Million Hearts® Outpatient Cardiac Rehabilitation Use Surveillance Methodology (v2.1 Feb2019)

Assessing Cardiac Rehabilitation (CR) Participation, Time to Initiation, Adherence, and Completion

Developed by: Million Hearts® Cardiac Rehabilitation Collaborative Surveillance Workgroup members

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Purpose: Provide an administrative claims-based outpatient CR surveillance methodology that can be applied to member databases within health insurance plans and health system databases to monitor and inform CR-related quality improvement efforts.

Measurement Period

1. To adequately report on all of the CR measures requires two years of data.
    a. Identify CR-eligible members during the first 1-year measurement period (e.g. calendar year).
    b. Assess participation, time to initiation, adherence and completion into the second 1-year measurement period (e.g. the following calendar year).
2. Abbreviated timeframes can be used if desired, especially if only participation rates are being assessed.

Eligible Population

Members are considered eligible for the CR benefit if they have experienced one or more of the following qualifying events based on receiving an International Classification of Diseases, 9th or 10th revision, clinical modification diagnosis/procedural code (ICD-9-CM or ICD-10-CM) in an inpatient claim or a Current Procedural Terminology (CPT) code in an outpatient or provider claim (Table 1). The list of CR qualifying events was compiled based on two Medicare Decision Memos: CAG-00089R and CAG-00437N.

Primary Qualifying Events (main surveillance):

1. Acute myocardial infarction (AMI): first or second listed diagnosis
2. Coronary artery bypass graft (CABG) surgery
3. Heart valve repair or replacement
4. Percutaneous coronary intervention (PCI; includes percutaneous transluminal coronary angioplasty or coronary stenting)
5. Heart or heart-lung transplant

Other Qualifying Conditions of Interest (can be tracked in secondary analyses):

1. Current stable angina pectoris
2. Stable, chronic heart failure

Inclusion Criteria

1. Uninterrupted member enrollment in the health plan or coverage in the health system for at least 12 months (365 days) after the initial qualifying event date (e.g. hospital discharge, outpatient procedure date) unless the member died >21 days and ≤365 days after the initial qualifying event date.

Exclusion Criteria

1. Identified as a nursing home resident (i.e., ≥90 consecutive days of Skilled Nursing Facility care):
    a. prior to the qualifying event (must occur during the measurement period) or
    b. within 21 days after the initial qualifying event date.
2. Received hospice care:
    a. prior to qualifying event (must occur during the measurement period) or
    b. within 21 days after the initial qualifying event date.
3. Identified as having end-stage renal disease (ESRD) during the initial 1-year measurement period (identified by using a health plan or health system specific ESRD indicator value or another specified definition (e.g. example here)).
    a. CR use among this population can be tracked separately.

CR Types and Codes (use of standard and intensive CR can be tracked separately or together)

A CR session is defined has having one of the following Healthcare Common Procedure Coding System (HCPCS) codes when billed with place of service codes of 11 (services provided in a physician's office), 19 (off campus-outpatient hospital) or 22 (on campus-outpatient hospital):

1. 93797: Physician services for outpatient CR; without continuous electrocardiographic [ECG] monitoring
2. 93798: Physician services for outpatient CR; with continuous ECG monitoring

3. G0422: Intensive CR; With or Without continuous ECG monitoring, With Exercise
4. G0423: Intensive CR; With or Without continuous ECG monitoring, Without Exercise

Suggested Measures

1. *Eligibility*: Number of members who had a CR-qualifying event and rate of members with a CR-qualifying event per 1000 members (the denominator should include members: 1) with uninterrupted health plan enrollment or health system coverage from the date they initiate enrollment/coverage until the end of the first 1-year measurement period (unless they died); and 2) who do not have ESRD).
2. *Participation*: Percentage of the members who had a qualifying event that used one or more CR sessions within one year (365 days) of the qualifying event.
3. *Time to CR Initiation*
   a. Mean days per participant from the event date (hospital discharge or procedure date) to the initial CR session date.
   b. Percentage of members who initiated CR within 21 days from the event date (hospital discharge or procedure date); aligns with the 2018 ACC/AHA Clinical Performance and Quality Measures for Cardiac Rehabilitation Quality Measure-1: Time to Enrollment (21 Days).
4. *Adherence*:
   a. Mean number of CR sessions used per participant within 36 weeks of initiating CR.
   b. Percentage of participants who used ≥25 CR sessions within 36 weeks of initiating CR (36 sessions is the recommended CR dose, but 25 sessions has been shown to be a meaningful threshold for conveying protective benefits).
5. *Completion*: Percentage of CR participants who completed 36 or more sessions within 36 weeks of initiating CR.
6. *Member Spending:* Mean CR participant out-of-pocket spending per CR session. Other spending-related measures can be tracked as desired.

Main Surveillance Tracking

1. During the first year of the measurement period, determine the number of unique members eligible for CR services.
   a. Some members may have more than one qualifying event in a year. Use the event (and associated discharge/ procedure date) that occurred first within the initial 1-year measurement period to begin "looking forward" for use of CR services (12 month period) as long as no other qualifying event (other than stable angina or heart failure) occurred in ≤21 days of the initial event. If another qualifying event occurred within this window, the discharge/procedure date associated with that event should be used as the "look forward" date.
2. After a member's first CR service claim, look forward 36 weeks to see how many CR sessions were attended. Note: There may be more than one CR service claim per day and members can attend more than their original 36 sessions, if approved.

Secondary Surveillance Tracking

- Perform the analyses above among members who met the case definitions for current stable angina pectoris or stable, chronic heart failure (methodology described further in the Appendix).
- Members who were deemed CR eligible for the conditions included in the main analysis should be excluded from this analysis.

Subgroup Analyses

1. Consider assessing the above measures (at a minimum) by: age group, gender, race-ethnicity, and initial qualifying event type.
2. Other potential subgroup assessments could include:
   a. Further stratification of the above subgroups by additional demographic characteristics (e.g. race-ethnicity by age and/or gender)
   b. Meaningful geographic classifications (e.g. hospital referral region, county, census block)
   c. Specific groups potentially at increased risk for poor CR participation within the member population (e.g. patients with chronic kidney disease, certain demographic groups)
3. Example table shells for surveillance are provided within this document and are available for download here.
   a. Main Surveillance (see Table 2)
   b. Secondary Surveillance (see Table 3)

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Table 1. Diagnosis and Procedural Codes* Used to Identify Cardiac Rehabilitation-qualifying Events

Main Surveillance		
Acute Myocardial Infarction		
ICD-9-CM Diagnosis Codes	**ICD-10-CM Diagnosis Codes**	
410.00, 410.01, 410.02, 410.10, 410.11, 410.12, 410.20, 410.21, 410.22, 410.30, 410.31, 410.32, 410.40, 410.41, 410.42, 410.50, 410.51, 410.52, 410.60, 410.61, 410.62, 410.70, 410.71, 410.72, 410.80, 410.81, 410.82, 410.90, 410.91, 410.92	I21.0, I21.01, I21.02, I21.09 , I21.1, I21.11, I21.19, I21.2, I21.21, I21.29, I21.3, I21.4, I21.9, I21.A1†, I21.A9†, I22.0, I22.1, I22.2, I22.8, I22.9	
Coronary artery bypass surgery (CABG)		
ICD-9-CM Procedural Codes	**ICD-10-CM Procedural Codes**	**CPT Codes**
36.10, 36.11, 36.12, 36.13, 36.14, 36.15, 36.16, 36.17, 36.19, 36.2	0210X, 0211X, 0212X, 0213X	33510, 33511, 33512, 33513, 33514, 33516, 33517, 33518, 33519, 33521, 33522, 33523, 33530, 33533, 33534, 33535, 33536, 33572, 35600, S2205, S2206, S2207, S2208, S2209
Valve Repair/Replacement Procedures		
ICD-9-CM Procedural Codes	**ICD-10-CM Procedural Codes (includes all codes with these as the first four identifiers)**	**CPT Codes**
35.00, 35.01, 35.02, 35.04, 35.05, 35.06, 35.07 , 35.08 , 35.09 , 35.10, 35.11, 35.12, 35.13, 35.14, 35.20, 35.21, 35.22, 35.23, 35.24, 35.25, 35.26, 35.27, 35.28, 35.33, 35.96, 35.97, 35.99	027F, 027G, 027H, 027J, 02CF, 02CG, 02CH, 02CJ, 02NF, 02NG, 02NH, 02NJ, 02QF, 02QG, 02QH, 02QJ, 02RF, 02RG, 02RH, 02RJ, 02TH, 02VG, 02UF, 02UG, 02UH, 02UJ	33361-33417, 33418-33430, 33460-33468, 33470-33478
Percutaneous transluminal coronary angioplasty (PTCA) or coronary stenting		
ICD-9-CM Procedural Codes	**ICD-10-CM Procedural Codes**	**CPT Codes**
00.66, 36.03, 36.04, 36.06, 36.07, 36.09	02703ZZ, 02704ZZ, 02713ZZ, 02714ZZ, 02723ZZ, 02724ZZ, 02733ZZ, 02734ZZ, 3E07017, 3E070PZ, 3E07317, 3E073PZ, 02700ZZ, 02710ZZ, 02720ZZ, 02730ZZ, 02C00ZZ, 02C10ZZ, 02C20ZZ, 02C30ZZ, 02C03ZZ, 02C04ZZ, 02C13ZZ, 02C14ZZ, 02C23ZZ, 02C24ZZ, 02C33ZZ, 02C34ZZ	92920, 92921, 92924, 92925, 92928, 92929, 92933, 92934, 92937, 92938, 92941, 92943, 92944, 92973, 92974
Heart or heart-lung transplant		
ICD-9-CM Procedural Codes	**ICD-10-CM Procedural Codes**	**CPT Codes**
33.6, 37.51, 37.52, 37.53, 37.54	02YA0Z0, 02YA0Z1, 02YA0Z2, , 0BYM0Z0, 0BYM0Z1, 0BYM0Z2, 02YA0Z0 , 02YA0Z1, 02YA0Z2, 02RK0JZ, 02RL0JZ, 02WA0JZ, 02WA0JZ	33945, 33927, 33928, 0051T, 0052T, 0053T
Secondary Surveillance		
Current stable angina pectoris		
ICD-9-CM Diagnosis Codes	**ICD-10-CM Diagnosis Codes**	
413.0, 413.1, 413.9	I20.1, I20.8, I20.9	
Stable*, chronic heart failure (LVEF ≤35% and NYHA class II to IV)		
ICD-9-CM Diagnosis Codes	**ICD-10-CM Diagnosis Codes**	
428.22, 428.42	I50.22, I50.42, I50.82†	
**"Stable" defined as no recent (≤6 weeks) or planned (≤6 months) major cardiovascular hospitalizations/ procedures)*		
Procedures related to chronic heart failure management		
Implantable (intracorporeal) ventricular assist device insertion		
ICD-9-CM Procedure Codes	**ICD-10-CM Procedure Codes**	**CPT Codes**
37.66	02HA0QZ	33979
Bi-ventricular pacemaker insertion		
ICD-9-CM Procedure Codes	**ICD-10-CM Procedure Codes**	**CPT Codes**
00.50, 00.51, 00.53, 00.54	0JH609Z, 0JH639Z, 0JH809Z, 0JH839Z, 0JH607Z, 0JH637Z, 0JH807Z, 0JH837Z	33224, 33225

**ICD-9-CM codes are in effect until Sept. 30, 2015 and ICD-10-CM codes are in effect starting on Oct. 1, 2015, unless otherwise noted (no notable change has occurred in CPT code use); †Effective Oct.1, 2017*

Table 2. Main Cardiac Rehabilitation (CR) Surveillance Table Shell

Subgroups	Total Members	Unique CR Eligible Members		CR Participation (≥1 CR Sessions)		Time to Initiation		CR Adherence		CR Completion (≥36 sessions)	Patient Spending
	N	N	Rate/ 1000	N	% among eligible	Mean days to initial CR session per participant	% initiating in ≤21 days	Mean sessions used per participant	% used ≥25 sessions among participants	% among participants	Mean amount per session ($US)
Overall Total											
Age Groups (years)											
18-44											
45-54											
55-64											
65-74											
75-84											
85+											
Gender (consider subsetting by age group)											
Male											
Female											
Race/Ethnicity (consider subsetting by age group)											
Non-Hispanic White											
Non-Hispanic Black											
Hispanic											
Asian											
Other race/ethnicity											
Unknown											
Initial Qualifying Event Type (consider subsetting by age group)											
AMI (1st or 2nd listed diagnosis)											
With no procedure											
With any procedure											
CABG											
With AMI											
No AMI											
PCI											
With AMI											
No AMI											
Heart valve procedure											
With AMI											
No AMI											
Heart transplant†											
Combination procedure											
With AMI											
No AMI											
CABG & heart valve‡											
Other Potential Subgroups											
Further stratification of the above groups by demographic characteristics (e.g. age and gender)											
By meaningful geographic classifications (e.g. county)											
Specific groups potentially at increased risk within the member population (e.g. patients with chronic kidney disease, certain demographic groups)											

Abbreviations: AMI, acute myocardial infarction; CABG, coronary artery bypass graft; PCI, percutaneous coronary intervention.

*Eligible conditions that occurred in combination of each other had to occur within 21 days of the initial qualifying event; beneficiaries who had 2 or more eligible procedures performed within 21 days are included in the "combination of procedures" rows.
†With or without AMI; includes both heart and heart-lung transplants.
‡Both a CABG and heart valve procedure were performed with the first 21 days of the initial qualifying event with or without an AMI occurring; no other procedures were performed during that period.

Table 3. Secondary Cardiac Rehabilitation (CR) Surveillance Table Shell

Subgroups	Total Members	Unique CR Eligible Members		CR Participation (≥1 CR Sessions)		Time to Initiation		CR Adherence		CR Completion (≥36 sessions)	Patient Spending
	N	N	Rate/ 1000	N	% among eligible	Mean days to initial CR session per participant	% initiating in ≤21 days	Mean sessions used per participant	% used ≥25 sessions among participants	% among participants	Mean amount per session ($US)
Initial Qualifying Event Type* (consider subsetting by age group)											
Stable angina											
Heart failure, overall											
Diagnosis based											
Procedure based											
VAD insertion											
BiV pacer insertion											

Abbreviations: VAD, (implantable) ventricular assist device; BiV pacer, bi-ventricular pacemaker.
*Excludes members who were eligible for CR based on the conditions and events captured via the main CR surveillance.

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Appendix: Secondary Cardiac Rehabilitation (CR) Surveillance

Purpose:

- Guide performance of the CR use analyses described above among members who meet the case definitions for current stable angina pectoris or stable, chronic heart failure.
- Members who were deemed CR eligible for the conditions included in the main analysis should be excluded from the analyses described below.
- Because these are secondary analyses, the case definitions in this section can be applied as:
    1. Mutually exclusive categories: if a member met the angina and heart failure definitions, assign them to the qualifying event type that had the earliest eligibility date to track for CR use; or
    2. Non-mutually exclusive categories: if a member met the angina and heart failure definitions, assign them to both qualifying event types and track for CR use.

Current stable angina pectoris

Identify members who had *at least two outpatient claims* for the condition during the first 1-year measurement period (e.g. calendar year); the angina codes (Table 1) can occur in any place in the claim.

- The eligibility date starts on the date of the first angina-related claim identified.
- Follow the methodology described for the main CR surveillance to report the CR-related measures.

Stable, chronic heart failure

Defined as having a left ventricular ejection fraction (LVEF) ≤35% and New York Heart Association (NYHA) class II to IV; "Stable" defined as no recent (≤6 weeks) or planned (≤6 months) major cardiovascular hospitalizations/ procedures.

- For Medicare Fee-for-service beneficiaries, effective for claims on or after February 18, 2014 (CAG-00437N). For members of other health plans, the effective date will need to be determined.
- Limitations of the methodology describe below:
    - Unable to capture NYHA class and formally determine preserved vs. reduced LVEF using administrative data. If the user has access to clinical data and NYHA classification information, these criteria can be applied to the case definition.
    - Unable to understand what hospitalizations/procedures were planned at the time the member became eligible for CR. If the user has access to this type of information, these criteria can be applied to the case definition.
- Potentially CR-eligible members are identified using a diagnosis (Definition 1) and/or procedure (Definition 2) based definition. Both are outlined below.

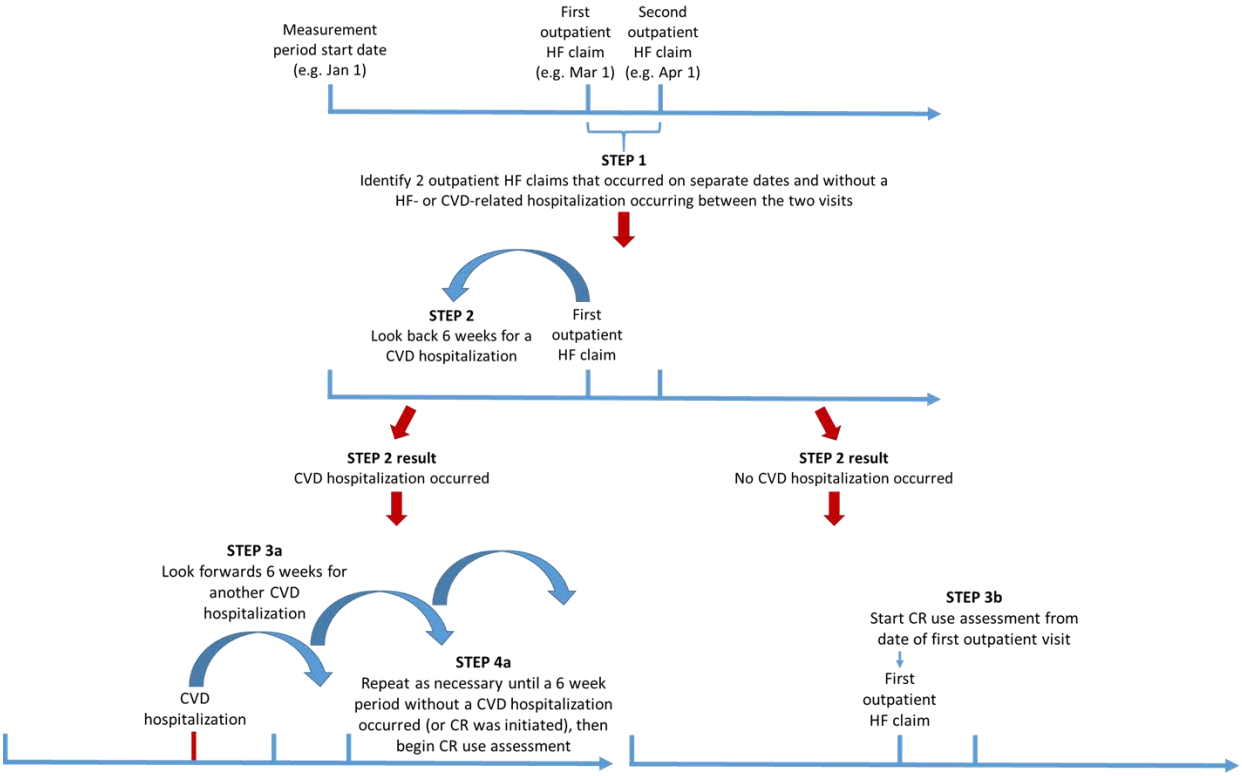
Definition 1: Heart failure diagnosis based

- From the beginning of the measurement period (e.g. Jan 1), begin looking forward. Use the ICD9/10-CM diagnosis codes for chronic systolic heart failure, chronic systolic/diastolic heart failure, and biventricular heart failure (Table 1) to identify CR-eligible members.
- If the member first had *at least two outpatient claims* during the 1-year measurement period (e.g. calendar year) with one of the HF indication codes in any place, use the methodology described in Figure 1.
- If the member first had an *inpatient claim* in any place with one of the HF indication codes (or had the HF-related hospitalization after the first HF-related outpatient claim but before the second HF-related outpatient claim), use the methodology described in Figure 2.

Definition 2: Heart failure-related procedure based

- From the beginning of the measurement period (e.g. Jan 1), begin looking forward. If the member had a ICD9/10-CM procedure code during any *inpatient* encounter or CPT code documented in any place within an *inpatient* or *outpatient* encounter for one of the two procedures below, use the methodology described in Figure 2.
    - *Insertion of an implantable (intracorporeal) ventricular assist device (VAD)* (codes available in Table 1)*; or*
    - *Insertion of a bi-ventricular pacemaker (BiV pacer)* (codes available in Table 1)

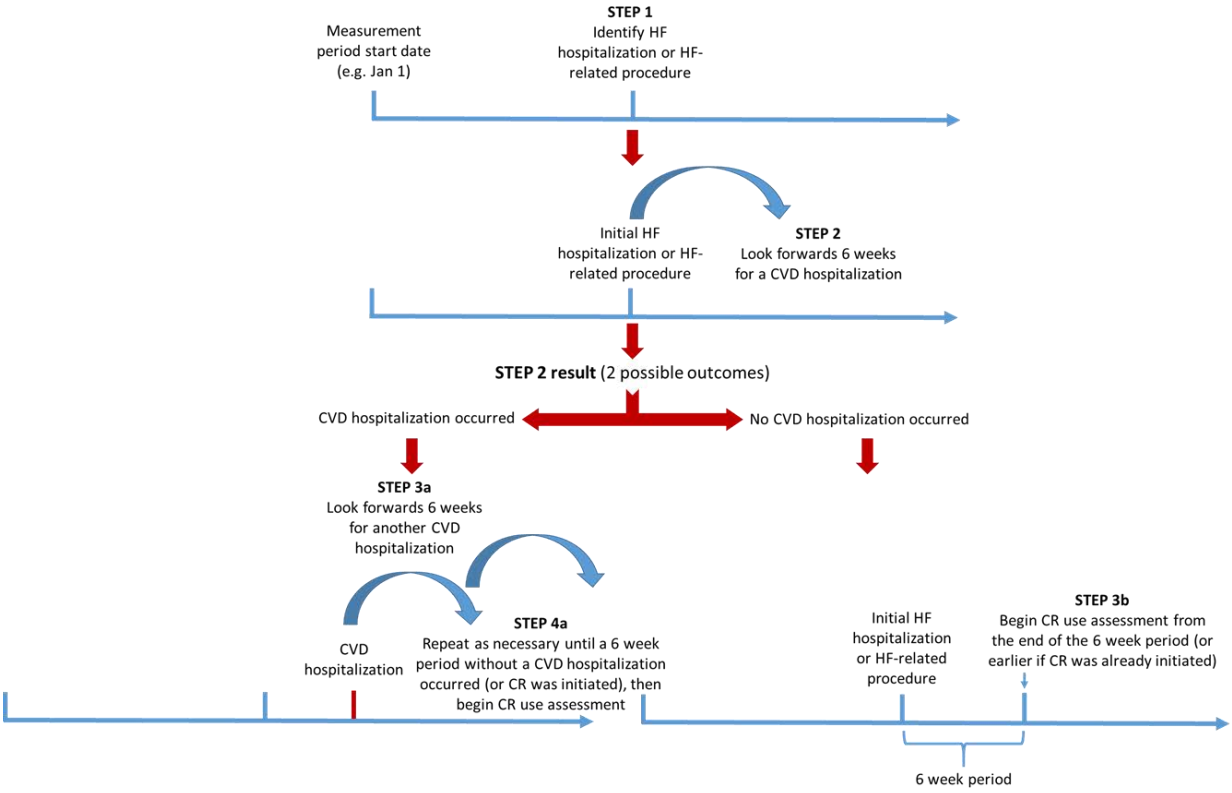
Figure 1. Stable, chronic heart failure CR use surveillance: outpatient visit methodology



Abbreviations: CR, cardiac rehabilitation; HF, heart failure; CVD, cardiovascular disease

Figure 1 describes the recommended methodology for conducted CR use surveillance among members with stable, chronic heart failure who first received their heart failure diagnosis during the measurement period in the outpatient setting. First (Step 1), starting at the beginning of the measurement period, identify two outpatient HF claims that occurred on separate dates and without a HF- or CVD-related hospitalization (first or second listed diagnosis code of ICD-9-CM: 390-434, 436-448 or ICD-10-CM: I00-I78) occurring between the two visits. If a HF hospitalization occurred between outpatient visit 1 and visit 2, use the methodology described in Figure 2. Then (Step 2), look back six weeks from the date of the first outpatient HF encounter to see if they had a CVD-related inpatient hospitalization. If yes (Step 3a), start the CR assessment period once CR use began or six weeks after the discharge from the CVD-related hospitalization (whichever occurred first). If another CVD-related hospitalization occurred during the six weeks after discharge (Step 4a), repeat the process until a 6-week window without a CVD-related hospitalization occurred or CR was initiated (whichever occurred first). If the calendar year ended without the CR initiation assessment period beginning, the final 6-week assessment should continue into the following year, but no additional 6-week window assessments should be performed in the new year. If an assessment for CR initiation cannot be performed because the member had another CVD hospitalization during that final 6-week assessment that continued into the new calendar year, that member should be removed from the CR eligible population count. If no CVD hospitalization was identified at Step 2, start the CR assessment period from the date of the first HF-related outpatient encounter (Step 3b).

Figure 2. Stable, chronic heart failure CR use surveillance: inpatient and procedure-based methodology



Abbreviations: CR, cardiac rehabilitation; HF, heart failure; CVD, cardiovascular disease

Figure 2 describes the recommended methodology for conducted CR use surveillance among members with stable, chronic heart failure who first received their HF diagnosis during the measurement period in the *inpatient setting* (includes members who had a HF hospitalization occur after the first, but before the second, outpatient HF encounter) or had a *HF-related procedure* performed (i.e. insertion/replacement of an implantable (intracorporeal) ventricular assist device or insertion of a bi-ventricular pacemaker). First (Step 1), identify the initial HF-related inpatient hospitalization or HF-related procedure during the measurement period. Then (Step 2), look forwards six weeks from the date of the initial HF hospitalization or HF-related procedure to see if a cardiovascular disease (CVD)-related inpatient hospitalization occurred: first or second listed diagnosis code of ICD-9-CM: 390-434, 436-448 or ICD-10-CM: I00-I78. If a CVD-related hospitalization occurred (Step 3a), start the CR measurement period once CR use began or six weeks after the discharge from the CVD-related hospitalization (whichever occurred first) as long as another CVD-related hospitalization didn't occur within that window. If another CVD-related hospitalization occurred, repeat the process until a 6-week window without a CVD-related hospitalization occurred or CR was initiated (whichever occurred first). If the calendar year ended without the CR initiation assessment period beginning, the final 6-week assessment can continue into the following year, but no additional 6-week window assessments should be performed in the new year. If an assessment for CR initiation cannot be performed because the member had another CVD hospitalization during that final 6-week assessment that continued into the new calendar year, that member should be removed from the CR eligible population count. If no CVD hospitalization was identified at Step 2, start the CR assessment period six weeks from the HF-related inpatient hospitalization discharge date or from when CR was initiated (whichever occurred first) (Step 3b).