The mission of the NCDR® is to improve the quality of cardiovascular patient care by providing information, knowledge and tools; implementing quality initiatives; and supporting research that improves patient care and outcomes.

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Companion Guide to your NCDR®

Outcomes Reports

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Author: BDenton Last update: January 15, 2019

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Release Notes

When compared to the v2.1 companion guide, the following changes will be reflected in the v2.2 companion guide:

1. Metrics 4, 5, 6 and 14 (Discharge Medications) for all generator procedures will now include patients in the numerator and the denominator when the medication is "No-Medical Reason" or "No-Patient Reason", in addition to "Yes".

2. Metric 7 Proportion of patients that receive antibiotics prior to the ICD implant or lead procedure has been retired.

3. Metric 11 Incidence of hematoma (implant procedures) has been retired.

4. Guideline metric 12 Proportion of patients that receive an ICD for class I, IIa, or IIb guideline indications has been retired.

5. Guideline metrics 15, 16, and 17 have been re-numbered as 25, 26, and 27 due to additional elements being included in the algorithms, such as but not limited to Guideline Directed Medical Therapy and Anticipated requirement for > 40% RV pacing, that are now being captured in v2.2.

6. Metric 18 Risk Adjusted Complications is temporarily suspended while new version data is exported to the analytic center for re-running the risk adjusted model.

7. AUC metrics 19, 20, 21, 22, 23, and 24 have been retired. New AUC metrics developed from new version data will be forthcoming.

Q42018 ICD Release Notes:

**Metric 13 has been updated:**

The Metric 13 denominator has been updated to exclude patients with Procedure Type (seq: 7010) of "Generator explant".
Overview

What is the ICD Outcomes Report?

The Outcomes Report analyzes your hospital's individual performance in relation to the entire ICD Registry population. This provides insight into your care variations and quality improvement opportunities.

Data for the Outcomes Report is made up of the quarters you submit to the Data Quality Report.

Frequently Used Terminology

Registry Aggregate: Benchmarking data that includes all registry participants who submitted complete data.

Benchmark Inclusion Status: Final DQR status for each timeframe.

- ☢️ A “Green” status indicates your submission is included in the benchmark that makes up the Registry Aggregate.
- 🟢 A “Yellow” status indicates your submission is not included in the Registry Aggregate for the R4Q period. Your submission data displayed is for informational purposes only.
- 🟥 A “Red” status indicates your submission is not included in Registry Aggregate benchmark. Due to the type of DQR error validations, the column for this data submission will be left blank.
**R4Q** (Rolling Four Quarters): The four consecutive quarters making up the Outcomes Report. The title page of the Outcomes Report indicates the last timeframe (year/quarter) included in the report. As each new report is released, the oldest timeframe “rolls” off the report.

**My Hospital Aggregate**: My Hospital Aggregate is the total number of procedures performed over the R4Q period. This is adjusted for the number of quarters in which valid submissions were received during the R4Q period.

**Volume Aggregate**: My Volume Aggregate is the total number of procedures performed over the R4Q period within the volume group.

**Data Quality Report**: The online system used to check that data is well formed and complete. Data must first be submitted to the DQR to be included in the Outcomes Report.
Downloading the Reports

Step 1: Check Your Access Settings

1. Set privileges to ensure access to your Outcomes Reports.
   a. Your registry site manager (RSM) must check the box next to the eReports privilege within the Site User Administration menu to allow your access to the Outcomes Report.
   b. This privilege only needs to be set once.

   ![Figure 1: Selecting Privileges: Outcomes Report](image)

2. Set Email Preferences to receive the automated Outcomes Report notification (optional, but recommended).
   a. Click Administration > Individual Profile.
   b. Check the box "Email me when any new Outcomes Report is available."
   c. This ensures you will receive an email when any new Outcomes Report is available for download.

   ![Figure 2: Selecting Email Preferences](image)
Step 2: Download the Report(s)

1. Login to the ICD Registry® website.
2. Select Dashboard from the left menu.
3. You must have the eReports privilege to perform this function.
4. From the table, select either the PDF or XLS image for the Year/Quarter you wish to download.

![Outcomes Report Display](image)

Figure 3: Outcomes Report Display

5. When the File Download dialog box appears, select Save. Save the file to your local system.
Title Page

The title page provides a quick snapshot of the report’s contents.

Figure 4: Title Page Explained

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Title Page Explained

1. Registry Version
   a. The current release of the ICD Registry.

2. Ending Timeframe
   a. Last "year/quarter" of the report
   b. Each report includes the ending timeframe and the previous three consecutive quarters referred to as rolling four quarters (When data is submitted for the 5th Quarter, the oldest data set is dropped from the calculations, thus the term “Rolling 4 Quarters”).

3. Site Name and NCDR Participant ID
   a. Facility name as reported on the ICD Registry Site Profile.

4. Aggregation Date
   a. Indicates the date that the last aggregation calculations were performed on all of the data contained in the data warehouse.
   b. Aggregation only includes data which passes Level 3 of the DQR

5. Publish Date
   a. Indicates the date when the report was posted to participant's portal on www.ncdr.com

6. Revision Number
   a. Indicates the "version" of the report.
   b. The Revision Number will increase only if algorithms or fundamental changes have been made to the report since the previous report release.
Executive Summary

The Executive Summary contains metrics as well as some graphs:

1. Metrics are divided into three sections: Device Based Guideline Metrics, Process and Outcome Metrics. These are used to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

   a. Detail Line - This refers to the line number in the Detail Section of the report. Each of the metrics refers to lines in the ICD report.

   b. My Hospital - Refers to the “My Hospital R4Q %” column of the Detail Section of the report. This is the value for your institution over the rolling four quarters (R4Q) period.

   c. All Hospitals 50th Percentile – refers to the performance of the hospital at the mid-point. Half of the hospitals performed better and half performed worse.

   d. All Hospitals 90th Percentile – refers to the performance of the hospital at the 90th percentile. 10% of the hospitals performed better and 90% performed worse. The 90th percentile or greater is considered "best practice”.

![Figure 5: The Executive Summary](image_url)
Executive Summary—Understanding Box and Whisker

Interpreting Box and Whisker Plots

**Distribution of Hospital Performance**

- **10th Percentile**
  - If your hospital scores below the 10th percentile, the arrow will be on the left of this number.

- **25th Percentile or 1st Quartile**
  - 75% of the hospitals achieved “better” scores than the 25th percentile.

- **50th Percentile or 2nd Quartile**
  - Middle of the distribution: Half of the hospitals data is above and half are below the median.

- **75th Percentile or 3rd Quartile**
  - 25% of the hospitals achieved “better” scores than the 75th percentile.

- **90th Percentile**
  - 10% of the hospitals achieved “better” scores than the 90th percentile.

**Your Hospital Position**

Your ‘Hospital Position’ in relation to all other hospitals’ data.
Detail Section Lines

This page is an “index” or “quick guide” to finding sections and subsections within the report.

<table>
<thead>
<tr>
<th>Population</th>
<th>Section</th>
<th>First Line #</th>
<th>Last Line #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registry</td>
<td>Submission Summary</td>
<td>1000</td>
<td>1002</td>
</tr>
<tr>
<td>All Patients</td>
<td>Volume Summary</td>
<td>1003</td>
<td>1007</td>
</tr>
<tr>
<td></td>
<td>Executive Summary</td>
<td>1006</td>
<td>1007</td>
</tr>
<tr>
<td></td>
<td>Demographics and Episode</td>
<td>1028</td>
<td>1093</td>
</tr>
<tr>
<td></td>
<td>of Care</td>
<td>1094</td>
<td>1147</td>
</tr>
<tr>
<td></td>
<td>History and Risk Factors</td>
<td>1146</td>
<td>1274</td>
</tr>
</tbody>
</table>

Figure 6: The Detail Section Line Reference

The algorithms are first sectioned by Procedure, then by subsection. The beginning and ending line numbers of the corresponding section are then provided.

1. Population
   a. This section shows which sections are parts of the “All Patients” summary, which are part of “Generator Procedures”, “Primary Prevention”, “Secondary Prevention” and “Lead only” procedures

2. Section
   a. The patient population contains “lines,” or algorithms, corresponding to the subject or source of the data. The sections generally correspond to those on the Data Collection Form, i.e., admissions, history and risk factors, procedure data, adverse events, and medications.

3. First Line #
   a. Displays the first “line” or algorithm for the corresponding section. Use this to quickly locate specific sections of the report.

4. Last Line #
   a. Displays the last “line” or algorithm for the corresponding section.
Detail Section Columns

The Detail Sections are the bulk of the ICD report.

These pages give individual detail on the number of responses that were coded for specific elements.

<table>
<thead>
<tr>
<th>Line#</th>
<th>Description</th>
<th>2017/Q1</th>
<th></th>
<th>2017/Q2</th>
<th></th>
<th>2017/Q3</th>
<th></th>
<th>2017/Q4</th>
<th></th>
<th>My Hospital R4Q</th>
<th></th>
<th>Volume Group Patients R4Q</th>
<th></th>
<th>U.S. Hospitals Patients R4Q</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1028</td>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1029</td>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1030</td>
<td>Male</td>
<td>5</td>
<td>12</td>
<td>38.5</td>
<td>5</td>
<td>7</td>
<td>71.4</td>
<td>2</td>
<td>2</td>
<td>100.0</td>
<td>2</td>
<td>12</td>
<td>22</td>
<td>54.6</td>
<td>6</td>
</tr>
<tr>
<td>1031</td>
<td>Female</td>
<td>8</td>
<td>13</td>
<td>81.3</td>
<td>2</td>
<td>7</td>
<td>28.6</td>
<td>0</td>
<td>2</td>
<td>0.0</td>
<td>16</td>
<td>22</td>
<td>49.2</td>
<td>49.2</td>
<td>2</td>
</tr>
</tbody>
</table>

1. Column Headers
   a. Submission Year and Quarter with Benchmark Inclusion Status
      • The timeframes (YYYYQQ) are displayed from left to right, with the “stoplight” beneath.
   b. My Hospital R4Q
      • Aggregate over the R4Q period (Rolling Four Quarters) for your facility’s data.
      • Sums the data from the “Green” timeframes.
   c. All Registry Patients R4Q
      • This column displays the aggregate data for all of the facilities submitting data to the Registry with a “Green” stoplight.
      • Based on quarterly data. For example, if one participant submits 4 “green” quarters, and one participant submits only 2 “green” quarters, those 6 “green” quarters are included in the Registry Aggregate.

2. Line #
   a. ICD line numbers begin with 1000.
   b. Line numbers are consecutive, even if algorithms have been removed or added.
   c. “Header” rows also have line numbers, even if no data is contained in the row.

3. Description
   a. “Header” rows are shaded in gray. These are often the element, or Sequence Number, coded from the data collection form. The indented lines below the “header row” are the selections for the element.
   b. Not all lines are repeated for all populations. For example, the number of procedures coded as Secondary Prevention is not a line item reported in the “Primary Prevention” population section.

4. Numerator / Denominator / Percentage
   a. Num is the abbreviation for “Numerator.” The numerator is the number of occurrences (the count) of the item, element, or selection. (Mean, median, or standard deviations excluded.)
   b. Den is the abbreviation for “Denominator”. The denominator is the total number of occurrences of the item, element, or selection.
   c. % is the abbreviation for “Percentage.” The percentage is calculated from the numerator and denominator of the line. Lines containing mean, median, and standard deviation calculations do not contain percentages.
   d. Due to available spacing Vol Group Pts R4Q and All Registry Pts R4Q columns do not contain denominators.

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Understanding Individual Detail Lines

Each line in each Detail Section corresponds to one or more elements from the data collection form. Most lines contain “counts” of the number of times an element is answered. Some lines are calculated, such as Median Age.

1. To begin, read the “header row” for a line item, it is the element for which we are reporting on how it was coded. In the example below, the element being reported on is Heart Failure Presentation.

2. Read down to the individual selection. The “Num” column within that row displays the number of times “Heart Failure” was coded. The “Den” column displays the denominator value “Population” Presentation was coded. In the example below, “Heart Failure” was coded 42 times out of 55. (Depending on the threshold for this element, this number might be less than the number of procedures for the quarter.)

3. The percentage is shown in the % column. See Error! Reference source not found., below

![Table Example]

<table>
<thead>
<tr>
<th>Line#</th>
<th>Description</th>
<th>Num</th>
<th>Den</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1149</td>
<td>Heart Failure</td>
<td>42</td>
<td>45</td>
<td>93.3</td>
</tr>
<tr>
<td>1150</td>
<td>NYHA Functional Class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1151</td>
<td>Class I</td>
<td>10</td>
<td>42</td>
<td>23.8</td>
</tr>
<tr>
<td>1152</td>
<td>Class II</td>
<td>19</td>
<td>42</td>
<td>45.2</td>
</tr>
<tr>
<td>1153</td>
<td>Class III</td>
<td>11</td>
<td>42</td>
<td>26.2</td>
</tr>
<tr>
<td>1154</td>
<td>Class IV</td>
<td>2</td>
<td>42</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Figure 8: Example - Header rows, Numerator, Denominator

4. Reading to the right, across the same line #, the My Hospital R4Q columns display the total number of times the element was coded over the 4 timeframes (inclusion status rules apply). See Figure 9, below.

![Figure 9 Example]

Figure 9: Example - My Hospital R4Q, Comparison Group, and Registry Aggregate columns
5. Significance of the “Element Threshold”
   a. Not all elements have a 100% Element Threshold (see the DQR Companion Guide for a complete description). Depending on the element and composite threshold percentages, you may see lines where the total number does not equal the total number of procedures/patients.

   **Example:**
   - For Q1, suppose you submit 100 patients. However, of those, you were only required to complete the element “Prior CABG” in 90% of your Admissions (90 out of 100).
   - As a result, you will see “90” as the denominator for lines. This is due to the fact that you only coded the element 90 out of 100 times.
ICD Outcomes Report (XLS format)

Detail Section

The ICD Report in spreadsheet format is a simplified view of the data as reported in the PDF version. Figure 10 illustrates how the format varies from the PDF format:

1. The major differences are:
   a. No Inclusion Summary
   b. No Detail Line Reference Page
   c. No Section breaks
   d. No “Benchmark Inclusion Status” stoplights

2. Without a Title Page or Inclusion Summary, the file name is the primary indicator of Year/Quarter of the report, as well as the report Revision Number.
   a. For example, the file named “2017Q4_999999_Standard_r2_16.xls” indicates that the ending timeframe is “2017Q4”, the participant ID is “999999”, it is a “Standard” Report, and the algorithm revision is “r2.”

3. The column headers for this report format are:
   a. Participant Name  The six-digit identifier for your institution (Col A-D)
   b. LineNumber  Line Number (matches the PDF version.) (Col A)
   c. Major Category  Main Category in Report (Col B)
   d. Minor Category  Sub-Category in Report (Col C)
   e. Description  Element Description/Algorithm (Col D)
   f. Timeframe 1  1st timeframe (Col E-G)
   g. Timeframe 1 Num  Numerator for the 1st timeframe data (Col E)
   h. Timeframe 1 Den  Denominator for the 1st timeframe data (Col F)
   i. Timeframe 1 Per  Percentage for the 1st timeframe data (Col G)
   j. Timeframe 2  2nd timeframe (Col H-J)
   k. Timeframe 2 Num  Numerator for the 2nd timeframe data (Col H)
   l. Timeframe 2 Den  Denominator for the 2nd timeframe data (Col I)
   m. Timeframe 2 Per  Percentage for the 2nd timeframe data (Col J)
   n. Timeframe 3  3rd timeframe (Col K-M)
   o. Timeframe 3 Num  Numerator for the 3rd timeframe data (Col K)
   p. Timeframe 3 Den  Denominator for the 3rd timeframe data (Col L)
   q. Timeframe 3 Per  Percentage for the 3rd timeframe data (Col M)
   r. Timeframe 4  4th timeframe (Col N-P)
   s. Timeframe 4 Num  Numerator for the 4th timeframe data (Col N)
   t. Timeframe 4 Den  Denominator for the 4th timeframe data (Col P)
   u. Timeframe 4 Per  Percentage for the 4th timeframe data (Col P)
v. My Hospital R4Q Num   Numerator for your hospital's R4Q of data (Col varies depending if on Time Frame Availability)
w. My Hospital R4Q Den   Denominator for your hospital's R4Q of data (Col varies depending if on Time Frame Availability)
x. My Hospital R4Q Per   Percentage for your hospital's R4Q of data (Col varies depending if on Time Frame Availability)
y. Aggregate R4Q Num     Numerator for the ICD Registry Aggregate (Col varies depending if on Time Frame Availability)
z. Aggregate R4Q Per     Percentage for the ICD Registry Aggregate (Col varies depending if on Time Frame Availability)
**ICD v2 Specifications for Executive Summary Measures and Metrics**

The "Registry Metrics" on the subsequent pages of this report are those metrics that have been developed to support self-assessment and quality improvement at the provider, hospital, and/or health care system level. Some of these metrics have been identified for potential use for accountability (i.e. public reporting, recognition programs) and have been submitted to the National Quality Forum for endorsement.

These metrics include data for four (4) consecutive quarters (example: the 2009 q1 report would include 2009q1, 2008q4, 2008q3 and 2008q2) that pass the NCDR data inclusion thresholds. The “q” indicates the quarter. This is also called “rolling four quarters” (R4Q).

**Metric Specifications Explained:**

<table>
<thead>
<tr>
<th>Metric Title</th>
<th>Numerator</th>
<th>Data coding associated with the metric numerator. Refer to the “ICD V2 Data Dictionary” for more information.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerator</strong></td>
<td>Statement of patients who meet this metric, i.e. patients receiving beta blockers.</td>
<td></td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
<td>Statement of patients eligible for this metric</td>
<td></td>
</tr>
<tr>
<td><strong>Denominator algorithm</strong></td>
<td>Data coding associated with the metric denominator</td>
<td></td>
</tr>
<tr>
<td><strong>Inclusion criteria</strong></td>
<td>Population included in this metric</td>
<td></td>
</tr>
<tr>
<td><strong>Exclusion criteria</strong></td>
<td>Patients in the metric population who are excluded, i.e. patients contraindicated or blinded for a medication.</td>
<td></td>
</tr>
</tbody>
</table>

**Clinical Rationale/Guideline Recommendation**

Executive summary metrics are selected based on supporting evidence and guideline recommendations (i.e. ACC/AHA Task Force on Practice Guideline recommendations). The clinical rationale and references to these supporting documents are provided for each metric.

**Specific guideline recommendations or evidence supporting metric**

**Relevant Citation(s):** Citations for supporting guidelines and/or evidence
SECTION I. PERFORMANCE MEASURES

Performance Measures  
*Endorsed by the National Quality Forum and appropriate for public reporting*

### Metric 4. ACE/ARB Therapy at Discharge for ICD/CRT-D implant patients with LVSD  
(NQF-Endorsed Performance Measure)

**REPORTING STATUS:** Implemented in 2010Q; Num. and Den. Inclusion of No-Medical/Pt. Reason implemented 2016Q2

<table>
<thead>
<tr>
<th><strong>Numerator</strong></th>
<th>Count of generator patients with a diagnosis of heart failure and left ventricular systolic dysfunction with ACE-I or ARB therapy prescribed at discharge.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerator algorithm</strong></td>
<td>ACE(10205)=Yes, No-Medical Reason, or No-Patient Reason OR ARB(10205)= Yes, No-Medical Reason, or No-Patient Reason</td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
<td>Count of generator patients with a diagnosis left ventricular systolic dysfunction</td>
</tr>
<tr>
<td><strong>Denominator algorithm</strong></td>
<td>LVEF (4160) &lt;40 AND Procedure type (7010)=Initial generator implant, Generator change, or Generator explant.</td>
</tr>
</tbody>
</table>

**Inclusion criteria**
- ICD/CRT-D patients

**Exclusion criteria**
- None

**Clinical Rationale/Guideline Recommendation**

ACE inhibitors have been shown to decrease morbidity, mortality, and hospitalizations for patients with heart failure and left ventricular systolic dysfunction. The efficacy of ARB therapy has been strengthened by several large-scale prospective randomized clinical trials demonstrating reduction in mortality and hospitalization for heart failure among patients with heart failure and LVSD. ACE inhibitors should be prescribed to all patients with HF due to LV systolic dysfunction unless they have a contraindication to their use or have been shown to be unable to tolerate treatment with these drugs. ACE inhibitors remain the first choice for inhibition of the renin-angiotensin system in chronic HF, but ARBs can now be considered a reasonable alternative. Even if the patient has responded favorably to the diuretic, treatment with ACE inhibitor or ARBs should be initiated and maintained in patients who can tolerate them, because they have been shown to favorably influence the long-term prognosis of HF.

This measure is endorsed by the National Quality Forum (NQF), endorsed measure #1522.

**ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult:**

- **Class I**
  - Angiotensin converting enzyme inhibitors are recommended for all patients with current or prior symptoms of HF and reduced LVEF, unless contraindicated (Level of Evidence: A).

- **Class IIa**
  - An ARB should be administered to post-MI patients without HF who are intolerant of ACEIs and have a low LVEF (Level of Evidence: B).

**CMS/JCAHO Core Measure: Heart Failure, HF-3: ACEI or ARB for LVSD (9)**

**Relevant Citation(s):** Bonow RO, Bennett S, Casey DE, Jr., et al. ACC/AHA clinical performance measures for adults with chronic heart failure: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Heart Failure Clinical Performance Measures) endorsed by the Heart Failure Society of America. J Am Coll Cardiol. 2005;46:1144-78.
### Metric 5. Beta Blocker at Discharge for ICD/CRT-D implant patients with a previous MI (NQF-Endorsed Performance Measure)

**REPORTING STATUS: Implemented in 2010Q2; Num. and Den. Inclusion of No-Medical/Pt. Reason implemented 2016Q2**

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Count of generator patients with prior MI and discharged on beta-blocker therapy.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerator algorithm</strong></td>
<td>Betablocker (10205)= Yes, No-Medical Reason, or No-Patient Reason</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator</th>
<th>ICD/CRT-D patients with a prior MI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Denominator algorithm</strong></td>
<td>PriorMI (4290)=yes AND Procedure type (7010)=Initial generator implant, Generator change, or Generator explante AND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>-ICD/CRT-D patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusion criteria</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Clinical Rationale/Guideline Recommendation

The benefits of beta blocker therapy in patients with prior myocardial infarction without contraindications have been established for a wide range of patient groups. The greatest mortality benefit is seen in patients with the greatest baseline risk: those with impaired ventricular function or ventricular arrhythmias and those who do not undergo reperfusion. The benefits of beta-blocker therapy for secondary prevention are well established.

This measure is endorsed by the National Quality Forum (NQF), endorsed measure #1528.


**Class I**

1. All patients after STEMI except those at low risk (normal or near-normal ventricular function, successful reperfusion, absence of significant ventricular arrhythmias) and those with contraindications should receive beta-blocker therapy. Treatment should begin within a few days of the event, if not initiated acutely, and continue indefinitely. (Level of Evidence: A)

2. Patients with moderate or severe LV failure should receive beta-blocker therapy with a gradual titration scheme. (Level of Evidence: B)


**CLASS I**

1. Beta blockers are indicated for all patients recovering from UA/NSTEMI unless contraindicated. (For those at low risk, see Class IIa recommendation below). Treatment should begin within a few days of the event, if not initiated acutely, and should be continued indefinitely. (Level of Evidence: B)

2. Patients recovering from UA/NSTEMI with moderate or severe LV failure should receive beta-blocker therapy with a gradual titration scheme. (Level of Evidence: B)

**CLASS IIa**

It is reasonable to prescribe beta blockers to low-risk patients (i.e., normal LV function, revascularized, no high-risk features) recovering from UA/NSTEMI in the absence of absolute contraindications. (Level of Evidence: B)


**Class I**

- Start and continue indefinitely in all patients who have had myocardial infarction, acute coronary syndrome, or left ventricular dysfunction with or without heart failure symptoms, unless contraindicated. (Level of Evidence: A)

**CLASS IIa**

- Consider chronic therapy for all other patients with coronary or other vascular disease or diabetes unless contraindicated. (Level of Evidence: C)

#### Relevant Citation(s):


Metric 6. Beta Blocker at Discharge for ICD/CRT-D Implant Patients with LVSD (NQF-Endorsed Performance Measure)

**REPORTING STATUS:** Implemented in 2010Q2; Num. and Den. Inclusion of No-Medical/Pt. Reason implemented 2016Q2

**Numerator**
Count of generator patients with a diagnosis of left ventricular systolic dysfunction (LVSD) prescribed beta blocker therapy on discharge.

**Numerator algorithm**
- Beta Blocker (any) (10205)= Yes, No-Medical Reason, or No-Patient Reason

**Denominator**
Count of ICD/CRT-D patients left ventricular systolic dysfunction (LVSD).

**Denominator algorithm**
- LVEF (4160)<40 AND Procedure type (7010)=Initial generator implant, Generator change, or Generator explant

**Inclusion criteria**
- ICD/CRT-D patients with a diagnosis of LVSD

**Exclusion criteria**
None

**Clinical Rationale/Guideline Recommendation**
Long term beta blocker therapy for patients with left systolic ventricular dysfunction (LVSD) can improve symptoms of heart failure, improve patient clinical status, and reduce hospitalizations and mortality.

This measure is endorsed by the National Quality Forum (NQF), endorsed measure #1529.

**ACC/AHA Secondary Prevention Guidelines (2006), Beta Blockers:**
- Start and continue indefinitely in all patients who have had myocardial infarction, acute coronary syndrome, or left ventricular dysfunction with or without heart failure symptoms, unless contraindicated. I (A)
- Consider chronic therapy for all other patients with coronary or other vascular disease or diabetes unless contraindicated. IIa (C)

**ACC/AHA Heart Failure Guidelines (2005, 2009 Update)**
13. In patients with reduced ejection fraction experiencing a symptomatic exacerbation of HF requiring hospitalization during chronic maintenance treatment with oral therapies known to improve outcomes, particularly ACEIs 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. (Level of Evidence: C)

14. In patients hospitalized with HF with reduced ejection fraction not treated with oral therapies known to improve outcomes, particularly ACEIs or ARBs and beta-blocker therapy, initiation of these therapies is recommended in stable patients prior to hospital discharge. (Level of Evidence: B)

15. 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. (Level of Evidence: B)

17. Comprehensive written discharge instructions for all patients with a hospitalization for HF and their caregivers is strongly recommended, with special emphasis on the following 6 aspects of care: diet; discharge medications, with a special focus on adherence, persistence, and uptitration to recommended doses of ACEI/ARB and beta-blocker medication; activity level; follow-up appointments; daily weight monitoring; and what to do if HF symptoms worsen. (Level of Evidence: C).

**Relevant Citation(s):**

2016 by American College of Cardiology Foundation.
Author: BDenton Last update: January 15, 2019

Confidential - Not for Release.

**REPORTING STATUS: Implemented in 2011Q4; Num. and Den. Inclusion of No-Medical/Pt. Reason implemented 2016Q2**

<table>
<thead>
<tr>
<th><strong>Numerator</strong></th>
<th>Generator patients who receive all medications for which they are eligible:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. ACE/ARB prescribed at discharge (if eligible for ACE/ARB as described in denominator)</td>
</tr>
<tr>
<td></td>
<td>2. Beta blockers prescribed at discharge (if eligible for beta blockers as described in denominator)</td>
</tr>
</tbody>
</table>

**Numerator algorithm**

\[(ACE/ARB(10205/10205)= Yes, No-Medical Reason, or No-Patient Reason AND (EF (4160)<40) AND (Beta blocker (10205)= Yes, No-Medical Reason, or No-Patient Reason) AND (EF (4160)<40) AND/OR (Previous MI (4290)=Yes)\]

<table>
<thead>
<tr>
<th><strong>Denominator</strong></th>
<th>All generator patients surviving hospitalization who are eligible to receive any one of the two medication classes:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1) Eligibility for ACE/ARB: Patients who have an ejection fraction (EF) of &lt;40%</td>
</tr>
<tr>
<td></td>
<td>2) Eligibility for beta blockers: Patients who have:</td>
</tr>
<tr>
<td></td>
<td>a. EF of &lt;40% AND/OR</td>
</tr>
<tr>
<td></td>
<td>b. a previous myocardial infarction (MI)</td>
</tr>
</tbody>
</table>

**Denominator algorithm**

Eligibility for one medication (see numerator)

<table>
<thead>
<tr>
<th><strong>Inclusion criteria</strong></th>
<th>-ICD/CRT-D patients eligible for beta blocker or ACE/ARB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exclusion criteria</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

**Clinical Rationale/Guideline Recommendation**

See individual measures above for clinical rationale/guideline recommendation

This measure is endorsed by the National Quality Forum (NQF), endorsed measure #965.
SECTION II: QUALITY MEASURES

Guidelines: ACC/AHA/HRS Device Based Therapy Guideline Metrics -- These data are based upon documents developed by the ACC, Heart Rhythm Society, American Heart Association and other national societies. These metrics are designed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. Guideline metrics are not appropriate for public/external reporting at this time.

Metric 25. Proportion of ICD/CRT-D patients that fulfill class I, IIa, or IIb guideline indications

Based on 2008 Device Based Therapy Guideline and 2012 Device Based Therapy Focused Update

REPORTING STATUS: Implemented in 2016QTR2

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Count of initial ICD/CRT-D implant procedures that meet any class I, IIa, or IIb ICD or CRT-D guideline indications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denominator</td>
<td>Count of initial ICD/CRT-D implant procedures.</td>
</tr>
<tr>
<td>Inclusion criteria</td>
<td>- ICD/CRT-D initial implant procedures. - Additional inclusion criteria as specified by specific recommendations below.</td>
</tr>
<tr>
<td>Exclusion criteria</td>
<td>- Enrolled in a clinical trial - Premarket clinical trial (7020)=Yes</td>
</tr>
</tbody>
</table>

Clinical Rationale/Guideline Recommendation

The 2008 ACC/AHA/HRS Guidelines and 2012 ACCF/AHA/HRS Focused Update for device-based therapy of cardiac rhythm abnormalities provides recommendations for ICD therapy for secondary prevention of sudden cardiac death, for primary prevention of sudden cardiac death, and for children, adolescents, and patients with congenital heart disease. Guideline recommendations with a “Class I” ranking indicate that the estimated size of treatment effect is significantly higher than the estimated risk of the therapy, and the treatment “should be administered”. The weight of the evidence identified to support these recommendations is ranked as either Level A (multiple supporting randomized trials or meta-analyses) or Level B (evidence from single randomized trial or nonrandomized studies).

Guideline recommendations with a “Class IIa” ranking indicate that the estimated benefit of therapy is greater than the estimated risk of therapy and that it is “reasonable to perform procedure/administer treatment” but additional studies with focused objectives are needed. The weight of the evidence identified to support these recommendations is ranked as either Level B (evidence from single randomized trial or nonrandomized studies) or Level C (only expert opinion, case studies, or standard of care to support the recommendation).

Guideline recommendations with a “Class IIb” ranking indicate that the estimated benefit of the therapy is greater than or equal to the estimated risk of the therapy, and that the “procedure/treatment may be considered”, but additional studies with broad objectives are needed. The weight of the evidence identified to support these recommendations is ranked as either Level B (evidence from single randomized trial or nonrandomized studies) or Level C (only expert opinion, case studies, or standard of care to support the recommendation).

Class I Recommendations for ICD/CRT-D implantation:

1. ICD therapy is indicated in patients who are survivors of cardiac arrest due to VF or hemodynamically unstable sustained VT after evaluation to define the cause of the event and to exclude any completely reversible causes. (Level of Evidence: A)

   Algorithm (VTAC Arrest (4230) OR VFib Arrest (4235)=Yes OR Hemodynamic Instability (4270)=Yes) AND (VT Type (4275)=Sustained monomorphic VT OR Sustained polymorphic VT or Sustained monomorphic and polymorphic VT) AND Reversible Cause = No (4265)

2. ICD therapy is indicated in patients with structural heart disease and spontaneous sustained VT, whether hemodynamically stable or unstable. (Level of Evidence: B)

   Algorithm (Primary valvular disease (4535)=Yes OR Other structural abnormalities (4540)=Yes OR NICM (4200)=Yes OR Coronary Artery Disease (4285)=Yes OR Ischemic Cardiomyopathy (4185)=Yes)
3. ICD therapy is indicated in patients with syncope of undetermined origin with clinically relevant, hemodynamically significant sustained VT or VF induced at electrophysiological study. (Level of Evidence: B)

4. ICD therapy is indicated in patients with LVEF less than or equal to 35% due to prior MI who are at least 40 days post-MI and are in NYHA functional Class II or III. (Level of Evidence: A)

5. ICD Therapy is indicated in patients with nonischemic DCM who have an LVEF less than or equal to 35% and who are in NYHA functional class II or III. (Level of Evidence: B)

6. ICD therapy is indicated in patients with LV dysfunction due to prior MI who are at least 40 days post-MI, have an LVEF less than or equal to 30%, and are in NYHA functional class I. (Level of Evidence: A)

7. ICD therapy is indicated in patients with nonsustained VT due to prior MI, LVEF less than or equal to 40%, and inducible VF or sustained VT at electrophysiological study. (Level of Evidence: B)

8. CRT is indicated for patients who have LVEF less than or equal to 35%, sinus rhythm, LBBB with a QRS duration greater than or equal to 150 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT. (Level of Evidence: A for NYHA class III/IV; Level of Evidence: B for NYHA class II)

AND
(VT Type (4275)=Sustained monomorphic VT, Sustained polymorphic VT or Sustained monomorphic and polymorphic VT)
AND Reversible Cause = No (4265)

AND
Syncope (4280)=Yes AND
Clinically relevant vent arrh induced (5015)=Yes

AND
Prior LVEF (4160)<=35% AND
Prior MI (4290)=Yes AND
Most Recent MI Date (4295) >=40 days from procedure date AND Most Recent PCI Date (4500) and most recent CABG Date (4520) >= 3 months from procedure date and
NYHA (4010)=(Class II or Class III) AND
ICSMGDMDose (4195) or NICMGDMDose (4210) = (Yes or Inability to Complete) AND Most Recent PCI Date (4500) and most recent CABG Date (4520) >= 3 months from procedure date

AND
NICM (4200)=Yes AND (ICSMGDMDose (4195) or NICMGDMDose (4210)) = (Yes or Inability to Complete) AND
Prior LVEF (4160)<=35% AND
NYHA (4010)=(Class II or Class III)

AND
Prior MI (4290)=Yes AND
Most Recent MI Date (4295) >=40 days from procedure date AND Most Recent PCI Date (4500) and most recent CABG Date (4520) >= 3 months from procedure date and
Prior LVEF (4160)<=30% AND
NYHA (4010)=(Class I) AND
ICSMGDMDose (4195) or NICMGDMDose (4210) = (Yes or Inability to Complete)

AND
Prior MI (4290)=Yes AND
Most Recent MI Date (4295) >=40 days from procedure date AND Most Recent PCI Date (4500) and most recent CABG Date (4520) >= 3 months from procedure date and
Prior LVEF (4160)<=40% AND
ICSMGDMDose (4195) or NICMGDMDose (4210) = (Yes or Inability to Complete)

AND
Clinically relevant vent arrh induced (5015)=Yes

AND
VT Type (4275)=Non-sustained VT AND
Prior MI (4290)=Yes AND
Prior LVEF (4160)=<=40% AND
ICSMGDMDose (4195) or NICMGDMDose (4210) = (Yes or Inability to Complete)

AND
Clinically relevant vent arrh induced (5015)=Yes

AND
NICM (4200) =Yes OR (Ischemic Cardiomyopathy (4185) =Yes and Most Recent MI Date (4295)= > 40 days from procedure date) OR
(Ischemic Cardiomyopathy (4185)= Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520) )= > 3 months from procedure date)) */(secondary prevention indication requires only the below algorithm)*/

AND
Prior LVEF (4160)<= 35% AND
Atrial Rhythm (5100) = Sinus AND
Intraventricular Conduction Types (5065)=LBBB.

2016 by American College of Cardiology Foundation.
Author: BDenton Last update: January 15, 2019
Confidential - Not for Release.
Class IIa Recommendations for ICD/CRT-D implantation:

**Recommendation:**

1. ICD implantation is reasonable for patients with unexplained syncope, significant LV dysfunction, and nonischemic DCM. (Level of Evidence: C)

Algorithm

\[
\text{Syncope (4280)=Yes AND PriorLVEF(4160)<=35\% AND NICM(4200)=Yes AND (ISCMDGMDT(4195) or NICMDGMDT(4210)) = (Yes or Inability to Complete)}
\]

2. ICD implantation is reasonable for patients with sustained VT and normal or near-normal ventricular function. (Level of Evidence: C)

Algorithm

\[
((\text{VT Type(4275)=Sustained monomorphic VT or Sustained polymorphic VT or Sustained monomorphic and polymorphic VT}) \text{ AND PriorLVEF(4160)>=50\%}) \text{ AND Reversible Cause (4265) =No)}
\]

3. ICD implantation is reasonable for patients with HCM who have 1 or more major risk factors for SCD. (Level of Evidence: C)

(The major risk factors include prior cardiac arrest, spontaneous sustained VT, spontaneous nonsustained VT, family history of SCD, syncope, LV thickness greater than or equal to 30 mm, and an abnormal blood pressure response to exercise.)

Algorithm

\[
\text{Structural Abnormality Type (4545) = Hypertrophic cardiomyopathy with high risk features =Yes}
\]

4. ICD implantation is reasonable for the prevention of SCD in patients with ARVD/C who have 1 or more risk factors for SCD. (Level of Evidence: C)

Algorithm

\[
\text{Structural Abnormality Type (4545) = Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) =Yes}
\]

5. ICD implantation is reasonable to reduce SCD in patients with long-QT syndrome who are experiencing syncope and/or VT while receiving beta blockers. (Level of Evidence: B)

Algorithm

\[
\text{Syndrome Type (4170)=Long QT Syndrome =Yes AND (Syncope (4280)=Yes OR Ventricular Tachycardia (4245)=Yes)}
\]

6. ICD implantation is reasonable for non-hospitalized patients awaiting transplantation. (Level of Evidence: C)

Algorithm

\[
\text{On Heart Transplant Waiting List (4355)=Yes OR Candidate for Transplant (4360) =Yes}
\]

7. ICD implantation is reasonable for patients with Brugada syndrome who have had syncope. (Level of Evidence: C)

Algorithm

\[
\text{Syndrome Type (4170)= Brugada Syndrome = Yes AND Syncope (4280)=Yes}
\]

8. ICD implantation is reasonable for patients with Brugada syndrome who have documented VT that has not resulted in cardiac arrest. (Level of Evidence: C)

Algorithm

\[
\text{Syndrome Type (4170)= Brugada Syndrome = Yes AND (Cardiac Arrest (4220) = No OR VTach Arrest (4230)=No OR VFib arrest (4235)=No) AND (Clinically relevant vent arrh induced (5015) =Yes OR Ventricular Tachycardia (4245)= Yes)}
\]
9. ICD implantation is reasonable for patients with catecholaminergic polymorphic VT who have syncope and/or documented sustained VT while receiving beta blockers. (Level of Evidence: C)

10. ICD implantation is reasonable for patients with cardiac sarcoidosis, giant cell myocarditis, or Chagas disease. (Level of Evidence: C)

11. CRT can be useful for patients who have LVEF less than or equal to 35%, sinus rhythm, LBBB with a QRS duration 120 to 149 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT (Level of Evidence: B)

12. CRT can be useful for patients who have LVEF less than or equal to 35%, sinus rhythm, a non-LBBB pattern with a QRS duration greater than or equal to 150 ms, and NYHA class III/ambulatory class IV symptoms on GDMT (Level of Evidence: A)

13. CRT can be useful in patients with atrial fibrillation and LVEF less than or equal to 35% on GDMT if a) the patient requires ventricular pacing or otherwise meets CRT criteria and b) AV nodal ablation or pharmacologic rate control will allow near 100% ventricular pacing with CRT. (Level of Evidence: B)
14. CRT can be useful for patients on GDMT who have LVEF less than or equal to 35% and are undergoing new or replacement device placement with anticipated requirement for significant (>40%) ventricular pacing. (Level of Evidence: C)

Class IIb Recommendations for ICD/CRT-D implantation:

**Recommendation:**

1. ICD therapy may be considered in patients with nonischemic heart disease who have an LVEF of less than or equal to 35% and who are in NYHA functional Class I. (Level of Evidence: C)

2. ICD therapy may be considered for patients with long-QT syndrome and risk factors for SCD. (Level of Evidence: B)

3. ICD therapy may be considered in patients with syncope and advanced structural heart disease in whom thorough invasive and noninvasive investigations have failed to define a cause. (Level of Evidence: C)

4. ICD therapy may be considered in patients with a familial cardiomyopathy associated with sudden death. (Level of Evidence: C)

**Algorithm:**

\[
\text{ICD therapy} = \begin{cases} 
\text{Yes} & \text{CAD (4285) = No AND Ischemic Cardiomyopathy (4185) = No AND Non-Ischemic Cardiomyopathy (4200) = Yes AND PriorLVEF (4160) <= 35 AND NYHA (4010) = Class I} \\
\text{Yes or Syncope (4280) = Yes AND OtherStructAbn (4540) = Yes} & \text{Syncope (4280) = Yes AND} \\
\text{Familial Hx of Non-Ischemic Cardiomyopathy (4180) = Yes OR Familial Syndrome with Risk of Sudden Death (4175) = Yes} & \end{cases}
\]
5. ICD therapy may be considered in patients with LV noncompaction. (Level of Evidence: C)

6. CRT may be considered for patients who have LVEF less than or equal to 30%, ischemic etiology of heart failure, sinus rhythm, LBBB with a QRS duration of greater than or equal to 150 ms, and NYHA class I symptoms on GDMT. (Level of Evidence: C)

7. CRT may be considered for patients who have LVEF less than or equal to 35%, sinus rhythm, a non-LBBB pattern with QRS duration 120 to 149 ms, and NYHA class III/ambulatory class IV on GDMT. (Level of Evidence: B)

8. CRT may be considered for patients who have LVEF less than or equal to 35%, sinus rhythm, a non-LBBB pattern with a QRS duration greater than or equal to 150 ms, and NYHA class II symptoms on GDMT. (Level of Evidence: B)

Structural Abnormality Type (4545) = LV Structural abnormality associated with risk for sudden cardiac arrest

CAD(4285) = Yes OR (Ischemic Cardiomyopathy (4185) = Yes and Most Recent MI Date(4295) = > 40 days from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date)) /*(secondary prevention indication requires only the below algorithm)*/

AND

PriorLVEF (4160) <= 30% AND Atrial Rhythm (5100) = Sinus AND

Intraventricular Conduction Type (5065) = LBBB AND (QRS Non Paced (5055) or Paced (5050) >= 150ms) AND NYHA (4010) = Class I AND (ISCMGDMTDose(4195) or NICMGMNMDose(4210)) = (Yes or Inability to Complete)

NICM(4200) = Yes OR (Ischemic Cardiomyopathy (4185) = Yes and Most Recent MI Date(4295) = > 40 days from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date)) /*(secondary prevention indication requires only the below algorithm)*/

AND

PriorLVEF (4160) <= 35% AND Atrial Rhythm (5100) = Sinus AND

Intraventricular Conduction Type (5065) <> LBBB should be Null*/ AND (QRS Non Paced (5055) or Paced (5050) = 120-149ms) AND NYHA (4010) = (Class III or IV) AND (ISCMGDMTDose(4195) or NICMGMNMDose(4210)) = (Yes or Inability to Complete)

NICM(4200) = Yes OR (Ischemic Cardiomyopathy (4185) = Yes and Most Recent MI Date(4295) = > 40 days from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date)) /*(secondary prevention indication requires only the below algorithm)*/

AND

PriorLVEF (4160) <= 35% AND Atrial Rhythm (5100) = Sinus AND

Intraventricular Conduction Type (5065) <> LBBB should be Null*/ AND (QRS Non Paced (5055) or Paced (5050) = >150ms) AND NYHA (4010) = Class II AND (ISCMGDMTDose(4195) or NICMGMNMDose(4210)) = (Yes or Inability to Complete)
Relevant Citation(s):

*Please note that indications 4, 6, and 7 have been updated based on a correction issued after the original publication date to add “or equal to” for the EF specified. This correction can be found here: http://content.onlinejacc.org/cgi/content/full/53/1/147
Metric 26. **Proportion of ICD patients that fulfill class I, IIa, or IIb guideline indications** Based on 2008 Device Based Therapy Guideline and 2012 Device Based Therapy Focused Update

**REPORTING STATUS:** Implemented in 2016QTR2

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Count of initial ICD implant procedures that meet any class I, IIa, or IIb ICD guideline indications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denominator</td>
<td>Count of initial ICD implant procedures.</td>
</tr>
</tbody>
</table>
| Inclusion criteria | - ICD initial implant procedures.  
- Additional inclusion criteria as specified by specific recommendations below. |
| Exclusion criteria | - Enrolled in a clinical trial |

### Class I Recommendations for ICD implantation:

#### Recommendation:

1. ICD therapy is indicated in patients who are survivors of cardiac arrest due to VF or hemodynamically unstable sustained VT after evaluation to define the cause of the event and to exclude any completely reversible causes. (Level of Evidence: A)

   **Algorithm:**
   
   (VTAC Arrest (4230) OR VFib Arrest(4235)=Yes OR Hemodynamic Instability(4270)=Yes) AND (VT Type(4275)=Sustained monomorphic VT OR Sustained polymorphic VT or Sustained monomorphic and polymorphic VT) AND Reversible Cause =No (4265)

2. ICD therapy is indicated in patients with structural heart disease and spontaneous sustained VT, whether hemodynamically stable or unstable. (Level of Evidence: B)

   **Algorithm:**
   
   (Primary valvular disease (4535)=Yes OR Other structural abnormalities (4540)=Yes OR NICM (4200)=Yes OR Coronary Artery Disease (4285)=Yes OR Ischemic Cardiomyopathy (4185)=Yes) AND (VT Type(4275)=Sustained monomorphic VT, Sustained polymorphic VT or Sustained monomorphic and polymorphic VT) AND Reversible Cause =No (4265)

3. ICD therapy is indicated in patients with syncope of undetermined origin with clinically relevant, hemodynamically significant sustained VT or VF induced at electrophysiological study. (Level of Evidence: B)

   **Algorithm:**
   
   Syncope(4280)=Yes AND Clinically relevant vent arrh induced(5015)=Yes

4. ICD therapy is indicated in patients with LVEF less than or equal to 35% due to prior MI who are at least 40 days post-MI and are in NYHA functional Class II or III. (Level of Evidence: A)

   **Algorithm:**
   
   PriorLVEF (4160)<=35% AND PriorMI (4290)=Yes AND MostRecent MI Date (4295) >=40 days from procedure date AND NYHA (4010)=(Class II or Class III) AND (ISCMDMTDose(4195) or NICMDMTDose(4210)) = (Yes or Inability to Complete) AND MostRecentPCI Date (4500) and most recent CMBG Date (4520) >= 3 months from procedure date

5. ICD Therapy is indicated in patients with nonischemic DCM who have an LVEF less than or equal to 35% and who are in NYHA functional class II or III. (Level of Evidence: B)

   **Algorithm:**
   
   NICM (4200)=Yes AND (ISCMDMTDose(4195) or NICMDMTDose(4210)) = (Yes or Inability to Complete) AND PriorLVEF (4160)<=35% AND NYHA (4010)= (Class II or Class III)

6. ICD therapy is indicated in patients with LV dysfunction due to prior MI who are at least 40 days post-MI, have an LVEF less than or equal to 30%, and are in NYHA functional class I. (Level of Evidence: A)

   **Algorithm:**
   
   PriorMI (4290)=Yes AND MostRecent MI Date (4295) >=40 days from procedure date AND PriorLVEF (4160)<=30% AND NYHA (4010)= Class I AND (ISCMDMTDose(4195) or NICMDMTDose(4210)) = (Yes or Inability to Complete) AND MostRecentPCI Date (4500) and
7. ICD therapy is indicated in patients with nonsustained VT due to prior MI, LVEF less than or equal to 40%, and inducible VF or sustained VT at electrophysiological study. (Level of Evidence: B)

- VT Type\(=\)Non-sustained VT
- PriorMI\(=\)Yes
- PriorLVEF\(\leq\)=40%
- (ISCMDMDT Dose\(=\)Yes or NICMDMDT Dose\(=\)Inability to Complete)
- Clinically relevant vent arrh induced \(=\)Yes

Most recent CABG Date \(\geq\) 3 months from procedure date

**Class IIa Recommendations for ICD implantation:**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ICD implantation is reasonable for patients with unexplained syncope, significant LV dysfunction, and nonischemic DCM. (Level of Evidence: C)</td>
<td>Sycope (=)Yes AND PriorLVEF(\leq)=35% AND NICM(=)Yes AND (ISCMDMDT Dose(=)Yes or NICMDMDT Dose(=)Inability to Complete)</td>
</tr>
<tr>
<td>2. ICD implantation is reasonable for patients with sustained VT and normal or near-normal ventricular function. (Level of Evidence: C)</td>
<td>((\text{VT Type}(=)Sustained monomorphic VT or Sustained polymorphic VT or (Sustained monomorphic and polymorphic VT)) \text{AND PriorLVEF}\geq\geq)=50%) \text{AND Reversible Cause} (=)No</td>
</tr>
<tr>
<td>3. ICD implantation is reasonable for patients with HCM who have 1 or more major risk factors for SCD. (Level of Evidence: C)</td>
<td>Structural Abnormality Type (=) Hypertrophic cardiomyopathy with high risk features (=)Yes</td>
</tr>
<tr>
<td>(The major risk factors include prior cardiac arrest, spontaneous sustained VT, spontaneous nonsustained VT, family history of SCD, syncope, LV thickness greater than or equal to 30 mm, and an abnormal blood pressure response to exercise)</td>
<td>Structural Abnormality Type (=) Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) (=)Yes</td>
</tr>
<tr>
<td>4. ICD implantation is reasonable for the prevention of SCD in patients with ARVD/C who have 1 or more risk factors for SCD. (Level of Evidence: C)</td>
<td>Syndrome Type (=)Long QT Syndrome (=)Yes AND (Sycope (=)Yes OR Ventricular Tachycardia (=)Yes)</td>
</tr>
<tr>
<td>5. ICD implantation is reasonable to reduce SCD in patients with long-QT syndrome who are experiencing syncope and/or VT while receiving beta blockers. (Level of Evidence: B)</td>
<td>On Heart Transplant Waiting List (=)Yes OR Candidate for Transplant (=)Yes</td>
</tr>
<tr>
<td>6. ICD implantation is reasonable for non-hospitalized patients awaiting transplantation. (Level of Evidence: C)</td>
<td>Syndrome Type (=)Brugada Syndrome (=)Yes AND Sycope (=)Yes</td>
</tr>
<tr>
<td>7. ICD implantation is reasonable for patients with Brugada syndrome who have had syncope. (Level of Evidence: C)</td>
<td>Syndrome Type (=)Brugada Syndrome (=)Yes AND (Cardiac Arrest (=)No OR VTach Arrest (=)No OR VFib arrest (=)No) \text{AND (Clinically relevant vent arrh induced} (=)Yes OR</td>
</tr>
<tr>
<td>8. ICD implantation is reasonable for patients with Brugada syndrome who have documented VT that has not resulted in cardiac arrest. (Level of Evidence: C)</td>
<td></td>
</tr>
</tbody>
</table>
9. ICD implantation is reasonable for patients with catecholaminergic polymorphic VT who have syncope and/or documented sustained VT while receiving beta blockers. (Level of Evidence: C)  

10. ICD implantation is reasonable for patients with cardiac sarcoidosis, giant cell myocarditis, or Chagas disease. (Level of Evidence: C)

**Class IIb Recommendations for ICD implantation:**

**Recommendation:**

1. ICD therapy may be considered in patients with nonischemic heart disease who have an LVEF of less than or equal to 35% and who are in NYHA functional Class I. (Level of Evidence: C)

2. ICD therapy may be considered for patients with long-QT syndrome and risk factors for SCD. (Level of Evidence: B)

3. ICD therapy may be considered in patients with syncope and advanced structural heart disease in whom thorough invasive and noninvasive investigations have failed to define a cause. (Level of Evidence: C)

4. ICD therapy may be considered in patients with a familial cardiomyopathy associated with sudden death. (Level of Evidence: C)

5. ICD therapy may be considered in patients with LV noncompaction. (Level of Evidence: C)

**Algorithm:**

- Syndrome Type (4170) = catecholaminergic polymorphic VT = Yes AND 
  - (Syncope (4280) = Yes OR VT Type (4275) = (Sustained monomorphic VT or Sustained polymorphic VT or "Sustained monomorphic and polymorphic VT") = Yes OR Clinically relevant vent arrh induced (5015) = Yes)

- Structural abnormality type (4545) = Infiltrative = Yes

- Syndrome Type (4170) = Long QT Syndrome AND 
  - (Cardiac arrest (4220) = Yes OR VT (4245) = Yes OR Familial Syndrome with Risk of Sudden Death (4175) = Yes OR Syncope (4280) = Yes)

- Syncope (4280) = Yes AND 
  - Other Struct Abn (4540) = Yes

- Familial Hx of Non-Ischemic Cardiomyopathy (4180) = Yes OR 
  - Familial Syndrome with Risk of Sudden Death (4175) = Yes

- Structural Abnormality Type (4545) = LV Structural abnormality associated with risk for sudden cardiac arrest
Relevant Citation(s):


*Please note that indications 4, 6, and 7 have been updated based on a correction issued after the original publication date to add “or equal to” for the EF specified. This correction can be found here: http://content.onlinejacc.org/cgi/content/full/53/1/147

**Metric 27. Proportion of CRT-D patients that fulfill class I, IIa, or IIb guideline indications** Based on 2008 Device Based Therapy Guideline and 2012 Device Based Therapy Focused Update

**REPORTING STATUS: Implemented in 2013QTR1**

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Count of initial CRT-D implant procedures that meet any class I, IIa, or IIb CRT-D guideline indications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denominator</td>
<td>Count of initial CRT-D implant procedures.</td>
</tr>
</tbody>
</table>
| Inclusion criteria | - CRT-D initial implant procedures.  
- Additional inclusion criteria as specified by specific recommendations below. |
| Exclusion criteria | - Enrolled in a clinical trial |

**Class I Recommendations for ICD implantation:**

**Recommendation:**

1. CRT is indicated for patients who have LVEF less than or equal to 35%, sinus rhythm, LBBB with a QRS duration greater than or equal to 150 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT. (Level of Evidence: A for NYHA class III/IV; Level of Evidence: B for NYHA class II)

**Algorithm:**

NICM (4200) = Yes OR (Ischemic Cardiomyopathy (4185) = Yes and (Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and (Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date) AND PriorLVEF (4160) <= 35% AND Atrial Rhythm (5100) = Sinus AND Intraventricular Conduction Types (5065) =
Class IIa Recommendations for ICD implantation:

Recommendation:

1. CRT can be useful for patients who have LVEF less than or equal to 35%, sinus rhythm, LBBB with a QRS duration 120 to 149 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT (Level of Evidence: B)  

Algorithm:

NICM (4200) = Yes OR (Ischemic Cardiomyopathy (4185) = Yes and Most Recent MI Date (4295) = > 40 days from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date)) /*(secondary prevention indication requires only the below algorithm)*/ AND

PriorLVEF (4160) <= 35% AND Atrial Rhythm (5100) = Sinus AND Intraventricular Conduction Types (5065) = LBBB = Yes AND (QRS Non Paced (5055) or Paced (5050)) 120-149ms AND NYHA (4010) = (Class II or III or IV) AND (ISCMGDMTDose(4195) or NICMGMMDose(4210)) = (Yes or Inability to Complete)

2. CRT can be useful for patients who have LVEF less than or equal to 35%, sinus rhythm, a non-LBBB pattern with a QRS duration greater than or equal to 150 ms, and NYHA class III/ambulatory class IV symptoms on GDMT (Level of Evidence: A)

Algorithm:

NICM (4200) = Yes OR (Ischemic Cardiomyopathy (4185) = Yes and Most Recent MI Date (4295) = > 40 days from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date)) /*(secondary prevention indication requires only the below algorithm)*/ AND

PriorLVEF (4160) <= 35% AND Atrial Rhythm (5100) = Sinus =Yes AND Intraventricular Conduction Types (5065) = LBBB =Null AND (QRS Non Paced (5055) or Paced (5050)) >= 150ms AND NYHA (4010) = (Class III or IV) AND (ISCMGMMDose(4195) or NICMGMMDose(4210)) = (Yes or Inability to Complete)

3. CRT can be useful in patients with atrial fibrillation and LVEF less than or equal to 35% on GDMT if a) the patient requires ventricular pacing or otherwise meets CRT criteria and b) AV nodal ablation or pharmacologic rate control will allow near 100% ventricular pacing with CRT (Level of Evidence: B)

Algorithm:

NICM (4200) = Yes OR (Ischemic Cardiomyopathy (4185) = Yes and Most Recent MI Date (4295) = > 40 days from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3
4. CRT can be useful for patients on GDMT who have LVEF less than or equal to 35% and are undergoing new or replacement device placement with anticipated requirement for significant (>40%) ventricular pacing (Level of Evidence: C)

Class IIb Recommendations for ICD implantation:

**Recommendation:**

1. CRT may be considered for patients who have LVEF less than or equal to 30%, ischemic etiology of heart failure, sinus rhythm, LBBB with a QRS duration of greater than or equal to 150 ms, and NYHA class I symptoms on GDMT. (Level of Evidence: C)

**Algorithm:**

| CAD(4285) = Yes OR (Ischemic Cardiomyopathy (4185) =Yes and Most Recent MI Date (4295) = > 40 days from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date)) AND (NYHA (4010) = Class II or III or IV) /*(secondary prevention indication requires only the below algorithm)*/ AND PriorLVEF (4160) <= 35% AND AFib Classification (4400) = (Permanent or Persistent or Long standing persistent) AND Atrial Rhythm (5100) = AFib AND Anticipated Requirement > 40% RV pacing (4350) = Yes AND (ISCMGDMTDose(4195) or NICMGMKDose(4210)) = (Yes or Inability to Complete) | NICM (4200) = Yes OR (Ischemic Cardiomyopathy (4185) =Yes and Most Recent MI Date (4295) = > 40 days from procedure date) OR (Ischemic Cardiomyopathy (4185) = Yes and ((Most Recent PCI Date (4500) or Most Recent CABG Date (4520)) = > 3 months from procedure date)) AND (NYHA (4010) = Class II or III or IV) /*(secondary prevention indication requires only the below algorithm)*/ AND PriorLVEF (4160) <= 35% AND Anticipated Requirement > 40% RV pacing (4350) = Yes AND (ISCMGDMTDose(4195) or NICMGMKDose(4210)) = (Yes or Inability to Complete) |
2. CRT may be considered for patients who have LVEF less than or equal to 35%, sinus rhythm, a non-LBBB pattern with QRS duration 120 to 149 ms, and NYHA class III/ambulatory class IV on GDMT. (Level of Evidence: B)

3. CRT may be considered for patients who have LVEF less than or equal to 35%, sinus rhythm, a non-LBBB pattern with a QRS duration greater than or equal to 150 ms, and NYHA class II symptoms on GDMT (Level of Evidence: B)

Relevant Citation:
### Metric 10. Failure to successfully place coronary sinus/left ventricular lead.

**REPORTING STATUS: Implemented in 2010Q2**

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Incidence of failure to successfully place coronary sinus/left ventricular lead.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerator algorithm</strong></td>
<td>CSLVLead (7630) = Implant unsuccessful</td>
</tr>
<tr>
<td>Denominator</td>
<td>ICD/CRT-D patients with attempted CS/LV lead implants</td>
</tr>
<tr>
<td><strong>Denominator algorithm</strong></td>
<td>Device Implanted 7620 = Yes</td>
</tr>
<tr>
<td></td>
<td>CS/LV Lead 7630 = Successfully implanted or Implant unsuccessful</td>
</tr>
<tr>
<td>Inclusion criteria</td>
<td>- Device Implanted 7620 = Yes</td>
</tr>
<tr>
<td>Exclusion criteria</td>
<td>- CS/LV Lead Not attempted OR Previously implanted</td>
</tr>
</tbody>
</table>

**Clinical Rationale/Guideline Recommendation**

This measure assesses your hospitals' rate of failure to successfully place a coronary sinus or left ventricular lead. This unadjusted outcome metric is intended to be used for quality improvement.
### Metric 13. Incidence of death or major adverse event

**REPORTING STATUS: Implemented in 2011Q4**

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Count of generator patients with discharge status (10105) of deceased or with a major intra or post procedure event:</th>
</tr>
</thead>
</table>
| - Cardiac arrest (9000);  
- Cardiac perforation (9010);  
- Hemothorax (9205);  
- Lead dislodgement (9260);  
- MI (9005);  
- Cardiac tamponade (9055);  
- Set screw problem (9255);  
- Pneumothorax (9215);  
- TIA (9140);  
- Stroke (9120);  
- Urgent cardiac surgery (9250); |

**Numerator algorithm**

Cardiac arrest (9000)= yes OR cardiac perforation (9010)= yes OR hemothorax (9205)= yes OR lead dislodgement(9260)= yes OR myocardial infarction (9005)=yes OR cardiac tamponade (9055)=yes OR set screw problem(9255)=yes OR pneumothorax(9215)=yes OR TIA (9140)or Stroke (9120)=yes OR urgent cardiac surgery (9250)

<table>
<thead>
<tr>
<th>Denominator</th>
<th>Count of generator patients.</th>
</tr>
</thead>
</table>

**Denominator algorithm**

Procedure Type (7010)= Initial generator implant or Generator change

**Inclusion criteria**

- All patients

**Exclusion criteria**

- Patients with Procedure Type (7010) Generator explant

**Clinical Rationale/Guideline Recommendation**

This measure displays your incidence of death or any adverse event at discharge following ICD implant procedures. This metric is an unadjusted rate of post-procedure complications which is intended to be used for quality improvement.