previa specified as without hemorrhage, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O44.10	Placenta previa with hemorrhage, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O44.11	Placenta previa with hemorrhage, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O44.12	Placenta previa with hemorrhage, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O44.13	Placenta previa with hemorrhage, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O45	Premature separation of placenta [abruptio placentae]
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O46	Antepartum hemorrhage, not elsewhere classified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O46.0	Antepartum hemorrhage with coagulation defect
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O46.8	Other antepartum hemorrhage
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O46.9	Antepartum hemorrhage, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O48.0	Post-term pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O48.1	Prolonged pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.00	Preterm labor without delivery, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.02	Preterm labor without delivery, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.03	Preterm labor without delivery, third trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.100	Preterm labor with preterm delivery, unspecified trimester, not applicable or unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.101	Preterm labor with preterm delivery, unspecified trimester, fetus 1
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.102	Preterm labor with preterm delivery, unspecified trimester, fetus 2
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.103	Preterm labor with preterm delivery, unspecified trimester, fetus 3
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.104	Preterm labor with preterm delivery, unspecified trimester, fetus 4
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.105	Preterm labor with preterm delivery, unspecified trimester, fetus 5
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.109	Preterm labor with preterm delivery, unspecified trimester, other fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.120	Preterm labor second trimester with preterm delivery second trimester, not applicable or unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.121	Preterm labor second trimester with preterm delivery second trimester, fetus 1
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.122	Preterm labor second trimester with preterm delivery second trimester, fetus 2
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.123	Preterm labor second trimester with preterm delivery second trimester, fetus 3
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.124	Preterm labor second trimester with preterm delivery second trimester, fetus 4
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.125	Preterm labor second trimester with preterm delivery second trimester, fetus 5
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.129	Preterm labor second trimester with preterm delivery second trimester, other fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.130	Preterm labor second trimester with preterm delivery third trimester, not applicable or unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.131	Preterm labor second trimester with preterm delivery third trimester, fetus 1
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.132	Preterm labor second trimester with preterm delivery third trimester, fetus 2
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.133	Preterm labor second trimester with preterm delivery third trimester, fetus 3
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.134	Preterm labor second trimester with preterm delivery third trimester, fetus 4
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.135	Preterm labor second trimester with preterm delivery third trimester, fetus 5
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.139	Preterm labor second trimester with preterm delivery third trimester, other fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.140	Preterm labor third trimester with preterm delivery third trimester, not applicable or unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.141	Preterm labor third trimester with preterm delivery third trimester, fetus 1
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.142	Preterm labor third trimester with preterm delivery third trimester, fetus 2
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.143	Preterm labor third trimester with preterm delivery third trimester, fetus 3
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.144	Preterm labor third trimester with preterm delivery third trimester, fetus 4

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.145	Preterm labor third trimester with preterm delivery third trimester, fetus 5
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O60.149	Preterm labor third trimester with preterm delivery third trimester, other fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O61.0	Failed medical induction of labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O61.1	Failed instrumental induction of labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O61.8	Other failed induction of labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O61.9	Failed induction of labor, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O62	Abnormalities of forces of labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O62.0	Primary inadequate contractions
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O62.1	Secondary uterine inertia
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O62.2	Other uterine inertia
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O62.3	Precipitate labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O62.4	Hypertonic, incoordinate, and prolonged uterine contractions
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O62.8	Other abnormalities of forces of labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O62.9	Abnormality of forces of labor, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O63	Long labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O63.0	Prolonged first stage (of labor)
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O63.1	Prolonged second stage (of labor)
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O63.2	Delayed delivery of second twin, triplet, etc.
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O63.9	Long labor, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64	Obstructed labor due to malposition and malpresentation of fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64.0	Obstructed labor due to incomplete rotation of fetal head
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64.1	Obstructed labor due to breech presentation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64.2	Obstructed labor due to face presentation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64.3	Obstructed labor due to brow presentation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64.4	Obstructed labor due to shoulder presentation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64.5	Obstructed labor due to compound presentation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64.8	Obstructed labor due to other malposition and malpresentation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O64.9	Obstructed labor due to malposition and malpresentation, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65	Obstructed labor due to maternal pelvic abnormality
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65.0	Obstructed labor due to deformed pelvis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65.1	Obstructed labor due to generally contracted pelvis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65.2	Obstructed labor due to pelvic inlet contraction
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65.3	Obstructed labor due to pelvic outlet and mid-cavity contraction
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65.4	Obstructed labor due to fetopelvic disproportion, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65.5	Obstructed labor due to abnormality of maternal pelvic organs
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65.8	Obstructed labor due to other maternal pelvic abnormalities
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O65.9	Obstructed labor due to maternal pelvic abnormality, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66	Other obstructed labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.0	Obstructed labor due to shoulder dystocia
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.1	Obstructed labor due to locked twins

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.2	Obstructed labor due to unusually large fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.3	Obstructed labor due to other abnormalities of fetus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.4	Failed trial of labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.40	Failed trial of labor, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.41	Failed attempted vaginal birth after previous cesarean delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.5	Attempted application of vacuum extractor and forceps
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.6	Obstructed labor due to other multiple fetuses
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.8	Other specified obstructed labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O66.9	Obstructed labor, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O67	Labor and delivery complicated by intrapartum hemorrhage, not elsewhere classified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O67.0	Intrapartum hemorrhage with coagulation defect
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O67.8	Other intrapartum hemorrhage
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O67.9	Intrapartum hemorrhage, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69	Labor and delivery complicated by umbilical cord complications
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.0	Labor and delivery complicated by prolapse of cord
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.1	Labor and delivery complicated by cord around neck, without compression
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.2	Labor and delivery complicated by other cord entanglement, with compression
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.3	Labor and delivery complicated by short cord
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.4	Labor and delivery complicated by vasa previa
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.5	Labor and delivery complicated by vascular lesion of cord
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.8	Labor and delivery complicated by other cord complications
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.81	Labor and delivery complicated by cord around neck, without compression
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.82	Labor and delivery complicated by other cord entanglement, without compression
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.89	Labor and delivery complicated by other cord complications
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O69.9	Labor and delivery complicated by cord complication, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O70	Perineal laceration during delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O70.0	First degree perineal laceration during delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O70.1	First degree perineal laceration during delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O70.2	Third degree perineal laceration during delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O70.3	Fourth degree perineal laceration during delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O70.4	Anal sphincter tear complicating delivery, not associated with third degree laceration
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O70.9	Perineal laceration during delivery, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71	Other obstetric trauma
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.0	Rupture of uterus (spontaneous) before onset of labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.00	Rupture of uterus before onset of labor, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.02	Rupture of uterus before onset of labor, second trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.03	Rupture of uterus before onset of labor, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.1	Rupture of uterus during labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.2	Postpartum inversion of uterus
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.3	Obstetric laceration of cervix
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.4	Obstetric high vaginal laceration alone
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.5	Other obstetric injury to pelvic organs
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.6	Obstetric damage to pelvic joints and ligaments
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.7	Obstetric hematoma of pelvis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.8	Other specified obstetric trauma
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.81	Laceration of uterus, not elsewhere classified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.89	Other specified obstetric trauma
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O71.9	Obstetric trauma, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O72.0	Third-stage hemorrhage
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74	Complications of anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.0	Aspiration pneumonitis due to anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.1	Other pulmonary complications of anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.2	Cardiac complications of anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.3	Central nervous system complications of anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.4	Toxic reaction to local anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.5	Spinal and epidural anesthesia-induced headache during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.6	Other complications of spinal and epidural anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.7	Failed or difficult intubation for anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.8	Other complications of anesthesia during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O74.9	Complication of anesthesia during labor and delivery, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75	Other complications of labor and delivery, not elsewhere classified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.0	Maternal distress during labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.1	Shock during or following labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.2	Pyrexia during labor, not elsewhere classified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.3	Other infection during labor
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.4	Other complications of obstetric surgery and procedures
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.5	Delayed delivery after artificial rupture of membranes
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.8	Other specified complications of labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.81	Maternal exhaustion complicating labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.89	Other specified complications of labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O75.9	Complication of labor and delivery, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O76	Abnormality in fetal heart rate and rhythm complicating labor and delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O77	Other fetal stress complicating labor and delivery

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O77.0	Labor and delivery complicated by meconium in amniotic fluid
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O77.1	Fetal stress in labor or delivery due to drug administration
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O77.8	Labor and delivery complicated by other evidence of fetal stress
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O77.9	Labor and delivery complicated by fetal stress, unspecified
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O80	Encounter for full-term uncomplicated delivery
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O82	Encounter for cesarean delivery without indication
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88	Obstetric embolism
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.0	Obstetric air embolism in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.01	Obstetric air embolism in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.011	Air embolism in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.012	Air embolism in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.013	Air embolism in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.019	Air embolism in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.02	Air embolism in childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.11	Amniotic fluid embolism in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.111	Amniotic fluid embolism in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.112	Amniotic fluid embolism in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.113	Amniotic fluid embolism in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.119	Amniotic fluid embolism in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.12	Amniotic fluid embolism in childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.2	Obstetric thromboembolism
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.21	Thromboembolism in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.211	Thromboembolism in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.212	Thromboembolism in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.213	Thromboembolism in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.219	Thromboembolism in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.22	Thromboembolism in childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.31	Pyemic and septic embolism in pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.311	Pyemic and septic embolism in pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.312	Pyemic and septic embolism in pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.313	Pyemic and septic embolism in pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.319	Pyemic and septic embolism in pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O88.32	Pyemic and septic embolism in childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O90.0	Disruption of cesarean delivery wound
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O90.1	Disruption of perineal obstetric wound
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O90.3	Peripartum cardiomyopathy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O90.4	Postpartum acute kidney failure
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O90.5	Postpartum thyroiditis
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O90.6	Postpartum mood disturbance
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.0	Infection of nipple associated with pregnancy, the puerperium and lactation

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.01	Infection of nipple associated with pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.011	Infection of nipple associated with pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.012	Infection of nipple associated with pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.013	Infection of nipple associated with pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.019	Infection of nipple associated with pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.1	Abscess of breast associated with pregnancy, the puerperium and lactation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.11	Abscess of breast associated with pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.111	Abscess of breast associated with pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.112	Abscess of breast associated with pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.113	Abscess of breast associated with pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.119	Abscess of breast associated with pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.119	Abscess of breast associated with pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.2	Nonpurulent mastitis associated with pregnancy, the puerperium and lactation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.21	Nonpurulent mastitis associated with pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.211	Nonpurulent mastitis associated with pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.212	Nonpurulent mastitis associated with pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.213	Nonpurulent mastitis associated with pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O91.219	Nonpurulent mastitis associated with pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92	Other disorders of breast and disorders of lactation associated with pregnancy and the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.0	Retracted nipple associated with pregnancy, the puerperium, and lactation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.01	Retracted nipple associated with pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.011	Retracted nipple associated with pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.012	Retracted nipple associated with pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.013	Retracted nipple associated with pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.019	Retracted nipple associated with pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.1	Cracked nipple associated with pregnancy, the puerperium, and lactation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.11	Cracked nipple associated with pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.111	Cracked nipple associated with pregnancy, first trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.112	Cracked nipple associated with pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.113	Cracked nipple associated with pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.119	Cracked nipple associated with pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.29	Other disorders of breast associated with pregnancy and the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.6	Galactorrhea
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O92.7	Other and unspecified disorders of lactation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.011	Tuberculosis complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.012	Tuberculosis complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.013	Tuberculosis complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.019	Tuberculosis complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.02	Tuberculosis complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.111	Syphilis complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.112	Syphilis complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.113	Syphilis complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.119	Syphilis complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.12	Syphilis complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.211	Gonorrhea complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.212	Gonorrhea complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.213	Gonorrhea complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.219	Gonorrhea complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.22	Gonorrhea complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.311	Other infections with a predominantly sexual mode of transmission complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.312	Other infections with a predominantly sexual mode of transmission complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.313	Other infections with a predominantly sexual mode of transmission complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.319	Other infections with a predominantly sexual mode of transmission complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.32	Other infections with a predominantly sexual mode of transmission complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.511	Other viral diseases complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.512	Other viral diseases complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.513	Other viral diseases complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.519	Other viral diseases complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.52	Other viral diseases complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.611	Protozoal diseases complicating pregnancy, first trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.612	Protozoal diseases complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.613	Protozoal diseases complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.619	Protozoal diseases complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.62	Protozoal diseases complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.811	Other maternal infectious and parasitic diseases complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.812	Other maternal infectious and parasitic diseases complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.813	Other maternal infectious and parasitic diseases complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.819	Other maternal infectious and parasitic diseases complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.82	Other maternal infectious and parasitic diseases complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O98.919	Unspecified maternal infectious and parasitic disease complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.011	Anemia complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.012	Anemia complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.013	Anemia complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.019	Anemia complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.02	Anemia complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.111	Other diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.112	Other diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.113	Other diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.119	Other diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.12	Other diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.21	Obesity complicating pregnancy, childbirth, and the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.280	Endocrine, nutritional and metabolic diseases complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.281	Endocrine, nutritional and metabolic diseases complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.282	Endocrine, nutritional and metabolic diseases complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.283	Endocrine, nutritional and metabolic diseases complicating pregnancy, third trimester

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000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.284	Endocrine, nutritional and metabolic diseases complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.310	Alcohol use complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.311	Alcohol use complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.312	Alcohol use complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.313	Alcohol use complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.314	Alcohol use complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.320	Drug use complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.321	Drug use complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.322	Drug use complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.323	Drug use complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.324	Drug use complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.33	Smoking (tobacco) complicating pregnancy, childbirth, and the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.8	Other specified diseases and conditions complicating pregnancy, childbirth and the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.81	Abnormal glucose complicating pregnancy, childbirth and the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.810	Abnormal glucose complicating pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.84	Bariatric surgery status complicating pregnancy, childbirth and the puerperium
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.84	Bariatric surgery status complicating pregnancy, unspecified trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.841	Bariatric surgery status complicating pregnancy, first trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.842	Bariatric surgery status complicating pregnancy, second trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.843	Bariatric surgery status complicating pregnancy, third trimester
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	O99.844	Bariatric surgery status complicating childbirth
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	I10	Z33.1	Pregnant state, incidental
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	9279009	extra-amniotic pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	14418008	precocious pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	41587001	third trimester pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	45307008	extrachorial pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	47200007	high risk pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	57630001	first trimester pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	58532003	unwanted pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	59466002	second trimester pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	65727000	intrauterine pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	72892002	normal pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	77386006	patient currently pregnant
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	83074005	unplanned pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	102872000	pregnancy on oral contraceptive
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	102873005	pregnancy on intrauterine device
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	102875003	surrogate pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169560008	pregnant - urine test confirms
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169561007	pregnant - blood test confirms

AMA - PCPI Level I EHR Specifications
Heart Failure - ACE/ARB Therapy for LVSD (HF-7)

value_set_id	clinical_ topic	topic_ indicator	measure_c omponent	standard_concept	standard_category	standard_ taxonomy	code	code_description
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169562000	pregnant - V.E. confirms
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169563005	pregnant - on history
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169564004	pregnant - on abdominal palpation
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169565003	pregnant - planned
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169566002	pregnant - unplanned - wanted
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169567006	pregnant -unplanned-not wanted
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	169568001	unplanned pregnancy unknown if child is wanted
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	199715003	grand multiparity with antenatal problem
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	237233002	concealed pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	237238006	pregnancy with uncertain dates
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	237239003	low risk pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	237240001	teenage pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	237241002	viable pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	237242009	non-viable pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	237244005	single pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	248985009	presentation of pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	281307002	uncertain viability of pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	314204000	early stage of pregnancy
000264	HF	7	E	Pregnancy	Diagnosis/Condition/Problem	SNM	442478007	combined tubal and intrauterine pregnancy
000212	HF	7	E	Patient reason for ACE inhibitor or ARB decline	Negation Rationale	SNM	134397009	angiotensin converting enzyme inhibitor declined
000212	HF	7	E	Patient reason for ACE inhibitor or ARB decline	Negation Rationale	SNM	401084003	angiotensin II receptor antagonist declined

NATIONAL QUALITY FORUM

Measure Evaluation 4.1
December 2009

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The subcriteria and most of the footnotes from the evaluation criteria are provided in Word comments within the form and will appear if your cursor is over the highlighted area. Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized)**:** Complete all yellow highlighted areas of the form. Evaluate the extent to which each subcriterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: *If there is no TAP or workgroup, the SC also evaluates the subcriteria (yellow highlighted areas).*

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the subcriteria, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met
C = Completely (unquestionably demonstrated to meet the criterion)
P = Partially (demonstrated to partially meet the criterion)
M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)
N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)
NA = Not applicable (only an option for a few subcriteria as indicated)

(for NQF staff use) **NQF Review #:** 0083 **NQF Project:** Cardiovascular Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Heart Failure : Beta-blocker therapy for Left Ventricular Systolic Dysfunction
De.2 **Brief description of measure**: Percentage of patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% who were prescribed beta-blocker therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge
1.1-2 **Type of Measure:** Process De.3 **If included in a composite or paired with another measure, please identify composite or paired measure** This measure is paired with Heart Failure (HF): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction.
De.4 **National Priority Partners Priority Area:** Population health De.5 **IOM Quality Domain**: Effectiveness, Equity De.6 **Consumer Care Need:** Living with illness

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	**NQF Staff**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.* A.1 **Do you attest that the measure steward holds intellectual property rights to the measure and the right to use aspects of the measure owned by another entity (e.g., risk model, code set)?** Yes A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:**	**A** **Y☐** **N☐**

B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section	**B** Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement Accountability	**C** Y☐ N☐
D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is provided. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement. D.1**Testing:** Yes, fully developed and tested D.2 **Have NQF-endorsed measures been reviewed to identify if there are similar or related measures?** Yes	**D** Y☐ N☐
(for NQF staff use**)** **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. *Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.* (evaluation criteria) **1a. High Impact**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Affects large numbers, Leading cause of morbidity/mortality, High resource use, Severity of illness, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Heart failure is a chronic condition that poses a major and growing threat to the public's health. Improving the effectiveness of care and optimizing patient outcomes will become increasingly important as the population of the United States ages. •Currently, approximately 5.7 million Americans are living with heart failure. •Heart failure incidence approaches 10 per 1000 population after 65 years of age. •A person aged 40 years or older has a 1 in 5 chance of developing heart failure. •Hospital discharges for heart failure rose from 877,000 in 1996 to 1,106,000 in 2006. •80% percent of men and 70% of women less than 65 years of age who have heart failure will die within 8 years. •In 2005, 1 in 8 death certificates (292,214 deaths) in the United States mentioned heart failure. •For 2009, the estimated direct and indirect cost of heart failure in the United States is $37.2 billion, representing a portion of the estimated $475.3 billion for all cardiovascular diseases. 1a.4 **Citations for Evidence of High Impact:** Lloyd-Jones D, Adams RJ, Brown TM, et al., American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics–2010 update: a report from the American Heart Association. Circulation. 2010;126:e46-e215.	**1a** C☐ P☐ M☐ N☐

Comment [KP1]: **1a.** The measure focus addresses:
•a specific national health goal/priority identified by NQF's National Priorities Partners; OR
•a demonstrated high impact aspect of healthcare (e.g., affects large numbers, leading cause of morbidity/mortality, high resource use (current and/or future), severity of illness, and patient/societal consequences of poor quality).

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: This measure is aimed at improving the number of patients with HF who are prescribed beta-blocker therapy in the outpatient and inpatient setting, particularly the three beta-blockers proven to reduce mortality and recommended in the treatment of patients with heart failure and LVSD.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Registry data from IMPROVE HF indicates that beta-blockers were prescribed to 86% of eligible outpatients without documented contraindications or intolerance. More importantly, use of beta-blockers varied widely with practices reporting rates of adherence as low as 8.6% and as high as 100%.(1)

From March 1, 2003, through December 31, 2004, Fonarow and colleagues analyzed data from the 259 U.S. hospitals (48,612 patients) participating in the Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients With Heart Failure (OPTIMIZE-HF) to determine the effect of a quality improvement initiative. Baseline data indicated that 78% of eligible patients were prescribed a beta-blocker at discharge. Use of any of the three recommended, evidence-based beta blockers (bisoprolol fumarate, carvedilol, metoprolol succinate) was significantly lower with 56% of eligible patients. (2)

(1)Fonarow GC, Yancy CW, Heywood JT. Adherence to heart failure quality-of-care indicators in US hospitals: analysis of the ADHERE Registry. Arch Intern Med. 2005; 165: 1469–1477.
(2)Fonarow GC, Abraham WT, Albert NM, et al. Influence of a performance-improvement initiative on quality of care for patients hospitalized with heart failure: results of the Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure (OPTIMIZE-HF). Arch Intern Med. 2007; 167:1493-1502.

Please see additional performance data in section 1 of the attached Measure Testing Summary.

1b.3 Citations for data on performance gap:
Please see additional performance data in section 1 and project descriptions at the end of the attached Measure Testing Summary.

1b.4 Summary of Data on disparities by population group:
A recent analysis of data derived from 14,464 outpatients enrolled from July 2008 through June 2009 into the American College of Cardiology's PINNACLE program concluded that there were no substantial racial or sex differences in compliance for key performance measures for CAD, HF, and atrial fibrillation. (Chan et al, 2010) Compliance rates between black and whites and men and women were generally similar for beta-blocker use for patients with heart failure and left ventricular systolic dysfunction. More specifically, 92.5% of Whites, 92.6% of Blacks, 92.4% of Men and 91.9% of Women with heart failure and left ventricular systolic dysfunction were prescribed beta-blocker therapy.

Reference: Chan PS, Oetgen WJ, Buchanan D, et al. Cardiac Performance Measure Compliance in Outpatients, The American College of Cardiology and National Cardiovascular Data Registry's PINNACLE (Practice Innovation And Clinical Excellence) Program, J. Am. Coll. Cardiol. 2010;56;8-14.

1b.5 Citations for data on Disparities:

1b
C☐
P☐
M☐
N☐

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** Beta-blockers are recommended for all patients with stable heart failure and left ventricular systolic dysfunction, unless contraindicated. Treatment should be initiated as soon as a patient is diagnosed with left ventricular systolic dysfunction and does not have low blood pressure, fluid overload, or recent treatment with an intravenous positive inotropic agent. Beta-blockers have been shown to lessen the symptoms of heart failure, improve the clinical status of patients, reduce future clinical deterioration, and decrease the risk of mortality and the combined risk of mortality and hospitalization.

1c
C☐
P☐
M☐
N☐

Comment [KP2]: 1b. Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating considerable variation, or overall poor performance, in the quality of care across providers and/or population groups (disparities in care).

Comment [k3]: 1 Examples of data on opportunity for improvement include, but are not limited to: prior studies, epidemiologic data, measure data from pilot testing or implementation. If data are not available, the measure focus is systematically assessed (e.g., expert panel rating) and judged to be a quality problem.

Comment [k4]: 1c. The measure focus is:
•an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed;
OR
•if an intermediate outcome, process, structure, etc., there is **evidence** that supports the specific measure focus as follows:
oIntermediate outcome – evidence that the measured intermediate outcome (e.g., blood pressure, Hba1c) leads to improved health/avoidance of harm or cost/benefit.
oProcess – evidence that the measured clinical or administrative process leads to improved health/avoidance of harm and
if the measure focus is on one step in a multi-step care process, it measures the step that has the greatest effect on improving the specified desired outcome(s).
oStructure – evidence that the measured structure supports the consistent delivery of effective processes or access that lead to improved health/avoidance of harm or cost/benefit.
oPatient experience – evidence that an association exists between the measure of patient experience of health care and the outcomes, values and preferences of individuals/ the public.
oAccess – evidence that an association exists between access to a health service and the outcomes of, or experience with, care.
oEfficiency – demonstration of an association between the measured resource use and level of performance with respect to one or more of the other five IOM aims of quality.

Comment [k5]: 4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., … [1]

1c.2-3. Type of Evidence: Evidence-based guideline

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
"Beta-blockers have now been evaluated in more than 20,000 patients with HF who participated in more than 20 published placebo-controlled clinical trials." "This collective experience indicates that long-term treatment with beta blockers can lessen the symptoms of HF, improve the clinical status of patients, and enhance the patient's overall sense of well-being." (1)

(1)Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343– 82.

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom***):**
Level A (Data derived from multiple randomized clinical trials or meta-analyses as noted by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines)

1c.6 Method for rating evidence: Levels of Evidence are classified as follows:
-Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses
-Level of Evidence B: Data derived from a single randomized trial or nonrandomized studies
-Level of Evidence C: Only consensus opinion of experts, case studies, or standard-of-care

1c.7 Summary of Controversy/Contradictory Evidence:

1c.8 Citations for Evidence (*other than guidelines***):**

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number***):**
Beta-blockers (using 1 of the 3 proven to reduce mortality, i.e., bisoprolol, carvedilol, and sustained release metoprolol succinate) are recommended for all stable patients with current or prior symptoms of [heart failure] and reduced LVEF, unless contraindicated. (Class I, Level of Evidence: A) (ACCF/AHA, 2009) (1)

Treatment with a beta blocker should be initiated at very low doses [see excerpt from guideline table below], followed by gradual increments in dose if lower doses have been well tolerated… physicians, especially cardiologists and primary care physicians, should make every effort to achieve the target doses of the beta blockers shown to be effective in major clinical trials. (ACCF/AHA, 2009) (1)

For the hospitalized patient:
-In patients with reduced ejection fraction experiencing a symptomatic exacerbation of [heart failure] requiring hospitalization during chronic maintenance treatment with oral therapies known to improve outcomes, particularly [ACE inhibitors] or ARBs and beta-blocker therapy, it is recommended that these therapies be continued in most patients in the absence of hemodynamic instability or contraindications. (Class I, Level of Evidence: C) (ACCF/AHA, 2009) (1)
-In patients hospitalized with [heart failure] with reduced ejection fraction not treated with oral therapies known to improve outcomes, particularly [ACE inhibitors] or ARBs and beta-blocker therapy, initiation of these therapies is recommended in stable patients prior to hospital discharge. (Class I, Level of Evidence: B) (ACCF/AHA, 2009) (1)
-Initiation of beta-blocker therapy is recommended after optimization of volume status and successful discontinuation of intravenous diuretics, vasodilators, and inotropic agents. Beta-blocker therapy should be initiated at a low dose and only in stable patients. Particular caution should be used when initiating beta blockers in patients who have required inotropes during their hospital course. (Class I, Level of Evidence: B) (ACCF/AHA, 2009) (1)

1c.10 Clinical Practice Guideline Citation: (1)Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult

Comment [k6]: 3 The strength of the body of evidence for the specific measure focus should be systematically assessed and rated (e.g., USPSTF grading system http://www.ahrq.gov/clinic/uspstf07/methods/benefit.htm). If the USPSTF grading system was not used, the grading system is explained including how it relates to the USPSTF grades or why it does not. However, evidence is not limited to quantitative studies and the best type of evidence depends upon the question being studied (e.g., randomized controlled trials appropriate for studying drug efficacy are not well suited for complex system changes). When qualitative studies are used, appropriate qualitative research criteria are used to judge the strength of the evidence.

Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343–82. 1c.11 **National Guideline Clearinghouse or other URL:** http://content.onlinejacc.org/cgi/reprint/53/15/e1.pdf 1c.12 **Rating of strength of recommendation** (*also provide narrative description of the rating and by whom*)**:** Class I (Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines) 1c.13 **Method for rating strength of recommendation** (*If different from USPSTF system, also describe rating and how it relates to USPSTF*)**:** Classifications of Recommendations are classified as follows: Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective. Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment. Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy. Class IIb: Usefulness/efficacy is less well established by evidence/opinion. Class III: Conditions for which there is evidence and/or general agreement that a procedure/treatment is not useful/effective and in some cases may be harmful. 1c.14 **Rationale for using this guideline over others:** It is the PCPI policy to use guidelines, which are evidence-based, applicable to physicians and other healthcare providers, and developed by a national specialty organization or government agency. In addition, the PCPI has now expanded what is acceptable as the evidence base for measures to included documented quality improvement (QI) initiatives or implementation projects that have demonstrated improvement in the quality of care.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, **met?** **Rationale:**	**1** **Y☐** **N☐**
2. SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES	
Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 **Do you have a web page where current detailed measure specifications can be obtained?** S.2 **If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 **Numerator Statement** (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome*)**:** 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 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 **Beta-blocker therapy should include bisoprolol, carvedilol, or sustained release metoprolol succinate.	**2a-specs** **C☐** **P☐** **M☐** **N☐**

Comment [k7]: USPSTF grading system **http://www.ahrq.gov/clinic/uspstf/grades.htm**: **A -** The USPSTF recommends the service. There is high certainty that the net benefit is substantial. **B -** The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. **C -** The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is at least moderate certainty that the net benefit is small. Offer or provide this service only if other considerations support the offering or providing the service in an individual patient. **D -** The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. **I -** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

Comment [KP8]: 2a. The measure is well defined and precisely specified so that it can be implemented consistently within and across organizations and allow for comparability. The required data elements are of high quality as defined by NQF's Health Information Technology Expert Panel (HITEP) .

2a.2 Numerator Time Window (*The time period in which cases are eligible for inclusion in the numerator***):**
Once during the measurement period

2a.3 Numerator Details (*All information required to collect/calculate the numerator, including all codes, logic, and definitions***):**
See attached for EHR Specifications.
For Claims/Administrative: Report CPT Category II Code: 4006F- Beta-blocker therapy prescribed

2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):**
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

2a.5 Target population gender: Female, Male
2a.6 Target population age range: 18 years and older

2a.7 Denominator Time Window (*The time period in which cases are eligible for inclusion in the denominator***):**
12 consecutive months

2a.8 Denominator Details (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**
See attached for EHR Specifications.
For Claims/Administrative: See coding tables attached for coding (ICD-9-CM, ICD-10-CM, SNOMED, CPT)
AND
Report CPT Category II Code (in development)3021F- Left ventricular ejection fraction (LVEF) < 40% or documentation of moderately or severely depressed left ventricular systolic function

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):**
Documentation of medical reason(s) for not prescribing beta-blocker therapy

Documentation of patient reason(s) for not prescribing beta-blocker therapy

Documentation of system reason(s) for not prescribing beta-blocker therapy

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
See attached for EHR Specifications.
For Claims/Administrative: See coding tables attached for coding (ICD-9-CM, ICD-10-CM, SNOMED, CPT)
- Append modifier to CPT II code 4006F-1P
- Append modifier to CPT II code 4006F-2P
- Append modifier to CPT II code 4006F-3P

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**

2a.12-13 Risk Adjustment Type: No risk adjustment necessary

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**

2a.15-17 Detailed risk model available Web page URL or attachment:

2a.18-19 Type of Score: Rate/proportion
2a.20 Interpretation of Score: Better quality = Higher score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
See attached for calculation algorithm

Comment [k9]: 11 Risk factors that influence outcomes should not be specified as exclusions.
12 Patient preference is not a clinical exception to eligibility and can be influenced by provider interventions.

2a.22 Describe the method for discriminating performance *(e.g., significance testing)*:

2a.23 Sampling (Survey) Methodology *If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate)*:

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Paper medical record/flow-sheet, Electronic administrative data/claims, Electronic clinical data, Electronic Health/Medical Record, Registry data

2a.25 Data source/data collection instrument (*Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.***):**
This measure, in its previous specifications, is currently being used in the ACCF PINNACLE registry for the outpatient office setting.

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL
www.pinnacleregistry.org

2a.29-31 Data dictionary/code table web page URL or attachment: Attachment NQF 0083_PCPI_HF-6_Beta Blocker for LVSD.pdf

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Clinicians: Individual, Clinicians: Group

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Home, Ambulatory Care: Office, Hospital, Ambulatory Care: Clinic, Nursing home (NH) /Skilled Nursing Facility (SNF), Ambulatory Care: Hospital Outpatient, Assisted Living, Group homes

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Clinicians: PA/NP/Advanced Practice Nurse, Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)*: Measure testing results with some relevance to this measure are provided in the attached summary. Please note, however, that the results summarized are from the testing of earlier versions of the PCPI Heart Failure and Hypertension measures. Additional PCPI staff analysis of the relevance of available testing data to the current version of these measures is ongoing and will be submitted to NQF separately and at the earliest possible date. Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)*:
Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
Please see additional information in sections 2, 4, 6, 7, 8, 9, 10 of the attached Measure Testing Summary

2b
C☐
P☐
M☐
N☐

2c. Validity testing

2c.1 Data/sample *(description of data/sample and size)*:

2c.2 Analytic Method *(type of validity & rationale, method for testing)*:
All PCPI performance measures are assessed for content validity by expert work group members during the development process. Additional input on the content validity of draft measures is obtained through a 30-day public comment period and by also soliciting comments from a panel of consumer, purchaser, and patient representatives convened by the PCPI specifically for this purpose. All comments received are

2c
C☐
P☐
M☐
N☐

Comment [KP10]: 2b. Reliability testing demonstrates the measure results are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period.

Comment [k11]: 8 Examples of reliability testing include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing may address the data items or final measure score.

Comment [KP12]: 2c. Validity testing demonstrates that the measure reflects the quality of care provided, adequately distinguishing good and poor quality. If face validity is the only validity addressed, it is systematically assessed.

Comment [k13]: 9 Examples of validity testing include, but are not limited to: determining if measure scores adequately distinguish between providers known to have good or poor quality assessed by another valid method; correlation of measure scores with another valid indicator of quality for the specific topic; ability of measure scores to predict scores on some other related valid measure; content validity for multi-item scales/tests. Face validity is a subjective assessment by experts of whether the measure reflects the quality of care (e.g., whether the proportion of patients with BP < 140/90 is a marker of quality). If face validity is the only validity addressed, it is systematically assessed (e.g., ratings by relevant stakeholders) and the measure is judged to represent quality care for the specific topic and that the measure focus is the most important aspect of quality for the specific topic.

reviewed by the expert work group and the measures adjusted as needed. Other external review groups (eg, focus groups) may be convened if there are any remaining concerns related to the content validity of the measures.

2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:

2d. Exclusions Justified

2d.1 **Summary of Evidence supporting exclusion(s):**
The PCPI support the consideration of exceptions or exclusions on a measure by measure basis. There must be clear rationale to permit an exception for a medical, patient, or system reason based on whether or not that reason is significant and occurs frequently enough. The PCPI also support systematic review and analysis of each physician´s exceptions data to identify practice patterns and opportunities for quality improvement.

The Heart Failure Work Group agreed to include a medical reason exception so that clinicians can exclude patients for whom the prescription of beta-blocker therapy may not be indicated or contraindicated (eg, low blood pressure, fluid overload) - see verbatim guidelines statements below. A patient reason exception has been included for patients who might decline this particular pharmacologic treatment. Additionally, a system reason exception has been included to account for potential financial constraints that would inhibit use/prescription of a beta-blocker.

"Beta blockers should be prescribed to all patients with stable HF due to reduced LVEF unless they have a contraindication to their use or have been shown to be unable to tolerate treatment with these drugs.

Which patients are sufficiently stable to be considered for treatment with a beta blocker? Regardless of the severity of symptoms, patients should not be hospitalized in an intensive care unit, should have no or minimal evidence of fluid overload or volume depletion, and should not have required recent treatment with an intravenous positive inotropic agent.

Betablockers may be considered in patients who have reactive airway disease or asymptomatic bradycardia but should be used with great caution or not at all in patients with persistent symptoms of either condition."

2d.2 **Citations for Evidence:**
Jessup M, Abraham WT, Casey DE, et al., writing on behalf of the 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult Writing Committee. 2009 focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2009;53:1343–82.

2d.3 **Data/sample** *(description of data/sample and size)*: Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary.

2d.4 **Analytic Method** *(type analysis & rationale)*:
Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary.

2d.5 **Testing Results** *(e.g., frequency, variability, sensitivity analyses)*:
Please see additional information in sections 1,3,5,7 of the attached Measure Testing Summary.

2d
C☐
P☐
M☐
N☐
NA☐

2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 **Data/sample** *(description of data/sample and size)*:

2e.2 **Analytic Method** *(type of risk adjustment, analysis, & rationale)*:
This is a process measure; risk adjustment is not indicated.

2e.3 **Testing Results** *(risk model performance metrics)*:

2e
C☐
P☐
M☐
N☐
NA☐

Comment [KP14]: 2d. Clinically necessary measure exclusions are identified and must be:
•supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;
AND
•a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;
AND
•precisely defined and specified:
–if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of cases excluded, exclusion rates by type of exclusion);
if patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately).

Comment [k15]: 10 Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, sensitivity analyses with and without the exclusion, and variability of exclusions across providers.

Comment [KP16]: 2e. For outcome measures and other measures (e.g., resource use) when indicated:
•an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care;[Error! Bookmark not defined.] OR
rationale/data support no risk adjustment.

Comment [k17]: 13 Risk models should not obscure disparities in care for populations by including factors that are associated with differences/inequalities in care such as race, socioeconomic status, gender (e.g., poorer treatment outcomes of African American men with prostate cancer, inequalities in treatment for CVD risk factors between men and women). It is preferable to stratify measures by race and socioeconomic status rather than adjusting out differences.

2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:	
2f. Identification of Meaningful Differences in Performance **2f.1 Data/sample from Testing or Current Use** *(description of data/sample and size)***:** Please see additional information in section 1 of the attached Measure Testing Summary. **2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)***:** Please see additional information in section 1 of the attached Measure Testing Summary. **2f.3 Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)***:** Please see additional information in section 1 of the attached Measure Testing Summary.	**2f** **C☐** **P☐** **M☐** **N☐**
2g. Comparability of Multiple Data Sources/Methods **2g.1 Data/sample** *(description of data/sample and size)***:** Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary. **2g.2 Analytic Method** *(type of analysis & rationale)***:** Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary. **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)***:** Please see additional information in sections 6,7,8,9,10 of the attached Measure Testing Summary.	**2g** **C☐** **P☐** **M☐** **N☐** **NA☐**
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)***:** **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** The ACCF, AHA, and PCPI advocate that performance measure data should, where possible, be stratified by race, ethnicity, and primary language to assess disparities and initiate subsequent quality improvement activities addressing identified disparities, consistent with recent national efforts to standardize the collection of race and ethnicity data. A 2008 NQF report endorsed 45 practices including stratification by the aforementioned variables.(1) A 2009 IOM report "recommends collection of the existing Office of Management and Budget (OMB) race and Hispanic ethnicity categories as well as more fine-grained categories of ethnicity (referred to as granular ethnicity and based on one's ancestry) and language need (a rating of spoken English language proficiency of less than very well and one's preferred language for health-related encounters)."(2) References (1)National Quality Forum Issue Brief (No.10). Closing the Disparities Gap in Healthcare Quality with Performance Measurement and Public Reporting. Washington, DC: NQF, August 2008. (2)Race, Ethnicity, and Language Data: Standardization for Health Care Quality Improvement. March 2010. AHRQ Publication No. 10-0058-EF. Agency for Healthcare Research and Quality, Rockville, MD. Available at: http://www.ahrq.gov/research/iomracereport. Accessed May 25, 2010.	**2h** **C☐** **P☐** **M☐** **N☐** **NA☐**
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties***, met?** **Rationale:**	*2* **C☐** **P☐** **M☐** **N☐**

Comment [KP18]: 2f. Data analysis demonstrates that methods for scoring and analysis of the specified measure allow for identification of statistically significant and practically/clinically meaningful differences in performance.

Comment [k19]: 14 With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74% v. 75%) is clinically meaningful; or whether a statistically significant difference of $25 in cost for an episode of care (e.g., $5,000 v. $5,025) is practically meaningful. Measures with overall poor performance may not demonstrate much variability across providers.

Comment [KP20]: 2g. If multiple data sources/methods are allowed, there is demonstration they produce comparable results.

Comment [KP21]: 2h. If disparities in care have been identified, measure specifications, scoring, and analysis allow for identification of disparities through stratification of results (e.g., by race, ethnicity, socioeconomic status, gender);OR rationale/data justifies why stratification is not necessary or not feasible.

3. USABILITY	
Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)	Eval Rating
3a. Meaningful, Understandable, and Useful Information 3a.1 **Current Use:** In use 3a.2 **Use in a public reporting initiative (disclosure of performance results to the public at large)** (*If used in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years*)**:** This measure is not yet used in any public reporting initiative. The measure will, however, be eligible for inclusion in the CMS PQRS and other government programs in 2012 and would thus provide information about clinician participation to the public. The ACCF, AHA, and PCPI believe that the reporting of such participation information is a beneficial first step on a trajectory toward the public reporting of performance results, which is most appropriate after the measures are thoroughly tested and the reliability of the performance data has been validated. Continued NQF endorsement will facilitate our ongoing progress toward this public reporting objective. 3a.3 **If used in other programs/initiatives (***If used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years***):** All PCPI measures are suitable for use in quality improvement initiatives and are made freely available on the PCPI website and through the implementation efforts of medical specialty societies and other PCPI members. The PCPI strongly encourages the use of its measures in QI initiatives and seeks to provide information on such initiatives to PCPI members. The American Heart Association's Get With The Guidelines®-Outpatient (GWTG-O) is a virtual performance improvement program that will improve adherence to evidence-based care in the outpatient setting, including specialist practices, general healthcare practices and health clinics. GWTG-Outpatient has had a long history of quality improvement for cardiovascular care. They have published 65 publications over the past 10 years. This program is designed to assist healthcare professionals in the outpatient setting to provide the best possible care to patients. This program collects a number of clinical measures for primary and secondary prevention. Clinical measure sets include those developed by American Heart Association, including those co-developed with other organizations, such as the American College of Cardiology Foundation and the American Medical Association, as well as other National Quality Forum endorsed measures. Through this program, data is collected on clinical measures affecting a number of cardiovascular related conditions including, atrial fibrillation, coronary artery disease, heart failure, hypertension, diabetes, and preventative care. The primary analytical system used is Duke Clinical Research Institute. Get With The Guidelines®-Outpatient is a quality improvement program that can be utilized for Maintenance of Certification (MOC) with groups like American Board of Internal Medicine (ABIM) and American Board of Family Medicine (ABFM). ABIM has confirmed that the reports received from Get With The Guidelines-Outpatient can be utilized in completion of their Self-Directed Practice Improvement Module (PIM). The Self-Directed PIM provides one pathway for earning practice performance credit in ABIM's MOC program. This program includes several integral components: A preliminary Continuing Education (CE) course for the care team, data submission and reporting that is integrated with existing Electronic Health Records (EHRs)/health technology platforms, corresponding professional and provider education including webinars, online tools and resources, digital access to reference materials and videos through the Get With The Guidelines®-Outpatient website (http://outpatient.heart.org). The free continuing education activity titled, Outpatient Quality Improvement Focus, addresses the quality chasm and treatment gap, presents the benefits of quality improvement and identifies the steps necessary for implementation in the practice setting. This continuing education activity is certified for physicians, nurses and pharmacists. Since its debut in 2005, Get With The Guidelines-Heart Failure® (GWTG-HF) has helped hospital teams across the nation provide evidence-based heart failure treatment consistent with up-to-date scientific guidelines from the American Heart Association. GWTG-HF historically has had a long history of quality	**3a** C☐ P☐ M☐ N☐

Comment [KP22]: 3a. Demonstration that information produced by the measure is meaningful, understandable, and useful to the intended audience(s) for both public reporting (e.g., focus group, cognitive testing) and informing quality improvement (e.g., quality improvement initiatives). An important outcome that may not have an identified improvement strategy still can be useful for informing quality improvement by identifying the need for and stimulating new approaches to improvement.

improvement for heart failure patient care. To date 17 peer-reviewed publications have been derived from data directly taken from GWTG-HF. This program is designed to assist healthcare professionals in the inpatient setting to provide the best possible care to patients with heart failure, by reducing the likelihood of recurring events, and allowing heart failure patients not only survive but reclaim their quality of life after hospitalization.

Hospitals, physicians, nurses and other healthcare providers who use GWTG-HF have access to patient-specific guideline information and immediate access to clinical decision support through the American Heart Association's Patient Management Tool™* (PMT), an online, interactive assessment and reporting system, through our vendor Outcome Sciences Inc. Using the PMT, hospitals can track their program performance and pinpoint areas for improvement.
GWTG-HF collects a number of clinical heart failure measures, including ejection fraction. Clinical measure sets include those developed by American Heart Association, including those co-developed with other organizations, such as the American College of Cardiology Foundation and the American Medical Association, as well as National Quality Forum. Through this program, we collect relevant medical history and more than 20 other elements, including symptoms, vital signs, exams, labs, medications, procedures, discharge status, ejection fraction, post discharge information, and many other data elements. More information on GWTG-HF is available at heart.org/getwiththeguidelines.

The American Heart Association has amassed a wealth of robust heart failure-related resources, newly aligned into a comprehensive offering to help take the failure out of heart failure.

One of our newest initiatives, known as "Target: Heart Failure" is intended to help medical professionals address the growing challenge by organizing the American Heart Association's wealth of robust heart failure-related resources into a comprehensive offering. The campaign provides healthcare professional with easy access to free educational tools, prevention programs, treatment guidelines, outcomes-based programs and quality initiatives,
including a downloadable toolkit containing awareness and prevention materials. Target: Heart Failure is an initiative to help healthcare professionals advance heart failure awareness, prevention, treatment and recovery. More information on Target: Heart Failure is available at www.heart.org/targethf

The American College of Cardiology Foundation's Cardiology Practice Improvement Pathway (CPIP) uses clinical measure sets that are developed and specified by the American College of Cardiology Foundation with the American Heart Association and the American Medical Association's Physician Consortium for Performance Improvement for Hypertension, Stable Coronary Artery Disease, Heart Failure, and Atrial Fibrillation/Atrial Flutter. This program is intended as an approved quality improvement product that can be applied toward ABIM's Part IV practice performance requirement for Maintenance of Certification (ABIM AQI application submitted). They are in the process of creating a homepage on the Cardiosource.org homepage. The URL will be cardiosource.org/cpip. The web-based tool will be available after spring 2011. Through an online webinar hosted in November 2010, CPIP anticipates enrolling 50 - 100 practices during 2011 which will provide data from about 500-1,000 cardiologists. This ACCF initiative has contracted with the NY QIO: IPRO to analyze and scores based on thresholds. Of the 100 points needed to achieve recognition in the program, 70 come directly from clinical points such as the Heart Failure measures that are being submitted to NQF for consideration. IPRO will audit 5% of practices who submit their data for recognition evaluation.

The American College of Cardiology Foundation's has an Performance Improvement program entitled "A New Era" which is an educational format approved for credit by the American Medical Association (AMA) and the American Nursing Credentialing Center. This continuing medical education program blends both quality improvement and educational methodologies to provide a high quality learning experience that impacts changes to practice. These activities are structured, long-term processes in which a healthcare professional learns about the heart failure specific performance metrics, uses metrics to retrospectively assess his practice, applies these metrics prospectively over a useful interval, and reevaluates his performance. As part of this process, clinicians set goals for change and engage in structured learning activities to improve their performance. As of December 6th, 2010:
- 425 clinicians have enrolled in A New ERA
- The data is generated from all but four states (Montana, New Hampshire, South Dakota, and Wyoming)
- 82% are physicians

- 90% agreed or strongly agreed that performance metric data were valuable - 80% agreed or strongly agreed that performance metric data review would help them improve their practice - No one has finished the program, as it takes several months to do so In 2008, the American College of Cardiology Foundation launched the PINNACLE program (formerly known as the Improving Continuous Cardiac Care or IC3). This was the first, national, prospective, outpatient based cardiac QI registry in the US. While participation is voluntary, this registry collects a variety of longituditional patient data at the point of service, including patients' symptoms, vital signs, medication, and recent hospitalizations. Jointly developed ACCF/AHA/PCPI measures for Coronary Artery Disease, Heart Failure, and Atrial Fibrillation. Data collection is achieved in 2 ways for the practices: paper forms or practice's electronic medical record data collection systems. The primary analytical system used is St. Luke's Mid America Heart Institute. The ACCF registry, PINNACLE, pulls data from outpatient facilities via paper flowsheets or 14 EHR vendors. As of December 10, 2010, there are 47 practices collecting data at 200 sites with 276,000 unique patients representing 1 million documented encounters. **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) 3a.4 **Data/sample** *(description of data/sample and size)*: 3a.5 **Methods** *(e.g., focus group, survey, QI project)*: 3a.6 **Results** *(qualitative and/or quantitative results and conclusions)*:	
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:**	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
3b. Harmonization If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source or different topic but same target population): 3b.2 **Are the measure specifications harmonized? If not, why?**	**3b** C☐ P☐ M☐ N☐ NA☐
3c. Distinctive or Additive Value 3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** 5.1 **If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the same target population), Describe why it is a more valid or efficient way to measure quality:**	**3c** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability*?	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, **met?** **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**

Comment [KP23]: 3b. The measure specifications are harmonized with other measures, and are applicable to multiple levels and settings.

Comment [k24]: 16 Measure harmonization refers to the standardization of specifications for similar measures on the same topic (e.g., *influenza immunization* of patients in hospitals or nursing homes), or related measures for the same target population (e.g., eye exam and HbA1c for *patients with diabetes*), or definitions applicable to many measures (e.g., age designation for children) so that they are uniform or compatible, unless differences are dictated by the evidence. The dimensions of harmonization can include numerator, denominator, exclusions, and data source and collection instructions. The extent of harmonization depends on the relationship of the measures, the evidence for the specific measure focus, and differences in data sources.

Comment [KP25]: 3c. Review of existing endorsed measures and measure sets demonstrates that the measure provides a distinctive or additive value to existing NQF-endorsed measures (e.g., provides a more complete picture of quality for a particular condition or aspect of healthcare, is a more valid or efficient way to measure).

4a. Data Generated as a Byproduct of Care Processes

4a.1-2 **How are the data elements that are needed to compute measure scores generated?**
Data generated as byproduct of care processes during care delivery (Data are generated and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition), Coding/abstraction performed by someone other than person obtaining original information (E.g., DRG, ICD-9 codes on claims, chart abstraction for quality measure or registry)

4a C☐ P☐ M☐ N☐

Comment [KP26]: 4a. For clinical measures, required data elements are routinely generated concurrent with and as a byproduct of care processes during care delivery. (e.g., BP recorded in the electronic record, not abstracted from the record later by other personnel; patient self-assessment tools, e.g., depression scale; lab values, meds, etc.)

4b. Electronic Sources

4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*)
Yes

4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.**

4b C☐ P☐ M☐ N☐

Comment [KP27]: 4b. The required data elements are available in electronic sources. If the required data are not in existing electronic sources, a credible, near-term path to electronic collection by most providers is specified and clinical data elements are specified for transition to the electronic health record.

4c. Exclusions

4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?**
No

4c.2 **If yes, provide justification.**

4c C☐ P☐ M☐ N☐ NA☐

Comment [KP28]: 4c. Exclusions should not require additional data sources beyond what is required for scoring the measure (e.g., numerator and denominator) unless justified as supporting measure validity.

4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences

4d.1 **Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results.**
Although we are not currently aware of any unintended consequences related to this measure, we plan through an active redesign of the PCPI website to facilitate the collection of information on unintended consequences from the users of PCPI measures.

4d C☐ P☐ M☐ N☐

Comment [KP29]: 4d. Susceptibility to inaccuracies, errors, or unintended consequences and the ability to audit the data items to detect such problems are identified.

4e. Data Collection Strategy/Implementation

4e.1 **Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data/missing data, timing/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/ implementation issues:**
Please see additional information in section 3 of the attached Measure Testing Summary.

4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:**
Costs to implement the measure have not been calculated.

4e.3 **Evidence for costs:**

4e.4 **Business case documentation:**

4e C☐ P☐ M☐ N☐

Comment [KP30]: 4e. Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, etc.) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use).

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility*?

4

Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met?
Rationale:

4 C☐ P☐ M☐ N☐

RECOMMENDATION

(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited** ☐
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y** ☐ **N** ☐ **A** ☐

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 Organization
American Medical Association, 515 N State St, Chicago, Illinois, 60654

Co.2 Point of Contact
Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-5056-

Measure Developer If different from Measure Steward
Co.3 Organization
American Medical Association, 515 N State St, Chicago, Illinois, 60654

Co.4 Point of Contact
Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-5056-

Co.5 Submitter If different from Measure Steward POC
Mark, Antman, DDS, MBA, mark.antman@ama-assn.org, 312-464-5056-, American Medical Association

Co.6 Additional organizations that sponsored/participated in measure development
American College of Cardiology Foundation/American Heart Association

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.
Robert O. Bonow, MD, MACC, FAHA, FACP (Co-Chair) (cardiology)
Theodore G. Ganiats, MD (Co-Chair) (family medicine; measure methodology)
Craig T. Beam, CRE (patient representative)
Kathleen Blake, MD (cardiac electrophysiology)
Donald E. Casey, Jr., MD, MPH, MBA, FACP (internal medicine)
Sarah J. Goodlin, MD (geriatrics, palliative medicine)
Kathleen L. Grady, PhD, APN, FAAN, FAHA (cardiac surgery)
Randal F. Hundley, MD, FACC (cardiology, health plan representative)
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PCPI measures are developed through cross-specialty, multi-disciplinary work groups. All medical specialties and other health care professional disciplines participating in patient care for the clinical condition or topic under study must be equal contributors to the measure development process. In addition, the PCPI strives to include on its work groups individuals representing the perspectives of patients, consumers, private health plans, and

employers. This broad-based approach to measure development ensures buy-in on the measures from all stakeholders and minimizes bias toward any individual specialty or stakeholder group. All work groups have at least two co-chairs who have relevant clinical and/or measure development expertise and who are responsible for ensuring that consensus is achieved and that all perspectives are voiced.
Ad.2 If adapted, provide name of original measure: Heart Failure (HF): Beta-Blocker Therapy **Ad.3-5 If adapted, provide original specifications URL or attachment**
Measure Developer/Steward Updates and Ongoing Maintenance **Ad.6 Year the measure was first released:** 2003 **Ad.7 Month and Year of most recent revision:** 12, 2010 **Ad.8 What is your frequency for review/update of this measure?** Every 3 years or as new evidence becomes available that materially affects the measures. **Ad.9 When is the next scheduled review/update for this measure?** 12, 2013
Ad.10 Copyright statement/disclaimers: This Physician Performance Measurement Set (PPMS) and related data specifications were developed by the Physician Consortium for Performance Improvement® (the Consortium) including the American College of Cardiology (ACC), the American Heart Association (AHA) and the American Medical Association (AMA) to facilitate quality improvement activities by physicians. The performance measures contained in this PPMS are not clinical guidelines and do not establish a standard of medical care, and have not been tested for all potential applications. While copyrighted, they can be reproduced and distributed, without modification, for noncommercial purposes, e.g., use by health care providers in connection with their practices. Commercial use is defined as the sale, license, or distribution of the performance measures for commercial gain, or incorporation of the performance measures into a product or service that is sold, licensed or distributed for commercial gain. Commercial uses of the PPMS require a license agreement between the user and the AMA, (on behalf of the Consortium) or the ACC or the AHA. Neither the AMA, ACC, AHA, the Consortium nor its members shall be responsible for any use of this PPMS. THE MEASURES AND SPECIFICATIONS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND.   Limited proprietary coding is contained in the measure specifications for convenience. Users of the proprietary code sets should obtain all necessary licenses from the owners of these code sets. The AMA, the ACC, the AHA, the Consortium and its members disclaim all liability for use or accuracy of any Current Procedural Terminology (CPT®) or other coding contained in the specifications.
Ad.11 -13 Additional Information web page URL or attachment: Attachment Testing Summary HF NQF Final_2_10_2011-634329406104256980.pdf
Date of Submission (*MM/DD/YY*)**:** 03/16/2011

Page 3: [1] Comment [k5] **Karen Pace** **10/5/2009 8:59:00 AM**

4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., mammography) or measures for multiple care processes that affect a single outcome.

PCPI Performance Measure Testing Results – Heart Failure

The PCPI Testing Protocol outlines the comprehensive set of tests that should be conducted in different practice settings, using different data sources, for each performance measurement set. The PCPI recognizes that multiple testing projects will be needed to achieve the required test results for each measurement set. Moreover, testing and surveillance should be part of continued evaluation and updating of the measures.

This document presents results for the American College of Cardiology (ACC)/American Heart Association (AHA)/ PCPI Heart Failure Physician Performance Measures from the CMS PQRI program, the DOQ program, a peer-reviewed study, and the Cardio-HIT project.

1. Where are the measures used and what are the documented performance rates ?

Performance rates for individual measures are found to vary across the measure reporting and testing programs. This is expected, in that the performance rates are derived from different data sources, different practice sites, and variation in both the program implementation of the measures and approaches to implementation of the measures at individual practices or by the physicians in the practice sites included in the testing project. Variation in performance rates across practice sites suggests that the measure is able to differentiate among practices. In addition, no single relatively high value of performance for a measure should be used as an indication of that measure being "topped out", and hence no longer important or meaningful to measure.

PCPI #	**NQF endorsed (#)**	**Measure**	**CMS PQRI[1]** (years, data source, performance 2007, 2008)	**Performance CMS DOQ-IT** (2008) (performance mean)	**Performance Baker[2] (EHR-only v. hybrid)** (2007) (performance)	**PCPI Cardio-HIT Incubator Group[3]** (EHRs) (2009) (performance)	**PINNACLE Registry Multi Month Comparison** (2010) (performance)[4]	**Performance Persell[5] Quality Improvement System** (surrogate testing) (2007-2009)
HF-1	0079	Left ventricular function assessment		**85.48%**		**23.3%**	**64.7%**	
HF-2	0085	Weight measurement		**97.85%**		**54.4%**		
HF-3		Blood pressure measurement		**98.92%**		**81.7%**		
HF-4	0078	Assessment of Clinical Symptoms of Volume Overload (Excess)					**50.17%**	
HF-5	0077	Assessment of Activity Level						
HF-8	0083	Beta-blocker therapy	PQRI# 8 2007: **52.29%** claims 2008: **48.66%** claims	**86.34%**	**90.9% - 92.8%**		**88.81%**	**81.4% - 90.2%**
HF-9	0081	ACEI/ARB therapy	PQRI# 5 2007: **49.26%** claims 2008: **37.20%** claims	**80.38%**	**93.9% - 98.7%**		**79.48**%	**84.9% - 89.3%**
HF-10	0084	Warfarin therapy – patients with afib	n/a	**67.03%**	**70.4% - 93.6%**	**77.8%**		**66.7% - 85.3%**

Performance ranges found in the PINNACLE project are as follows:

Measure	25th percentile	Median	75th percentile	90th percentile	Mean (St Dev)
LVEF HF-1	42.5%	74.2%	92.7%	99.5%	66.2% (+/– 31.4%)
ACE/ARB HF-9	73.9%	81.9%	90%	92.7%	81.8% (+/- 8.8%)
BB HF-8	77.3%	89.5%	94.4%	98.9%	85.5% (+/- 11.9%)
Assessment HF 4-5	0.3%	72.6%	93.3%	100%	53.7% (+/- 41.3%)

What are the reported exception rates? (# patients with valid exceptions / (# patients in denominator)

It is expected that reported exception rates will vary across measures and across the measure reporting and testing programs. This is primarily due to differences in the types of measure (eg, medications versus screening), data sources examined in testing, variation among the practice sites where the measures were implemented, and the types and number of reasons included in the measure specification (ie, medical reason, patient reason, and system reason). Any one value for a reported exception rate, in of itself, should not be interpreted as indication of gaming or patient selection behavior.

	CMS PQRI 2007	CMS PQRI 2008	PCPI Cardio-HIT Incubator Group 2009
Beta-blocker therapy	**2.82%**	**0.0%***	**5.39%**
ACEI/ARB therapy	**5.81%**	**4.15%**	**6.17%**
Warfarin therapy	na	na	**5.26%**

*Unable to calculate.

2. **Which tests have been carried out in which settings or data sources?** Tests of feasibility/ implementation, reliability, validity, and unintended consequences conducted in a variety of practice settings including (eg solo practices, large practices, academic practices, safety-net practices, single- and multi-specialty groups).

Setting / Data Source	Medical Record (Gold Standard) (Paper or Electronic)	EHR Reporting	Registry	Administrative Data (single source)	Administrative Data (multiple sources)	Administrative Data Plus Clinical Data
Solo Practice	• Feasibility • Inter-Rater Reliability	• Feasibility • Parallel forms Reliability				
Specialty Practice	• Feasibility • Inter-Rater Reliability		• Feasibility • Parallel-forms Reliability			
Safety-net practice						
Academic Setting						
Community Setting						

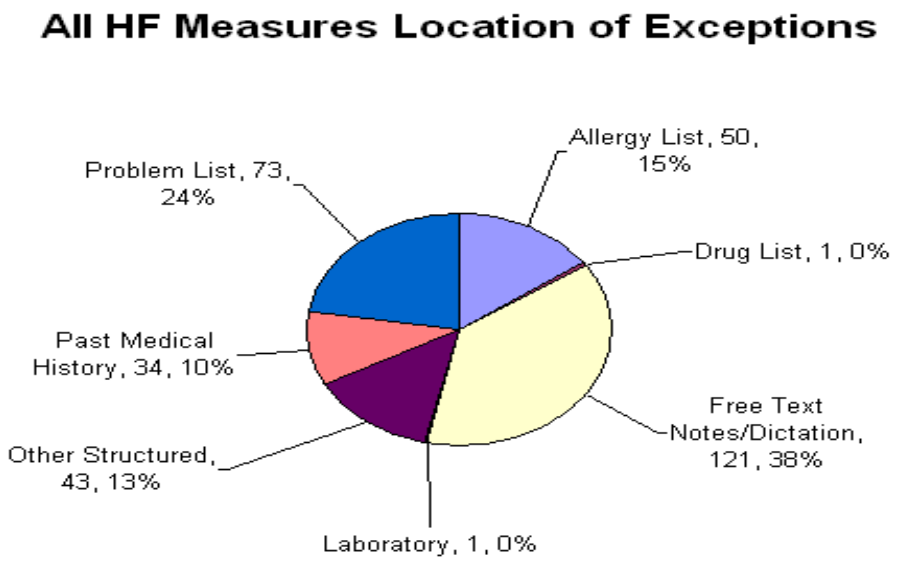
Feasibility Testing	**3. How confident are we that practices can accurately collect and report these measures in a sustainable fashion?** These measures have been tested and found to be generally feasible in EHR, paper, and claims data sources. Results from a study published by Persell, the AMA-sponsored Cardio-HIT project, and the CMS Doctors' Office Quality (DOQ) IT Project, as well as use in CMS's PGP Demonstration project and EHR demonstration project revealed that the heart failure measures are feasible to collect, as currently specified. The feasibility of a PCPI performance measure/measure set refers to: • Whether or not data are stored in a codified field • Which clinical codes sets are utilized/available • Where in the record the data are found • Necessary clarifications needed to implement the measure • Documentation of challenges to measure implementation • The extent to which clinical practices are able to interpret measure definitions and technical specifications, and a) integrate them into existing workflows and health information systems to collect, manage, and manipulate data elements; b) compute performance measures; and c) generate performance reports within a reasonable time frame and budget. **AMA PCPI Testing Project: Cardio-HIT** Data Source 5 physician offices with 5 different EHRS, in use for at least 4 years at time of project 13,985 eligible patients Methods Translated integrated measure specifications to data fields within practice EHRs Location of data (eg, problem list, medication summary) was recorded for data elements as well as whether or not the data was codified using a standard code set such as LOINC or SNOMED • Exported de-identified patient data to a warehouse for measure calculation -- successfully completed by all sites. • Location of exception data useful to inform EHR design, CDS design. Results • Each of the practice sites mapped the data elements required for each of the HF measures to their individual EHR and determined the additional system and work flow modifications required to integrate any additional data elements needed. • Since each practice had a unique set of data fields, individual mapping of the data elements at the practice level was required. Each EHR required the development of additional data fields in order to achieve the functionality required to query and report on all data elements for all measures. • An interface template was developed for each practice EHR which contains the unique set of data fields, validation requirements and acceptable values associated with ACC/AHA/PCPI measures. Using the interface template, each practice queried its EHR database to compile the data elements required for each measure. To assure consistent capture of data across a disperse set of EHR systems, the interface template identifies the submission of the prescribed coding system or standardized medical vocabulary as defined per the ACC/AHA/PCPI measure. • It was not required that each data element be sent to the data warehouse using a specific coding system or standardized coding language but rather that each site would determine what specificity of data was feasible based on the current structure of data in their EHR. The consensus of the Cardio-HIT team was to

provide industry accepted coded values (as identified by HITSP) if available. Examples include LOINC coding for lab tests, ICD for diagnoses and NDC for medications.

- In cases where the EHR was unable to support a medical vocabulary, an acceptable alternative was to substitute a "Y/N" value for those fields. For example, some sites were able to capture the prescription of a medication through the use of NDC codes but other sites determined that the use of Yes/No, medication prescribed (no CPT-II codes sent for medicaitons; CPT-II codes were sent for exceptions) was more feasible.

Percent of HF Exceptions Found in Codified Data

	Problem List	Past Medical History	Free Text Notes/ Dictation	Other Structured Text	Allergy List	Drug List	Laboratory
All 3 HF Measures: Beta Blocker, ACE/ARB, Warfarin	**24%**	**10%**	**38%**	**13%**	**15%**	**0%**	**0%**



Baker, et al. – EHRs

Observational study compared automated review of EHRs data with automated review followed by manual review of electronic notes for patients with apparent quality deficits (hybrid review).

- Performance based on automated review of EHRs data was similar to that based on hybrid review for the three drug-related measures studied, though performance was better in the hybrid review for all cases.
- For the warfarin measure, the hybrid review improved performance from 70.4% to 93.6%, primarily because contraindications to prescribing warfarin were not detected in the automated review.
- Failure to recognize contraindications to medications documented only in provider notes caused performance on medication-based quality measures to be underestimated.

Doctor's Office Quality (DOQ) Project

Data Source

National feasibility study, the CMS Doctors' Office Quality[6] (DOQ) Project

Methods

Reviewers assessed the feasibility of use of the ACC/AHA/PCPI measures in offices by performing retrospective audits of paper medical records and electronic health records

Results

The results revealed that 4 of the 6 measures studied from the HF set are feasible to collect, as currently specified. As part of the DOQ project, reviewers assessed the feasibility of use of the ACC/AHA/PCPI measures in offices by performing retrospective audits of paper medical records and electronic health records.

Limitations to feasibility were as follows:

DENOMINATOR IDENTIFICATION:

- ICD-9 coding was not sufficient in identifying patients with LVSD

NUMERATOR IDENTIFICATION:

- Left Ventricular Function Assessment, and Left Ventricular Function Testing
  - Site 1: Feasible with limitations.
    - LVSD data cannot be retrieved, but this functionality is expected with the new cardiology system being implemented
  - Site 2: Feasible
- Weight Measurement
  - Site 1: Feasible
  - Site 2: Feasible
- Blood Pressure Screening
  - Site 1: Feasible
  - Site 2: Feasible
- Beta Blocker Therapy
  - Site 1: Feasible with limitations.
    - The EHR currently stores results/interpretation as text only and not discrete values, and only indicates whether an order has been completed or not, but this additional functionality is expected with the new cardiology system being implemented
  - Site 2: not tested
- ACE inhibitor therapy
  - Site 1: Feasible with limitations.
    - The EHR currently stores results/interpretation as text only and not discrete values, and only indicates whether an order has been completed or not, but this additional functionality is expected with the new cardiology system being implemented
  - Site 2: not tested
- Warfarin Therapy for Patients with Afib
  - Site 1: Feasible
  - Site 2: Feasible

CMS PQRI –2008 –Claims

- Two HF measures, PQRI #5 and #8, were included in 2007 and 2008 PQRI..
- The rate of submissions accepted as appropriately coded were (2008):
  - Beta-blocker therapy for LVSD **77.30** %
    - **13.43** % of submissions were rejected due to an incorrect DX code
  - ACE inhibitor or ARB therapy for LVSD **67.57** %
    - **25.48** % of submissions were rejected due to an incorrect DX code
- Denominator mismatch rates (% rejected due to incorrect matching of quality code and denominator) were (2008):

- Beta-blocker therapy for LVSD **22.7** %
  - **13.43** % of submissions were rejected due to an incorrect DX code
- ACE inhibitor or ARB therapy for LVSD **32.43** %
  - **25.48** % of submissions were rejected due to an incorrect DX code

Pinnacle Registry Multi Month Comparison
Patient cohorts were created by analyzing one month of submissions to the PINNACLE registry. The first cohort is made up of encounters during October 2009 and the second cohort is made up of encounters during September 2010, made up of 22 and 23 practices, respectively, representing approximately 191 sites. There are 10,627 patient records in the first cohort and 11,692 patients in the second cohort, 83.9% of which are unique. Submissions to the registry are voluntary, and demonstrate feasibility by the number of records which were submitted.

Reliability Testing

4. How confident are we that the measures accurately and consistently assess the performance of physicians providing the care assessed in the measure?

Reliability is whether two abstractors, reviewing the same data from the same data source, would come to the same conclusion as to the patient meeting the measure, not meeting the measure, or qualifying as an exception.

Baker, et al. – EHRs
Inter-rater reliability was not conducted. Parallel forms reliability was conducted.
Baker, et al. did not calculate Kappa statistics for inter-rater reliability.

Cardio-HIT – Multi-site EHRs
Inter-rater reliability was not conducted. Parallel forms reliability was conducted.
Cardio-HIT did not calculate Kappa statistics for inter-rater reliability.

Doctor's Office Quality Pilot Project

Data Source:
2 practices sites with electronic health records
Methods
Abstractor responses were compared with "gold standard" responses determined by two abstractors familiar with the data definitions and who were responsible for abstractor training.
Results

Measure	Doctor's Office Quality (DOQ) Project (agreement %, Trial 1, Trial 2)
LVF Assessment Recorded	45 / 48 **94** % 4 / 4 **100** %
LVF Testing for Hospitalized Patients	30 / 48 **63** % 4 / 4 **100** %
Visits with Weights Recorded	449 / 464 **97** % 36 /455 **80** %
Visits with Blood Pressure Recorded	452 / 464 **97** % 36 / 45 **80** %
Beta-Blocker Therapy (with LVSD)	44 / 48 **92** % 4 / 4 **100** %
ACE Inhibitor Therapy (with LVSD)	45 / 48 **94** % 4 / 4 **100** %
Warfarin Therapy (with afib)	45 / 48 **94** % 4 / 4 **100** %

Measure reliability can also be tested by taking two comparable, independent samples from a set of data, and determining if the performance in both samples is not statistically different.

Pinnacle Registry Multi Month Comparison

Using these assumptions, then, PINNACLE analysts established two patient cohorts separated by eleven months. The first cohort is from October 2009 and the second patient cohort is from September 2010. Analysis of the two cohorts shows that 83.9% of the patients in the sample are primary cases and thus the cohorts contain sufficient uniqueness to assess the reliability of measures with a test-retest methodology. Furthermore, the HF population in each cohort presents consistently with near identical clinical descriptors, including the distribution of LVEF values [severely reduced (9.5%, 8.9%), moderately reduced (11.7%, 4.8%), mildly reduced (12.5%, 12.1%), normal (66.2%, 67.9%)] and New York Heart Association class [Class I (39.1%, 35.6%), Class II (41.8%, 43.3%), Class III (17.3%, 19.0%), Class IV (1.8%, 2.1%)].

Once the cohorts were defined, performance was calculated at the individual physician level and the practice level. These rates were then aggregated to calculate the mean and standard deviation by cohort. Means were compared using the independent sample t-test to demonstrate that it is not possible to reject the null hypothesis at the .05 level.

Note: A 2 tailed t-test was conducted. Because the p value is greater than the α level there is no significant difference between the measures of the two cohorts. Practice is the unit of measure for the t test. Some N's are unequal because a practice was missing one or more data elements needed to calculate the performance measure.

Measure	October 2009 Mean Performance (n, std dev)	September 2010 Mean Performance (n, std dev)	t	p	alpha	Statistically Different?
LVS Function Assessment	63.14% (22, 0.315)	64.70% (23, 0.316)	-0.166	0.869	0.05	No (p>alpha)
ACE or ARB for patients with LVSD	81.90% (21, 0.159)	79.48% (21, 0.210)	0.423	0.674	0.05	No (p>alpha)
Assessment of Clinical Symptoms of Volume Overload (Excess) AND Assessment of Activity Level	51.86% (22, 0.410)	50.17% (23, 0.431)	0.468	0.893	0.05	No (p>alpha)
Beta blocker therapy	83.86% (21, 0.156)	88.81% (21, 0.113)	1.180	0.245	0.05	No (p>alpha)

NOTE: n is measured at the level of practice sites

We interpret this finding to indicate the performance measure is reliable for the following reasons:

1. We have demonstrated that the two cohorts are largely unique, with 83.9% of the sample populations composed of non-overlapping patients.
2. We have also demonstrated that despite this uniqueness, the HF population attributes are highly consistent, as expected with large sample sizes and expected mean regression.
3. We have asserted based on experience and detailed registry analysis that absent major scientific change or aggressive PI or QI interventions, physician performance is both non-stochastic and consistent over time.
4. Thus, the fact that physician performance was statistically non-differentiable between the two cohorts indicates measure repeatability and hence reliability.

Measure Exceptions Validated

(and specific exception reasons documented to inform measure maintenance)

5. Are exceptions clinically appropriate and consistently documented?

Exceptions found for these measures were clinically appropriate.

AMA PCPI Testing Project: Cardio-HIT

Data Source

5 physician offices with 5 different EHRs, in use for at least 4 years at time of project
13,985 eligible patients

Methods

- Translated integrated measure specifications to data fields within practice EHRs
- Manual review of 5 EHRs compared to automated exporting of data to a data warehouse for measure calculation.
- Agreement was determined by comparing an exception that was reported to the data warehouse, which, upon manual abstraction of the EHRs, was confirmed to be appropriate when compared to an a priori list (predetermined list of medical, patient, or system reasons) developed by the clinical experts on the project team and review of clinical guidelines.

Results

- Reported exceptions were validated upon manual review of the medical record, against an a priori list generated by expert opinion. Measure exceptions were validated 95.32% of the time.
- Top medical exception reasons reported were:
  - Beta-blocker therapy: Lung/pulmonary contraindication was the exception reason for 31.04% of exceptions.
  - ACEI/ARB therapy: Renal contraindication was the medical exception reason for 66.36% of exceptions.
  - Warfarin therapy: Gastrointestinal tract contraindication was the exception reason for 20.41% of the exceptions.

All Exceptions – Weighted Data Abstraction Sample	Medical Reason	Clinical Contraindication	Drug Allergy	Drug Interaction	Drug Intolerance
Overall (n=306)	98.2%	85.23%	4.7%	0.0%	10.1%
Beta Blocker Therapy (n=118)	98.0%	74.7%	3.5%	0.0%	21.8%
ACE inhibitor/ARB Therapy (n=127)	99.5%	89.8%	5.9%	0.00%	4.2%
Warfarin Therapy (n=61)	96.1%	95.8%	4.2%	0.0%	0.0%

Beta Blocker Therapy Weighted Sample Data- All Exceptions		
Exceptions	Frequency (%) †	Frequency (n)
Adverse Reaction to Beta Blockers	5.66%	0.275
Doc. of bradycardia/< 50 bpm/correlation for NOT Rx beta-blockers	5.66%	0.275
End of Life Issues	6.47%	0.315
Fatigue	5.66%	0.275
Lung/Pulmonary	58.78%	2.860
Other doc. by pract. for not prescribing therapy	12.12%	0.590
Uncompensated CHF	5.66%	0.275

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure
Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

ACE Inhibitor or ARB Therapy Weighted Sample Data- All Exceptions

Exceptions	Frequency (%) †	Frequency (n)
Adverse reaction to ACE inhibitor or ARB therapy	3.61%	0.987
Allergy/intolerance (e.g., cough) to ACE inhibitor or ARB therapy	7.38%	2.018
End of Life Issues	3.72%	1.016
Hyperkalemia	3.72%	1.016
Hypotension	13.94%	3.811
Moderate or severe aortic stenosis subaortic stenosis	1.26%	0.343
Other doc. by pract. for not prescribing therapy	4.92%	1.345
Patient Refusal	9.02%	2.466
Renal	52.43%	14.331

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

Warfarin Therapy Weighted Sample Data- All Exceptions

Exceptions	Frequency (%) †	Frequency (n)
Bleeding Risk	6.54%	4.113
Dementia/advanced dementia	5.17%	3.248
End of life issues	6.76%	4.247
GI Tract	12.92%	8.123
Hematologic Abnormalities	5.82%	3.657
Hepatic/Liver	6.54%	4.113
Non-compliance with INR follow-up/medication management	0.50%	0.315
Other doc. by pract. for not prescribing therapy	23.62%	14.847
Other significant bleeding	8.54%	5.371
Patient Refusal	12.08%	7.596
Risk for Falls	11.51%	7.235

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Data Source: OFI Abstraction Sample (manual review of EHR) where Non-HF (N = 4) have been removed

Location and Codification of Exceptions

	Allergy List		Drug List	
Measure	# Included	% Coded	# Included	% Coded
All HF Measures	46	4.35%	0	0.00%
Beta-blocker Therapy	14	7.14%	0	0.00%
ACE/ARB Therapy	19	5.26%	0	0.00%
Warfarin Therapy	13	0.00%	0	0.00%

	Free Text Notes/Dictation		Laboratory	
Measure	# Included	% Coded	# Included	% Coded
All HF Measures	126	11.11%	1	0.00%
Beta-blocker Therapy	39	12.82%	0	0.00%
ACE/ARB Therapy	46	6.52%	1	0.00%
Warfarin Therapy	41	14.63%	0	0.00%

Measure	Other Structured		Past Medical History	
	# Included	% Coded	# Included	% Coded
All HF Measures	45	17.78%	31	9.68%
Beta-blocker Therapy	15	20.00%	13	0.00%
ACE/ARB Therapy	17	11.76%	10	10.00%
Warfarin Therapy	13	23.08%	8	25.00%

Measure	Problem List		TOTAL
	# Included	% Coded	
All HF Measures	75	86.67%	324
Beta-blocker Therapy	23	91.30%	104
ACE/ARB Therapy	32	93.75%	125
Warfarin Therapy	20	70.00%	95

Top Medical Reasons for Exceptions –Beta Blocker Therapy (Weighted Sample Data)

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Adverse Reaction to Beta Blockers	5.13%	6.029		
Allergy List			6.029	0.00%
Doc. of bradycardia/< 50 bpm/correlation for NOT Rx beta-blockers	11.00%	12.931		
Allergy List			1.381	0.00%
Discharge Sumary			1.381	0.00%
Free Notes			5.522	0.00%
Past Medical History			2.761	0.00%
Problem List			1.887	100.00%
End of Life Issues	1.17%	1.381		
Free Text			1.381	0.00%
Fatigue	17.82%	20.947		
Allergy List			0.994	0.00%
Assessment List			2.761	0.00%
Free Text			8.403	0.00%
Past Medical History			2.761	0.00%
Problem List			4.648	70.30%
Stress Test			1.381	0.00%
History of 2nd or 3rd Degree AV block without permanent pacemaker	4.37%	5.135		
Consultation			0.994	0.00%
Free Text			1.381	100.00%
Problem List			2.761	100.00%
Hypotension	17.84%	20.967		
Allergy List			1.381	0.00%
ED notes			1.887	0.00%
Free Text			12.177	0.00%
Past Medical History			2.761	0.00%
Problem List			2.761	100.00%
Lung/Pulmonary	31.04%	36.490		
Allergy List			2.761	50.00%
Assessment List			3.368	59.01%
Free Text			8.642	34.72%

Past Medical History			9.277	0.00%
Problem List			12.443	88.90%
Other doc. by pract. for not prescribing therapy	10.03%	11.790		
Allergy List			5.135	0.00%
Assessment List			0.994	100.00%
Free Text			4.280	0.00%
Problem List			1.381	100.00%
Uncompensated CHF	1.61%	1.887		
Discharge Summary			0.506	0.00%
H&P			1.381	0.00%
† Frequencies are given as a percent of the total number of Medical Exceptions for this measure				

Top Medical Reasons for Exceptions – ACE Inhibitor or ARB Therapy (Weighted Sample Data)

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Adverse reaction to ACE inhibitor or ARB therapy	4.30%	5.483		
Allergy List			5.483	0.00%
Allergy/intolerance (e.g., cough) to ACE inhibitor or ARB therapy	3.58%	4.557		
Allergy List			4.139	0.00%
Free Text			0.418	0.00%
End of Life Issues	1.02%	1.302		
Free Text			1.302	0.00%
Hyperkalemia	9.61%	12.241		
Allergy List			1.995	0.00%
Discharge Summary			1.344	0.00%
Free Text			6.214	0.00%
Lab			1.344	0.00%
Problem List			1.344	100.00%
Hypotension	8.34%	10.622		
Discharge Summary			1.344	0.00%
Free Text			9.278	0.00%
Moderate or severe aortic stenosis subaortic stenosis	1.89%	2.413		
Past Medical History			0.418	0.00%
Problem List			1.995	67.38%
Other doc. by pract. for not prescribing therapy	4.90%	6.240		
Allergy List			2.795	0.00%
Free Text			3.445	0.00%
Renal	66.36%	84.542		
Allergy List			4.758	28.25%
Assessment List			11.172	0.00%
Discharge Summary			2.832	22.98%
Free Text			25.394	18.44%
H&P			0.418	0.00%
Past Medical History			10.167	13.22%
Problem List			29.801	97.82%
† Frequencies are given as a percent of the total number of Medical Exceptions for this measure				

Top Medical Reasons for Exceptions – ACE Inhibitor or Warfarin Therapy

Medical Reason for Exception - Location	Frequency (%) †	Frequency (n)	Location Count	Percent Coded at Location
Allergy or intolerance	3.01%	1.850		
Allergy List			1.850	0.00%
Bleeding Risk	6.30%	3.871		
Free Text Notes/Dictation			3.255	0.00%
Problem List			0.617	0.00%
Dementia/advanced dementia	2.64%	1.624		
Free Text Notes/Dictation			1.173	61.60%
Problem List			0.451	0.00%
End of life issues	1.91%	1.173		
Free Text Notes/Dictation			1.173	0.00%
GI Tract	20.41%	12.534		
Allergy List			1.233	0.00%
Free Text Notes/Dictation			5.058	37.48%
H&P			0.451	0.00%
Past Medical History			2.598	32.66%
Problem List			3.195	73.44%
Hematologic Abnormalities	20.13%	12.362		
Assessment List			3.394	0.00%
Free Text Notes/Dictation			2.996	43.36%
H&P			0.451	0.00%
Past Medical History			0.451	0.00%
Problem List			5.070	91.11%
Hepatic/Liver	8.82%	5.416		
Assessment List			1.697	50.00%
Free Text Notes/Dictation			0.849	0.00%
Problem List			2.870	54.74%
Non-compliance with INR follow-up/medication management	1.38%	0.849		
Free Text Notes/Dictation			0.849	0.00%
Other doc. by pract. for not prescribing therapy	5.74%	3.527		
Allergy List			2.062	0.00%
Free Text Notes/Dictation			1.465	0.00%
Other significant bleeding	14.43%	8.863		
Free Text Notes/Dictation			7.239	6.22%
Past Medical History			0.901	50.00%
Problem List			0.723	100.00%
Risk for falls	15.22%	9.346		
Allergy List			2.466	0.00%
Assessment List			0.849	0.00%
Discharge Summary			0.451	0.00%
Free Text Notes/Dictation			5.130	16.54%
Past Medical History			0.451	0.00%

† Frequencies are given as a percent of the total number of Medical Exceptions for this measure

Comparison of Data Sources *Note: in these projects it is recommended to always compare the secondary data source to the current gold standard of manual abstraction of the medical record.	**6. Is measure collection from different data sources comparable? How does automated measure calculation compare to manual measure abstraction?** **AMA PCPI Testing Project: Cardio-HIT** Data Source 5 physician offices with 5 different EHRs, in use for at least 4 years at time of project 13,985 eligible patients Methods • Translated integrated measure specifications to data fields within practice EHRs • Accuracy of heart failure data elements were verified by comparing automated measure abstraction and calculation against manual abstraction of an EHRs • For three samples of patients, researchers completed a manual review of each patient's electronic chart o Sample 1: patients who appeared to meet the numerator of the quality measure o Sample 2: patients who appeared to fail the quality measure (did not meet numerator nor have exception) o Sample 3: patients who appeared to not meet the numerator and have an exception to the quality measure Results Performance rates calculated automatically by the data warehouse compared to the rates of performance, opportunities for improvement and misclassification rates determined with manually abstracted data samples. • Automated review alone: Overall performance for the three measures was 76.84% and varied among the measures: ▪ Beta-blocker therapy: 86.34% ▪ ACEI/ARB therapy: 80.38% ▪ Warfarin therapy: 67.03% • Manual review alone: 22.35% of the cases were identified as failing to meet the measure (opportunities for improvement): ▪ Beta-blocker therapy: 9.30% ▪ ACEI/ARB therapy: 19.53% ▪ Warfarin therapy: 27.69% • Discrepancies between performance measures based on EHRs automated review alone and those based on automated review plus manual review were due to two types of misclassification: ▪ identify performance among true, eligible patients ▪ failure to correctly exclude patients • The overall rate of misclassification in the automatic calculation (identified from manual review) was 10.23% and varied across the measures: ▪ Beta-blocker therapy: 22.35% ▪ ACEI/ARB therapy: 14.34% ▪ Warfarin therapy: 4.54% **7. If automated reporting identifies a patient as meeting the measure, what likelihood is there that manual review will validate that finding?** Patient samples from populations identified by the automated reporting as Measure Mets, Opportunities for Improvement or Exceptions were validated upon manual review of the medical record for the six HF measures

Measure Mets

- Automated review: 89.90% of patients met the numerator
  - Left ventricular function: 85.48%
  - Weight measurement: 97.85%
  - Blood pressure screening: 98.92%
  - Beta-blocker therapy: 86.34%
  - ACEI/ARB therapy: 80.38%
  - Warfarin therapy: 67.03%
- Upon manual validation of the patient sample: 82.88% met the numerator
  - Left ventricular function: 59.57%
  - Weight measurement: 88.35%
  - Blood pressure screening: 98.53%
  - Beta-blocker therapy: 95.82%
  - ACEI/ARB therapy: 75.52%
  - Warfarin therapy: 80.21%

Opportunities for Improvement

- Automated review: 9.96% of patients were opportunities for improvement
  - Left ventricular function: 14.52%
  - Weight measurement: 2.15%
  - Blood pressure screening: 1.08%
  - Beta-blocker therapy: 12.93%
  - ACEI/ARB therapy: 18.41%
  - Warfarin therapy: 31.24%
- Upon manual validation of the patient sample 44.14% of the opportunities for improvement remained opportunities for improvement
  - Left ventricular function: 65.12%
  - Weight measurement: 77.85%
  - Blood pressure screening: 59.63%
  - Beta-blocker therapy: 9.30%
  - ACEI/ARB therapy: 19.53%
  - Warfarin therapy: 27.69%
- Upon manual validation of the above patient sample
  - 34.31% were found to meet the numerator of the measure
  - 16.37% were found to have an exception
  - 5.18% were found to meet the numerator and had an exception

Exceptions (only the 3 drug measures reported exceptions)

- Automated review: 5.57% of patients had an exception
  - Beta-blocker therapy: 5.39%
  - ACEI/ARB therapy: 6.17%
  - Warfarin therapy: 5.26%
- Upon manual validation of the exception patient sample, the overall agreement rate was 94.05%
  - Beta-blocker therapy: 84.20%
  - ACEI/ARB therapy: 100.00%
  - Warfarin therapy: 95.66%

8. Are the individual parts of the measure (numerator, denominator, exceptions) reliably calculated, as compared to the overall measure?

Over the 3 drug measures analyzed, the agreement rates were:

- Numerator: 76.84%
- Denominator: 94.43%
- Exception: 66.19%
- Overall: 72.18%

9. What proportion of patients that met the measure are correctly identified?

Sensitivity: 74.75%

10. What proportion of patients that do not meet the measure are correctly identified?

AMA PCPI Testing Project: Cardio-HIT

Specificity: 70.10%

Patients Automatically Identified as Exceptions	Agreement			
Measure	Mean Rate	S.E.	95% C.I.	N
All HF Measures	87.312%	2.026%	83.16%, 91.47%	270
Beta-blocker Therapy	76.221%	3.839%	68.29%, 84.15%	123
ACE/ARB Therapy	97.793%	1.506%	94.32%, 100%	95
Warfarin Therapy	94.384%	3.198%	87.15%, 100%	52

Patients Automatically Identified as Opportunities for Improvement	Agreement				
Measure	Mean Rate	S.E.	95 % C.I.	N - num	N - den
All HF Measures	44.14%	2.17%	39.80% ,48.48%	232	526
Left Ventricular Function	65.12%	3.32%	58.38% ,71.87%	134	206
Weight Measurement	77.85%	7.20%	62.25% ,93.46%	26	33
Blood Pressure Screening	59.63%	10.46%	36.87% ,82.40%	13	22
Beta-blocker Therapy	9.30%	4.13%	0.18% ,18.41%	5	49
ACE/ARB Therapy	19.53%	4.89%	9.18% ,29.87%	13	66
Warfarin Therapy	27.69%	3.66%	20.18% ,35.21%	41	149

False Positive Opportunities for Improvement - Numerator Actually Met					
Measure	Mean Rate	S.E.	95% C.I.	N - num	N - den
All HF Measures	34.31%	2.07%	30.16% ,38.46%	180	526
Left Ventricular Function	34.88%	3.32%	28.13% ,41.62%	72	206
Weight Measurement	7.53%	4.57%	0.00% ,18.00%	3	33
Blood Pressure Screening	40.37%	10.46 %	17.605% ,63.13%	9	22
Beta-blocker Therapy	59.06%	7.00%	44.34% ,73.79%	29	49
ACE/ARB Therapy	31.88%	5.75%	19.86% ,43.91%	21	66
Warfarin Therapy	31.47%	3.80%	23.68% ,39.26%	47	149
Left Ventricular Function	34.31%	2.07%	30.16% ,38.46%	180	526

Measure	Mean Rate	S.E.	95% C.I.	N - num	N - den
All HF Measures	16.37%	1.61%	13.12% ,19.63%	86	526
Left Ventricular Function	0.00%	0.00%	0.00%, 0.24%	0	206
Weight Measurement	14.62%	6.12%	1.12% ,28.11%	5	33
Blood Pressure Screening	0.00%	0.00%	0.00%, 2.27%	0	22
Beta-blocker Therapy	9.30%	4.13%	0.18% ,18.41%	5	49
ACE/ARB Therapy	34.25%	5.85%	22.02% ,46.49%	23	66
Warfarin Therapy	36.30%	3.94%	28.25% ,44.35%	54	149
Left Ventricular Function	16.37%	1.61%	13.12% ,19.63%	86	526

EHR "In Silo" Verification

Note: initially this may be of limited usefulness until EHR functionality and use progresses

11. Can EHR products reliably identify data elements and calculate these measures?

A "dummy" data set of patient data will be provided to several EHR vendors along with EHR measure specifications. The vendors will use this test file to determine if their system can reliably calculate the measures based on intended documentation patterns.

This test has not yet been performed for this measure set.

Predictive Validity

12. Does high performance on these measures lead to better patient outcomes?

If the scientific evidence regarding the process of care is strong and widely accepted in the field, no formal evaluation of predictive validity is necessary. If the evidence is less strong, however, it is desirable to show that high performance leads to better patient outcomes.

This test has not yet been performed for this measure set. It should be noted that the Persell study shows that targeted QI projects can improve performance on the process measures.

Unintended Consequences

13. Have monitoring and testing uncovered unexpected consequences of measurement?

Testing should be performed for anticipated unintended consequences. Unanticipated unintended consequences should be monitored for on a long term basis as they may only occur in later stages and widespread adoption.
This test has not yet been performed for this measure set.

Project Descriptions

Doctor's Office Quality Pilot Project

Data was captured at two large physician practice groups who use two distinct EHR systems. The study population of group 1 was their fee-for service Medicare patients. The study population was all non-Medicare patients for Group 2. Once the DOQ clinical measures were developed, the practices were given technical specifications to use to capture the quality measures from their EHR system. Feasibility was assessed for all measures, and some measures were implemented.

Baker, et al (EHRs-only v. hybrid)

The objective of the study was to evaluate the accuracy of an automated system that used EHRs data and specifications from national organizations to measure quality of care for outpatients with heart failure. The research was designed as an observational study comparing success rates on quality measures based on automated review of EHRs data compared to automated review followed by manual review of physician notes for apparent failures (hybrid review).
A single site setting at an academic general internal medicine clinic with several years experience using a commercial EHRs. The researchers measured the left ventricular ejection fraction (LVEF), prescription of a beta blocker and an angiotensin converting enzyme

inhibitor (ACEI) for patients with left ventricular systolic dysfunction (LVEF < 0.40), and prescription of warfarin for patients with comorbid atrial fibrillation.
Adult patients, 517 records, with a qualifying ICD-9 diagnosis of heart failure and two or more clinic visits over the last 18 months. Success rates based only on automated review of EHRs data versus hybrid review were similar for LVEF measurement (94.6% vs. 97.3%) and beta blocker prescription (90.9% vs. 92.8%). However, success rates based on automated review of EHRs data were substantially lower than hybrid review for prescription of ACEI (93.9% vs. 98.6%) and warfarin for atrial fibrillation (70.4% vs. 93.5%).
The studied concluded that using EHRs data alone to measure quality remains problematic because exclusion criteria are often documented only in physicians' notes. EHRs vendors and national quality organizations should collaboratively develop systems to facilitate collection of the data required to routinely assess quality of care.

Cardio-HIT Project
The AMA received funding for Phase II of the Cardio-HIT project from the Agency for Healthcare Research and Quality (AHRQ). The AMA in collaboration with five (5) physician practice sites, the Iowa Foundation for Medical Care, and the National Committee for Quality Assurance, conducted a 2-year, observational study of exception reporting, building on the prior work under Cardio-HIT, a research collaborative of six (6) EHRs-enabled independent group practices that collected data and reported on nationally recognized physician performance measures for coronary artery disease and heart failure.
In Cardio-HIT Phase II, we: (1) empirically documented the prevalence and patterns of exception reporting in these measures; (2) assessed the feasibility and accuracy of exception reporting by validating a sample of reported exceptions against manual EHRs record review; and (3) analyzed and addressed stakeholder perspectives on exception reporting to refine existing principles in the design of physician performance measures.

Pinnacle Registry Multi Month Comparison
Two cohorts of patient encounters for patients aged 18 years and older with a diagnosis of heart failure were created by analyzing two distinct months of data submissions to the PINNACLE Registry™. The first cohort is made up of encounters during October 2009 and the second cohort is made up of encounters during September 2010, made up of 22 and 23 practices, respectively, representing approximately 191 sites. There are 10,627 patient records in the first cohort and 11,692 patients in the second cohort, 83.9% of which are unique.
Overview
Assessing the reliability of measures in large scale electronic databases being sourced by disparate EHR systems requires the application of novel techniques. While we expect coding for commonly used data elements to become more standardized in the medium to long term, the proliferation of EHR vendors and the predisposition toward practice-level customization precipitated by stimulus funding has only exacerbated the variation in electronic documentation in the short term. As a result, registries like PINNACLE must rely on a layered normalization and data quality approach to ensure reliability. PINNACLE presently applies four layers of quality control: 1) custom data mapping with multi-iteration, multi-stakeholder validation, 2) a formal Data Quality Report utility and tight XSD schema, and 3) continuous aggregate data quality review. In addition, for the purposes of this application, PINNACLE analysts have applied statistical sampling techniques (described below) to replicate at scale (tens of thousands of records) more traditional, small scale chart audits.

Custom Data Mapping with Multi-Iteration, Multi-Stakeholder Validation
The System Integration technology employed by the PINNACLE Registry is partially automatic and partially manual. The automatic portions of the process rely on standard data maps that correspond with the data structure of individual EHR products and versions. Relatively straightforward data elements, such as date of birth and heart failure diagnosis, are

generally structured consistently across practices with similar EHRs and can thus be identified and mapped automatically with software. More complex or less common elements, NYHA class for example, must be identified and mapped manually. This process relies on clinical and technical experts from the practice working with PINNACLE project managers and engineers to locate, and potentially normalize, the relevant data element. While potentially time consuming, this process ensures that multiple, highly-trained stakeholders (providers, practice technologists, PINNACLE project managers, engineers, and clinical staff) are reviewing and concurring on the accuracy of the data maps.
Furthermore, at multiple stages during the integration process practices and providers are reviewing both raw data pulls and calculated performance measures on test data extracts, full data extracts, and production extracts. Only after mapping is completed and the practice and PINNACLE staff have signed off on the accuracy of the data maps is the system placed into production.

Data Quality Report utility and XSD Schema
Production-level data extraction occurs on a massive scale. Initial production data extracts to generate baseline performance in the registry for even a single large practice can number in the hundreds of thousands of patient encounters. More routine monthly and quarterly extracts can generate thousands, or even tens of thousands, of encounters per practice. At that volume, human validation of inbound data quality is impossible. Instead PINNACLE deploys a two layered automated data quality validation process. The first layer is a data quality utility, called the DQR, which applies 65 unique tests to inbound data. These tests include valid range checks, parent child relationships, data completeness, and coding accuracy. The utility then generates a report alerting PINNACLE engineers, EHR vendors, or sometimes the practices themselves, to data errors. Depending on the scale of error, files may either be rejected in their entirety for revision and re-submittal or individual records may be segregated from the data load. After the file clears the DQR it must then pass a final XSD validation before being loaded into the data warehouse for production reporting.

Continuous Aggregate Data Quality Review
Once data has been calculated and aggregated at the practice and national level it then becomes possible and appropriate to reapply human scrutiny to data quality and measure reliability management. PINNACLE employs highly skilled professional assets, including the former chief data quality analyst for the 2010 United States Census, to be continuously reviewing and evaluating the accuracy of PINNACLE's reporting. In addition to evaluating data completeness, PINNACLE data quality resources also monitor inter- and intra-practice and provider, as well as inter-temporal, performance variability. PINNACLE is now of sufficient maturity that patterns in provider and practice level performance can be quickly interpreted to indentify 1) failures in data mapping, 2) failures in physician documentation (especially exclusion documentation), and 3) accurate assessments of performance.

Statistical Sampling Techniques for Assessment of Measure Reliability
Due to the scale of the PINNACLE Registry, as well as a series of outstanding methodological questions as to the value of EHR chart audits for validating information that was extracted from the same electronic source data, PINNACLE has not conducted such analyses. Instead, PINNACLE analysts use the scale of the registry itself to create smaller sample cohorts to assess the reliability and stability of measures. This approach requires certain assumptions, which we believe have prima facie validity and are confirmed from large scale analysis of the registry. The assumptions are as follows:
1. Physician performance is non-stochastic over time
2. Physician performance is statistically stable over modest time intervals absent exogenous shocks (i.e. major new scientific findings or direct performance improvement interventions)
3. At large patient population sizes, independent AF populations present consistently and

	normally **Persell, et al (Quality Improvement System)** This study was a time series analysis at a large internal medicine practice using a commercial EHR. Subjects included all adult patients eligible for each measure (range approximately 100-7500 patients). Measures included were modified versions of the national measures, which were updated to allow for extraction from the EHR and local workflow patterns. During the year before the intervention, performance improved significantly for 14 measures. Implementation of a multifaceted QI intervention using EHR tools to improve quality measurement and the accuracy and timeliness of clinician feedback improved performance and/or accelerated the rate of improvement for multiple measures simultaneously. For some measures clinical care changed, and for others, documentation was improved.

AMA-PCPI Level I EHR Specifications

Clinical Topic	Heart Failure
Measure Title	**Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction**
Measure #	**PCPI HF-6 / NQF 0083 / PQRI 8**
Measure Description	Percentage of patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% who were prescribed beta-blocker therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge
Measurement Period	Twelve consecutive months
Initial Patient Population	Patient Age: Patients aged 18 years and older before the start of the measurement period Diagnosis Active: Patient has a diagnosis of Heart Failure before or simultaneously to encounter date Encounter: At least two visits (or at least one inpatient discharge) with the physician, physician's assistant, or nurse practitioner during the measurement period
Denominator Statement	All patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% *NOTE: LVEF < 40% corresponds to qualitative documentation of moderate dysfunction or severe dysfunction*
Numerator Statement	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 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 **Beta-blocker therapy should include bisoprolol, carvedilol, or sustained release metoprolol succinate
Denominator Exceptions	Documentation of medical reason(s) for not prescribing beta-blocker therapy (eg, low blood pressure, fluid overload, patients recently treated with an intravenous positive inotropic agent, not indicated, contraindicated, other medical reason) Documentation of patient reason(s) for not prescribing beta-blocker therapy (eg, patient declined, social, religious, other patient reason) Documentation of system reason(s) for not prescribing beta-blocker therapy (eg, resources to perform the services not available, insurance coverage, other reason attributable to health care delivery system)

AMA - PCPI Level I EHR Specifications

Measure Logic for Heart Failure: Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction

Measure Description: Percentage of patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% who were prescribed beta-blocker therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge

Measurement Period: 12 consecutive months

PCPI # HF-6 / NQF # 0083 / PQRI # 8

PAGE 1

Identify Patients in Initial Patient Population (IPP)

- PATIENT AGE [1] 18 years and older
- And
- DIAGNOSIS[2] Active — Heart Failure — Value Set 000265
- And
- ENCOUNTER[3 4] — Value Set 000002, 000009

Identify Patients in Denominator (D)

- All Patients Identified within the Initial Patient Population
- And
- Quantitative ╬ (a) OR Qualitative ▲ (b)

Quantitative ╬ (a):
- DIAGNOSTIC STUDY Result — Ejection Fraction < 40% — Value Set 000003
- OR
- PERFORMED Diagnostic Study — Value Set 000004
- And
- RESULT Documented — LVEF < 40% — Value Set 000004

Qualitative ▲ (b):
- DIAGNOSTIC STUDY Result — LVSD : Moderate or Severe Dysfunction — Value Set 000248
- OR
- DIAGNOSIS Active — LVSD — Value Set 000244
- And
- RESULT Documented — Severity Status: Moderate or Severe — Value Set 000247

Identify Patients in Numerator (N)

- All Patients Identified within the Denominator
- And
- MEDICATION Prescribed — Beta-blocker Therapy for LVSD — Value Set 000211

Identify Patients who have valid Denominator Exceptions (E)

- See PAGE 2 For (E)

PARAMETER SPECIFICATIONS (Value Sets are found in the Coding Appendices):

IPP: [1] Patient Age-18 years and older before the start of measurement period; [2]Diagnosis, Active-before or simultaneously to encounter date; [3] Encounter, value set 000002- ≥ to 2 visits during measurement period; [4] Encounter,value set 000009-at each hospital discharge during the measurement period;

D: All in (D) occurring before or simultaneously to measurement period;

N: Medication, Prescribed-active or ordered during the measurement period;

╬The results will be documented as numerical values represented as a percentage

▲ Qualitative results correspond to numeric equivalents as follows (Crosswalk):
- Hyperdynamic: corresponds to LVEF greater than 70%
- Normal: corresponds to LVEF 50% to 70% (midpoint 60%)
- Mild dysfunction: corresponds to LVEF 40% to 49% (midpoint 45%)
- Moderate dysfunction: corresponds to LVEF 30% to 39% (midpoint 35%)
- Severe dysfunction: corresponds to LVEF less than 30%

Version 2.0

AMA - PCPI Level I EHR Specifications

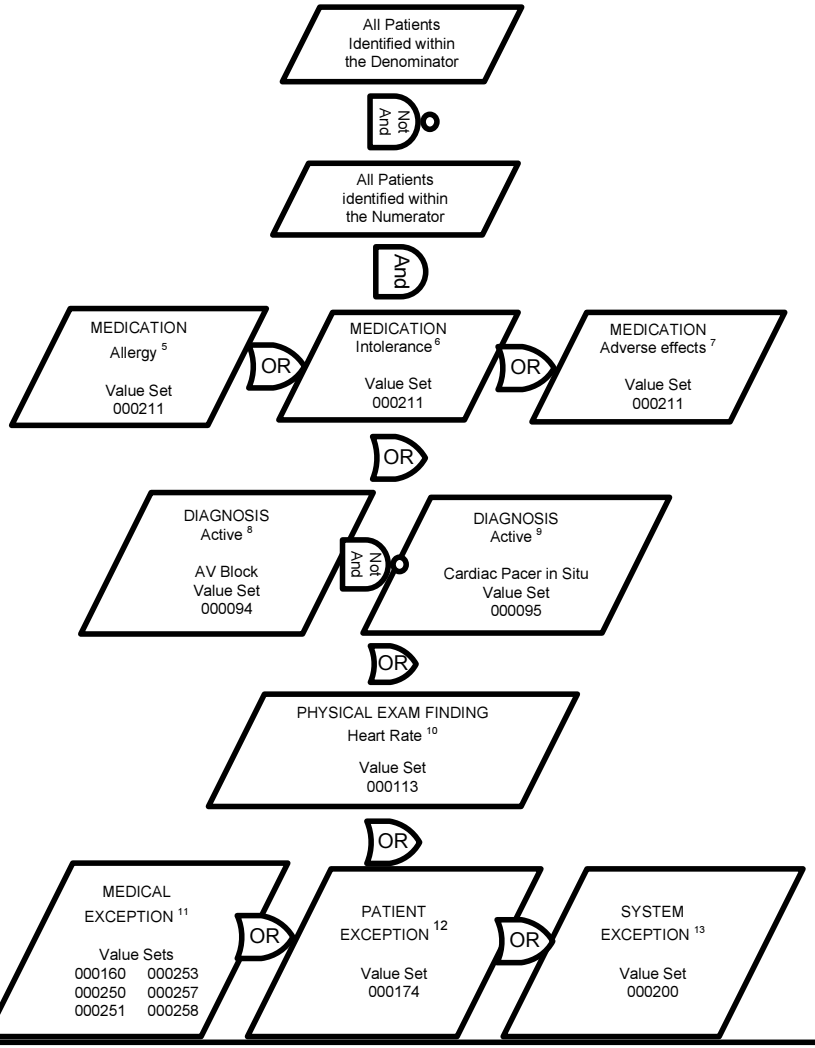
Measure Logic for Heart Failure: Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction

Measure Description: Percentage of patients aged 18 years and older with a diagnosis of heart failure with a current or prior LVEF < 40% who were prescribed beta-blocker therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge

Measurement Period: 12 consecutive months

PCPI # HF-6 / NQF # 0083 / PQRI # 8

PAGE 2

Identify Patients in Initial Patient Population (IPP)	Identify Patients in Denominator (D)	Identify Patients in Numerator (N)	Identify Patients who have valid Denominator Exceptions * (E)
See PAGE 1 For (IPP)	See PAGE 1 For (D)	See PAGE 1 For (N)	

PARAMETER SPECIFICATIONS (Value Sets are found in the Coding Appendices):

E: [5, 6, 7, 8, 9, 12, 13] in (E) occurring before or simultaneously to measurement period; [10] Physical Exam Finding-2 consecutive heart rate readings during measurement period at less than 50 beats per minute; [11] Medical Exception-Value Sets 000160, 000250, 000251, 000257, 000258 occur before or simultaneously to measurement period, value set 000253 occurring during measurement period; [5 6 7] Medication Allergy, Intolerance, Adverse Effects-the Value Set listed references the medications to which the allergy, intolerance or adverse effect exist;

* Coded examples are NOT intended to be an exhaustive list. Exceptions will vary for each patient and situation.

Basic Measure Calculation:

$$\frac{(N)}{(D) - (E)} = \%$$

The PCPI strongly recommends that exception rates also be computed and reported alongside performance rates as follows:

Exception Calculation:

$$\frac{(E)}{(D)} = \%$$

Exception Types:
E= E1 (Medical Exceptions) + E2 (Patient Exceptions) + E3 (System Exceptions)
For patients who have more than one valid exception, only one exception should be be counted when calculating the exception rate

Initial Patient Population (IPP)	Denominator (D)	Numerator (N)	Denominator Exceptions (E)
Definition: The initial patient population identifies the general group of patients that the performance measureis designed to address; usually focused on a specific clinical condition (e.g., coronary artery disease, asthma). For example, a patient aged 18 years and older with a diagnosis of CADwho has at least 2 Visits during the measurement period.	**Definition:** The denominator defines the specific group of patients for inclusion in a specific performance measure based on specific criteria (e.g., patient's age, diagnosis, prior MI). In some cases, the denominator may be I dentical to the initial patient population.	**Definition:** The numerator defines the group of patients in the denominator for whom a process or outcome of care occurs (e.g., flu vaccine received).	**Definition:** Denominator exceptions are the valid reasons why patients who are included in the denominator population did not receive a process or outcome of care (described in the numerator). Patients may have Denominator Exceptions for medical reasons (e.g., patient has an egg allergy so they did not receive flu vaccine); patient reasons (e.g., patient declined flu vaccine); or system reasons (e.g., patient did not receive flu Vaccine due to vaccine shortage). These cases are removed from the denominator population for the performance calculation, however the number of patients with valid exceptions should be calculated and reported. This group of patients constitutes the Denominator Exception reporting population – patients for whom the numerator was not achieved and a there is a valid Denominator Exception.
Find the patients who meet the Initial Patient Population criteria (IPP)	Find the patients who qualify for the denominator (D): ○ From the patients within the Patient Population criteria (IPP) select those people who meet Denominator selection criteria. (In some cases the IPP and D are identical).	Find the patients who qualify for the Numerator (N): ○ From the patients within the Denominator (D) criteria, select those people who meet Numerator selection criteria. ○ Validate that the number of patients in the numerator is less than or equal to the number of patients in the denominator	From the patients who did not meet the Numerator criteria, determine if the patient meets any criteria for the Denominator Exception (E1 + E2+E3). If they meet any criteria, they should be removed from the Denominator for performance calculation. As a point of reference, these cases are removed from the denominator population for the performance calculation, however the number of patients with valid exceptions should be calculated and reported.

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Heart Failure - Beta Blocker Therapy for LVSD

value_set_id	clinical_ topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.01	MAL HYP HRT DIS W HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.11	BEN HYP HRT DIS W HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	402.91	HYP HRT DIS NOS W HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.01	MAL HYP HRT/REN DIS W HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.03	MAL HYP HRT/REN DIS W HF&RF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.11	BEN HYP HRT/REN DIS W HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.13	BEN HYP HRT/REN DIS W HF&RF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.91	HYP HRT/REN DIS W HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	404.93	MAL HYP HRT/REN DIS W HF&RF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.0	CHF NOS
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.1	LEFT HEART FAILURE
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.20	SYSTOLIC HRT FAILURE NOS
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.21	AC SYSTOLIC HRT FAILURE
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.22	CHR SYSTOLIC HRT FAILURE
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.23	AC ON CHR SYSTOLIC HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.30	DIASTOLC HRT FAILURE NOS
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.31	AC DIASTOLIC HRT FAILURE
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.32	CHR DIASTOLIC HRT FAIL
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.33	AC ON CHR DIASTOLIC HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.40	SYSTOLIC/DIASTOLIC HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.41	AC SYSTOLIC/DIASTOLIC HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.42	CHR SYSTOLIC/DIASTOLIC HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.43	AC/CHR SYSTOLIC/DIASTOLIC HF
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I9	428.9	HEART FAILURE NOS
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I11.0	Hypertensive heart disease with heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I13.0	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I13.2	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.1	Left ventricular failure/Cardiac asthma
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.20	Unspecified systolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.21	Acute systolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.22	Chronic systolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.23	Acute on chronic systolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.30	Unspecified diastolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.31	Acute diastolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.32	Chronic diastolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.33	Acute on chronic diastolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.40	Unspecified combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.41	Acute combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.42	Chronic combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.43	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	I10	I50.9	Heart failure, unspecified / Biventricular (heart) failure NOS
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	364006	acute left-sided heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5053004	cardiac insufficiency due to prosthesis (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5148006	hypertensive heart disease with congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	5375005	chronic left-sided congestive heart failure (disorder)

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value_set_id	clinical_ topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10091002	high output heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10335000	chronic right-sided heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	10633002	acute congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	13839000	Bernheim's syndrome (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	25544003	low output heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	33644002	postvalvulotomy syndrome (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	42343007	congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	43736008	rheumatic left ventricular failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	44313006	right heart failure secondary to left heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	46113002	hypertensive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	48447003	chronic heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	56675007	acute heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	60856006	cardiac insufficiency following cardiac surgery (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	66989003	chronic right-sided congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	74960003	acute left-sided congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	77737007	benign hypertensive heart disease with congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	80479009	acute right-sided congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	82523003	congestive rheumatic heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	83105008	malignant hypertensive heart disease with congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	84114007	heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	85232009	left heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	88805009	chronic congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	92506005	biventricular congestive heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	90727007	pleural effusion due to congestive heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	111283005	chronic left-sided heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	128404006	right heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194767001	benign hypertensive heart disease with congestive cardiac failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194779001	hypertensive heart and renal disease with (congestive) heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	194781004	hypertensive heart and renal disease with both (congestive) heart failure and renal failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195111005	Decompensated cardiac failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195112003	compensated cardiac failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	195114002	acute left ventricular failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	206586007	congenital cardiac failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	233924009	heart failure as a complication of care (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	277639002	sepsis-associated right ventricular failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	314206003	refractory heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	359617009	acute right-sided heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	359620001	acute right heart failure
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	367363000	right ventricular failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	410431009	cardiorespiratory failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	417996009	systolic heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	418304008	diastolic heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	424404003	decompensated chronic heart failure (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426012001	right heart failure due to pulmonary hypertension (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426263006	congestive heart failure due to left ventricular systolic dysfunction (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	426611007	congestive heart failure due to valvular disease (disorder)
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	441481004	chronic systolic heart failure

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value_set_id	clinical_ topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000265	HF	6	IPP	Heart Failure	Diagnosis/Condition/Problem	SNM	441530006	chronic diastolic heart failure
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99201	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99202	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99203	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99204	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99205	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99212	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99213	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99214	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99215	
000009	HF	6	IPP	Encounter-INPT Discharge	Encounter	CPT	99238	
000009	HF	6	IPP	Encounter-INPT Discharge	Encounter	CPT	99239	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99241	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99242	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99243	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99244	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99245	
000002	HF	6	IPP	Encounter -Nursing Facility	Encounter	CPT	99304	
000002	HF	6	IPP	Encounter -Nursing Facility	Encounter	CPT	99305	
000002	HF	6	IPP	Encounter -Nursing Facility	Encounter	CPT	99306	
000002	HF	6	IPP	Encounter -Nursing Facility	Encounter	CPT	99307	
000002	HF	6	IPP	Encounter -Nursing Facility	Encounter	CPT	99308	
000002	HF	6	IPP	Encounter -Nursing Facility	Encounter	CPT	99309	
000002	HF	6	IPP	Encounter -Nursing Facility	Encounter	CPT	99310	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99324	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99325	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99326	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99327	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99328	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99334	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99335	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99336	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99337	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99341	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99342	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99343	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99344	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99345	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99347	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99348	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99349	
000002	HF	6	IPP	Encounter-Outpatient	Encounter	CPT	99350	
000003	HF	6	D (a)	Ejection Fraction	Diagnostic Study	SNM	70822001	CARDIAC EJECTION FRACTION
000003	HF	6	D (a)	Ejection Fraction	Diagnostic Study	SNM	250908004	LEFT VENTRICULAR EJECTION FRACTION
000003	HF	6	D (a)	Ejection Fraction	Diagnostic Study	SNM	250907009	LEFT VENTRICULAR FUNCTION
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78414	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78451	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78452	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78453	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78454	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78468	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78472	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78473	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78481	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78483	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78494	

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value_set_id	clinical_ topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	78496	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93303	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93304	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93306	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93307	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93308	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93312	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93313	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93314	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93315	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93316	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93317	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93350	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93351	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93352	
000004	HF	6	D (a)	LVF Assessment	Diagnostic Study	CPT	93543	
000248	HF	6	D (b)	LVSD : Moderate or Severe Dysfunction	Diagnostic Study	SNM	10189741000046100	Moderate left ventricular systolic dysfunction (disorder)
000248	HF	6	D (b)	LVSD : Moderate or Severe Dysfunction	Diagnostic Study	SNM	10189751000046100	Severe left ventricular systolic dysfunction (disorder)
000244	HF	6	D (b)	LVSD	Diagnosis/Condition/Problem	SNM	134401001	Left Ventricular Systolic Dysfunction
000247	HF	6	D (b)	Severity Status	Result	SNM	6736007	Moderate (severity)
000247	HF	6	D (b)	Severity Status	Result	SNM	24484000	Severe (Severity)
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	200031	carvedilol 6.25 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	200032	carvedilol 12.5 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	200033	carvedilol 25 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	212388	Coreg 6.25 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	212389	Coreg 12.5 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	212390	Coreg 25 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	686924	carvedilol 3.125 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	686926	Coreg 3.125 Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854901	Bisoprolol Fumarate 10 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854903	Zebeta 10 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854905	Bisoprolol Fumarate 5 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854907	Zebeta 5 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854908	bisoprolol fumarate 10 MG / HCTZ 6.25 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854910	Ziac 10/6.25 Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854916	bisoprolol fumarate 2.5 MG / HCTZ 6.25 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854918	Ziac 2.5/6.25 Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854919	bisoprolol fumarate 5 MG / HCTZ 6.25 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	854921	Ziac 5/6.25 Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860510	carvedilol phosphate 10 MG 24 HR Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860512	24 HR Coreg 10 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860513	carvedilol phosphate 10 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860514	Coreg 10 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860516	carvedilol phosphate 20 MG 24 HR Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860518	24 HR Coreg 20 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860519	carvedilol phosphate 20 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860520	Coreg 20 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860522	carvedilol phosphate 40 MG 24 HR Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860524	24 HR Coreg 40 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860525	carvedilol phosphate 40 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860526	Coreg 40 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860532	carvedilol phosphate 80 MG 24 HR Extended Release Capsule

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value_set_id	clinical_topic	topic_indicator	measure_component	standard_concept	standard_category	standard_taxonomy	code	code_description
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860534	24 HR Coreg 80 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860535	carvedilol phosphate 80 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	860536	Coreg 80 MG Extended Release Capsule
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	865154	Bisoprolol Fumarate 1.25 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	865155	Bisoprolol Fumarate 2.5 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	865157	Bisoprolol Fumarate 3.75 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	865159	Bisoprolol Fumarate 7.5 MG Oral Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	866412	metoprolol tartrate 100 MG (as metoprolol succinate 95 MG) 24 HR Extended Release Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	866414	24 HR Toprol XL 100 MG Extended Release Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	866419	metoprolol tartrate 200 MG (as metoprolol succinate 190 MG) 24 HR Extended Release Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	866421	24 HR Toprol XL 200 MG Extended Release Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	866436	metoprolol tartrate 50 MG (as metoprolol succinate 47.5 MG) 24 HR Extended Release Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	866452	hydrochlorothiazide 12.5 MG / metoprolol tartrate 100 MG (as metoprolol succinate 95 MG) 24 HR Extended Release Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	866455	Dutoprol 100/12.5 MG 24 HR Extended Release Tablet
000211	HF	6	N	Beta Blocker Therapy for LVSD	Medication	RxNorm	866846	HCTZ 25 MG / metoprolol tartrate 200 MG (as metroprolol succinate 190 MG) 24 HR Extended Release Tablet
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	I9	426.0	AV BLOCK COMPLETE
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	I9	426.12	AV BLOCK-MOBITZ II
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	I9	426.13	AV BLOCK-2ND DEGREE NOS
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	I10	I44.2	Atrioventricular block, complete
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	I10	I44.1	Atrioventricular block, second degree
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	2374000	Monofascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	4554005	intraventricular conduction defect (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	4973001	left bundle branch hemiblock (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	6180003	complete left bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	6374002	bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	9651007	long QT syndrome (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	13620007	Stokes-Adams-Morgagni syndrome (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	20143001	bilateral bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	20852007	Romano-Ward syndrome (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	27885002	complete atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	28189009	Mobitz type II atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	30667004	right bundle branch block AND left anterior fascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	32425009	right bundle branch block, anterior fascicular block AND posterior fascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	32758004	right bundle branch block with left bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	37760005	left anterior fascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	41863008	right bundle branch block, anterior fascicular block AND incomplete posterior fascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	43906007	right bundle branch block AND incomplete left bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	44103008	postoperative sinoatrial disease (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	46319007	right bundle branch block AND left posterior fascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	46619002	congenital heart block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	46935006	Stokes-Adams syndrome (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	50799005	atrioventricular dissociation (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	54016002	Mobitz type I incomplete atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	59118001	right bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	62026008	left posterior fascicular block (disorder)

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value_set_id	clinical_ topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	63467002	left bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	64872007	congenital incomplete atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	66568003	right bundle branch block, posterior fascicular block AND incomplete anterior fascicular block
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	71792006	nodal rhythm disorder (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	73459006	right branch block, incomplete anterior fascicular block AND incomplete posterior fascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	74021003	Bifascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	76887001	anterior fascicular block, posterior fascicular block AND incomplete right bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	77221000	incomplete atrioventricular block with atrioventricular response (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	82226007	diffuse intraventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	82580003	congenital complete atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	86014007	trifascicular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	93130009	Lenegre's disease (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	129575004	pacemaker twiddler's syndrome (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	195039008	partial atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	195042002	second degree atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	195046004	left main stem bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	204383001	congenital complete atrioventricular heart block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	204384007	congenital incomplete atrioventricular heart block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	233917008	atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	233918003	postoperative complete heart block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	233919006	familial isolated complete right bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	251114004	intermittent second degree atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	251120003	incomplete left bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	251123001	complete right bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	251124007	incomplete right bundle branch block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	251125008	minor intraventricular conduction defect (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	251152003	marked sinus arrhythmia (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	270492004	first degree atrioventricular block (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	276513001	neonatal dysrhythmia (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	283645003	lev's syndrome (disorder)
000094	HF	6	E	Atrioventricular Block	Diagnosis/Condition/Problem	SNM	302944009	congenital complete heart block (disorder)
000095	HF	6	E	Cardiac Pacer in Situ	Diagnosis/Condition/Problem	I10	Z95.0	Presence of cardiac pacemaker
000095	HF	6	E	Cardiac Pacer in Situ	Diagnosis/Condition/Problem	I9	V45.01	STATUS-POST PACEMAKER
000095	HF	6	E	Cardiac Pacer in Situ	Device	SNM	14106009	cardiac pacemaker
000095	HF	6	E	Cardiac Pacer in Situ	Device	SNM	56961003	cardiac transvenous pacemaker
000095	HF	6	E	Cardiac Pacer in Situ	Device	SNM	360127006	intravenous cardiac pacemaker system
000113	HF	6	E	Heart Rate	Diagnosis/Condition/Problem	SNM	364075005	Heart Rate
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.00	EXTRINSIC ASTHMA UNSPEC
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.01	EXTRINSIC ASTHMA W STATUS ASTH
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.02	EXTRINSIC ASTHMA W (AC) EXAC
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.10	INTRINSIC ASTHMA NOS
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.11	INTRINSIC ASTHMA W STATUS ASTH
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.12	INTRINSIC ASTHMA W (AC) EXAC
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.20	CHR OBST ASTHMA UNSPEC
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.21	CHR OBST ASTHMA W STAT ASTH
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.22	CHR OBST ASTHMA W (AC) EXAC
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.81	EXERCSE IND BRONCHOSPASM
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.82	COUGH VARIANT ASTHMA
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.90	ASTHMA NOS

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value_set_id	clinical_ topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.91	ASTHMA NOS W STATUS ASTHT
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I9	493.92	ASTHMA NOS W (AC) EXAC
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.22	Mild intermittent asthma with status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.32	Mild persistent asthma with status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.42	Moderate persistent with status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.52	Severe persistent with status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.90	Unspecified asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.901	Unspecified asthma with (acute) exacerbation
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.902	Unspecified asthma with status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.990	Exercise induced bronchospasm
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	I10	J45.991	Cough variant asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	11641008	millers' asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	12428000	intrinsic asthma without status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	13151001	flax-dressers' disease
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	30352005	allergic-infective asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	31387002	exercise-induced asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	55570000	asthma without status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	56968009	wood asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	57546000	asthma with status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	59327009	intrinsic asthma with status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	59786004	weavers' cough
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	63088003	extrinsic asthma without status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	67415000	hay asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	85761009	byssinosis
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	91340006	extrinsic asthma with status asthmaticus
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	92807009	chemical-induced asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	93432008	drug-induced asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	195949008	chronic asthmatic bronchitis
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	195967001	asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	195977004	mixed asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	195979001	asthma unspecified
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	196013003	pneumopathy due to inhalation of other dust
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	225057002	brittle asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	233672007	byssinosis grade 3
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	233678006	childhood asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	233679003	late onset asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	233681001	extrinsic asthma with asthma attack
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	233683003	hay fever with asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	233685005	intrinsic asthma with asthma attack
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	233688007	sulfite-induced asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	266361008	intrinsic asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	266364000	asthma attack
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	281239006	exacerbation of asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	304527002	acute asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	370218001	mild asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	370219009	moderate asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	370220003	occasional asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	370221004	severe asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	389145006	allergic asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	405944004	asthmatic bronchitis
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	407674008	aspirin-induced asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	409663006	cough variant asthma

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value_set_id	clinical_topic	topic_indicator	measure_component	standard_concept	standard_category	standard_taxonomy	code	code_description
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	423889005	Non-IgE mediated allergic asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	424199006	substance induced asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	424643009	igE-mediated allergic asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	425969006	exacerbation of intermittent asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	426656000	severe persistent asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	426979002	mild persistent asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	427295004	moderate persistent asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	427354000	exacerbation of persistent asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	427603009	intermittent asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	427679007	mild intermittent asthma
000257	HF	6	E	Asthma	Diagnosis/Condition/Problem	SNM	442025000	acute exacerbation of chronic asthmatic bronchitis
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	29894000	vagal autonomic bradycardia (disorder)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	42177007	BRADYCARDIA - PULSE SLOW
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	44273001	reflex bradycardia (finding)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	44602002	PERSISTENT SINUS BRADYCARDIA
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	47101004	cardiotachometry
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	48867003	SLOW HEART BEAT - BRADYCARDIA
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	49044005	SEVERE SINUS BRADYCARDIA
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	49710005	sinus bradycardia (disorder)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	162988008	on examination - pulse rate - bradycardia (finding)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	251162005	atrio-ventricular-junctional (nodal) bradycardia (disorder)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	278085001	baseline bradycardia (finding)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	309746001	[D]Sinus bradycardia (situation)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	397841007	drug-induced bradycardia (disorder)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	426177001	electrocardiogram: sinus bradycardia (finding)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	SNM	426627000	electrocardiogram: bradycardia (finding)
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	I9	427.89	other specified cardiac dysrrhythmias
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	I9	427.81	sinoatrial node dysfunction
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	I9	337.09	Other idiopathic peripheral autonomic neuropathy
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	I10	G90.09	Other idiopathic peripheral autonomic neuropathy
000258	HF	6	E	Bradycardia	Diagnosis/Condition/Problem	I10	R00.1	Bradycardia unspecified
000160	HF	6	E	Medical reason	Negation Rationale	HL7	21745	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	21747	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	21703	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	21704	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	22855	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	21990	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	21738	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	22259	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	21815	
000160	HF	6	E	Medical reason	Negation Rationale	HL7	22261	
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.0	ORTHOSTATIC HYPOTENSION
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.1	CHRONIC HYPOTENSION
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.29	IATROGENC HYPOTENSION
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.8	HYPOTENSION NEC
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-9	458.9	HYPOTENSION NOS
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	R03.1	Nonspecific low blood-pressure reading
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	I95.0	Idiopathic hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	I95.1	Orthostatic hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	I95.2	Hypotension due to drugs
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	ICD-10	I95.8	Other hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	45007003	Low blood pressure
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	77545000	Chronic hypotension

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value_set_id	clinical_ topic	topic_ indicator	measure_ component	standard_concept	standard_category	standard_ta xonomy	code	code_description
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	286963007	Chronic hypotension - idiopathic
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	75181005	Chronic orthostatic hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	84438001	Pure autonomic failure
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	234171009	Drug-induced hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	429561008	Exertional hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	408667000	Hemodialysis-associated hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	67763001	Hypotensive episode
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	195506001	Idiopathic hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	271870002	Low blood pressure reading
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	88887003	Maternal hypotension syndrome
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	200112003	Maternal hypotension syndrome - delivered with postnatal problem
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	200111005	Maternal hypotension syndrome - delivered
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	200113008	Maternal hypotension syndrome with antenatal problem
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	200114002	Maternal hypotension syndrome with postnatal problem
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	28651003	Orthostatic hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	75181005	Chronic orthostatic hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	84438001	Pure autonomic failure
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	61933008	Hyperadrenergic postural hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	70247006	Hypoadrenergic postural hypotension
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	371073003	Postural orthostatic tachycardia syndrome
000250	HF	6	E	Hypotension	Diagnosis/Condition/Problem	SNM	230664009	Sympathotonic orthostatic hypotension
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	ICD-9	276.6	Fluid overload
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	ICD-10	E87.7	Fluid overload
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	21639008	Hypervolemia
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	43498006	Body fluid retention
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	234176004	Idiopathic fluid retention
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	56977002	Idiopathic edema
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	1794009	Idiopathic corneal edema
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	402866002	Periodic edema
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	234177008	Excess interdialytic weight gain
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	42669007	Hyponatremia with excess extracellular fluid volume
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	61688009	Overhydration
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	276644000	Neonatal overhydration
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	35633007	Transfusion reaction due to excess volume
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	52139007	Volume excess, disturbed Starling forces
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	32442003	Volume excess, primary hormone excess
000251	HF	6	E	Fluid Overload	Diagnosis/Condition/Problem	SNM	77624000	Volume excess, primary renal sodium retention
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	347930	milrinone 1 MG/ML (as milrinone lactate) Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	311705	milrinone 200 MCG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	545299	Primacor 0.2 MG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	807270	Primacor 1 MG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	251225	Enoximone 5 MG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	204504	Digoxin 0.1 MG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	104208	digoxin 250 MCG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	208135	Lanoxin 0.1 MG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	208137	Lanoxin 0.25 MG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	412888	Ouabain 0.25 MG/ML Injectable Solution
000253	HF	6	E	Intravenous Positive Inotropic Agent	Medication - Administered	RxNorm	901047	Levosimendan 2.5 MG/ML Injectable Solution
000174	HF	6	E	Patient reason	Negation Rationale	HL7	19729	
000174	HF	6	E	Patient reason	Negation Rationale	HL7	21741	
000174	HF	6	E	Patient reason	Negation Rationale	HL7	21746	
000174	HF	6	E	Patient reason	Negation Rationale	HL7	21743	
000174	HF	6	E	Patient reason	Negation Rationale	HL7	21710	

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000174	HF	6	E	Patient reason	Negation Rationale	HL7	21708	
000174	HF	6	E	Patient reason	Negation Rationale	HL7	22851	
000174	HF	6	E	Patient reason	Negation Rationale	HL7	14880	
000174	HF	6	E	Patient reason	Negation Rationale	HL7	22260	
000174	HF	6	E	Patient reason	Negation Rationale	HL7	15985	
000200	HF	6	E	System Reason	Negation Rationale	HL7	22168	
000200	HF	6	E	System Reason	Negation Rationale	HL7	22169	
000200	HF	6	E	System Reason	Negation Rationale	HL7	22165	
000200	HF	6	E	System Reason	Negation Rationale	HL7	22166	
000200	HF	6	E	System Reason	Negation Rationale	HL7	22167	
000200	HF	6	E	System Reason	Negation Rationale	HL7	21493	
000200	HF	6	E	System Reason	Negation Rationale	HL7	19731	
000200	HF	6	E	System Reason	Negation Rationale	HL7	19730	
000200	HF	6	E	System Reason	Negation Rationale	HL7	19733	
000200	HF	6	E	System Reason	Negation Rationale	HL7	19735	
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000200	HF	6	E	System Reason	Negation Rationale	HL7	19736	
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000200	HF	6	E	System Reason	Negation Rationale	HL7	19988	
000200	HF	6	E	System Reason	Negation Rationale	HL7	19987	