Million Hearts® Outpatient Cardiac Rehabilitation Use Surveillance Methodology (May 2025)

Assessing Cardiac Rehabilitation Participation, Time to Initiation, Adherence, and Completion

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

Main Contact: Lisa M. Pollack, gkz8@cdc.gov; Division for Heart Disease and Stroke Prevention, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention

Purpose: Provide an administrative claims-based outpatient cardiac rehabilitation (CR) surveillance methodology that can be applied to health system databases to monitor and inform CR-related quality improvement efforts.

Summary of updates from prior version

- Shortened follow-up period for tracking the number of CR sessions. This allows for the use of more timely data, due to marginal changes in the number of CR sessions identified between the prior (longer) follow-up period and the new (shortened) follow-up period. For example, in 2018, CR completion with the prior follow-up period was 28.93% versus 28.51% with the shortened follow-up period. The average number of CR sessions was the same (mean = 26, standard deviation = 13).
    - Prior (longer) follow-up period required ≈20 months beyond the CR qualifying event (QE) measurement period, to allow 365 days (12 months) for enrollment + 36 weeks (≈8 months) for participation. For example, for QEs in 2022, follow-up data through mid-2024 would be required, so that patients with a QE at the very end of 2022 could be followed 365 days for enrollment (through the end of 2023). And if patients enrolled at the end of 2023, participation metrics (i.e., number sessions completed) would be tracked forward 36 weeks (≈8 months) after enrollment, into mid-2024.
    - New (shortened) 12-month follow-up period: from the CR QE index date, look forward 365 days to assess CR participation metrics.
- Added guidance for identifying virtual CR claims in Section 4 (Identifying CR claims).

1. Measurement period for CR surveillance

- More than 2 years of data (≈27 months) are required to adequately report on most CR measures (Table 1).
    - This includes a ≥90-day lookback period prior to the QE index date to accommodate the exclusion criteria (details below).
    - A 90-day lookback period is sufficient. However, a further lookback period may be used to ensure a cleaner population (e.g., with no history of QEs within a specified time frame)—but at the tradeoff of reducing sample size or excluding certain populations (i.e., those without continuous enrollment).
- Identify CR-eligible persons in year 1 and assess CR measures from year 1 to year 2.

2. Eligible population for CR

- Based on two Medicare decision memos, CAG-00089R and CAG-00437N, persons are eligible for the CR benefit if they experienced ≥1 QE.[1,2]
- CR QEs using administrative claims-based data are identified using: International Classification of Diseases, 9th/10th edition, Clinical Modification (ICD-9/-10-CM) diagnosis/procedural codes in an inpatient claim; or Current Procedural Terminology (CPT) code in an outpatient or provider claim (Table 2).

2.1. Primary QEs (main CR surveillance)

1. Acute myocardial infarction (AMI).
2. Coronary artery bypass graft (CABG) surgery.
3. Heart valve repair or replacement procedure.
4. Percutaneous coronary intervention (PCI; includes percutaneous transluminal coronary angioplasty [PTCA] or coronary stenting and same-day discharge after an outpatient PCI).
5. Heart or heart-lung transplant.
6. Single event: a primary QE in year 1 and no other primary QE within 21 days of the initial primary QE.
7. Combination event: a primary QE in year 1 and another primary QE within 21 days of the initial primary QE, including events that occurred on the same day (e.g., AMI with PCI). Combination events should be treated separately from single events.[3]

2.2. Secondary QEs (secondary CR surveillance)

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

2.3. CR surveillance considerations

- For any CR QE that includes an AMI (e.g., AMI with CABG, AMI with HF, AMI with PCI, AMI alone), people have 365 days to start CR to have it covered by insurance.
- For all other CR QEs, there is no time frame for starting CR and having it covered by insurance. However, in this algorithm, we adhere to the 365 days to start CR because it is clinically relevant and consistent with other reporting.
- According to Centers for Medicare & Medicaid Services (CMS), standard outpatient CR sessions are limited to a maximum of two 1-hour sessions per day, up to 36 sessions, over a period of up to 36 weeks; the weeks do not need to be consecutive.[2]
- There is an option for an additional 36 sessions over an extended time period if approved by Medicare (under section 1862(a)(1)(A) of the Social Security Act).[2]

2.4. Inclusion criteria

1. Alive for >21 days after the QE, and
2. Continuous enrollment in a health plan or coverage in a health system for ≥90 days before and ≥365 days after the initial QE; or continuous enrollment until date of death if the individual died between 21 days and 365 days after the initial QE.

2.5. Exclusion criteria

1. Persons with ≥90 consecutive days in an inpatient acute care hospital (inpatient prospective payment system reimbursed hospital, critical access hospital), other inpatient hospital (inpatient psychiatric facility, other hospital type [e.g., cancer center]), or post-acute care setting (long-term care hospital, inpatient rehabilitation facility, skilled nursing facility, home health):
    a. In the ≥90-day lookback period prior to the QE, or
    b. Within 21 days after the initial QE (i.e., if the ≥90 consecutive days occurs within 21 days of the QE, then the patient is excluded).
2. Received hospice care:
    a. In the ≥90-day lookback period prior to the QE, or
    b. Within 21 days after the initial QE.
3. Identified as having end-stage renal disease (ESRD) in the measurement period (see Appendix Table 1 for example value set).
    a. CR participation among persons with ESRD could be tracked separately, as having the condition does not disqualify people from participating in CR.

3. QE index date

- The QE index date is the date CR surveillance begins and depends on the event type.

3.1. Primary QEs

- Single events (Appendix Figure 1):
  - The QE index date is the inpatient hospital discharge date associated with the QE or the outpatient procedure date.
- Combination events (Appendix Figure 1):
  - The QE index date is the inpatient hospital discharge date associated with the subsequent QE or the subsequent outpatient procedure date.

3.2. Secondary QEs

- Stable angina pectoris (need to identify 2 outpatient angina claims; Appendix Figure 1):
  - The QE index date is the date associated with the first outpatient angina claim identified in the measurement period.
- Stable, chronic HF: outpatient visit methodology (need to identify 2 outpatient HF claims; Appendix Figure 2):
  - If a cardiovascular disease (CVD) hospitalization occurred 6 weeks before the first outpatient HF claim, then the QE index date is identified through an iterative process of looking forward 6 weeks for a CVD hospitalization.
  - If a CVD hospitalization did not occur 6 weeks before the first outpatient HF claim, then the QE index date is the date associated with the first outpatient HF claim.
- Stable, chronic HF: inpatient and procedure-based methodology (Appendix Figure 3):
  - If a CVD hospitalization occurred 6 weeks after the first HF-related inpatient hospitalization or procedure, then the QE index date is identified through an iterative process of looking forward 6 weeks after discharge from the most recent CVD hospitalization for another CVD hospitalization.
  - If a CVD hospitalization did not occur 6 weeks after the first HF-related inpatient hospitalization or procedure, then the QE index date is the date associated with the first CR service claim after the HF-related inpatient hospitalization or the date 6 weeks from the HF-related inpatient hospitalization discharge date, whichever occurred first.

4. Identifying CR claims

4.1. Codes to identify CR claims

- Standard and intensive CR participation can be tracked separately or together.
- A CR session is defined as having one of the following Healthcare Common Procedure Coding System (HCPCS) codes when billed with line place of service code 11 (services provided in a physician's office), 19 (off campus-outpatient hospital), or 22 (on campus-outpatient hospital).
- Standard CR:
  - 93797: Physician services for outpatient CR; without continuous electrocardiographic (ECG) monitoring.
  - 93798: Physician services for outpatient CR; with continuous ECG monitoring.
- Intensive CR:
  - G0422: Intensive CR; With or Without continuous ECG monitoring, With Exercise.
  - G0423: Intensive CR; With or Without continuous ECG monitoring, Without Exercise.
- Revenue center code 0943 may also be used to identify additional CR claims:
  - For example, in the CMS data, the revenue codes are not in the Part B non-institutional/carrier claims, but they are in the Part B institutional/hospital outpatient claims and could be used along with HCPCS codes to identify CR (i.e., if HCPCS in [93797, 93798, G0422, G0423] or revenue center code in [0943]). However, most CR encounters are identified in the Part B non-institutional/carrier claims using the 4 HCPCS codes.

- As part of the COVID-19 Public Health Emergency, virtual delivery of CR services, defined as services provided via real-time audio-visual technology, from a hospital outpatient facility, became payable by CMS under the Hospital Outpatient Prospective Payment System (HOPPS) via the Hospitals Without Walls initiative in 2020 and ended with the Public Health Emergency (PHE) on May 11, 2023.[4,5] Virtual delivery of CR services from a physician office became payable under the Medicare Physician Fee Schedule on October 14, 2020, and has been extended through the CMS rule making process through the 2025 calendar year.[6,7] Virtual delivery of CR services can be identified from (1) institutional Part B claims using modifier codes (CR, 95, GT, FR) along with the CR HCPCS codes and (2) non-institutional Part B claims using modifier codes (CR, 95, GT, FR) and place of service (POS) codes (02, 10) along with the CR HCPCS codes.

4.2. Counting CR claims

- If the dataset contains units of services provided, account for the number of CR units when counting number of CR sessions. For instance, one CR claim could have 2 units, which is due to 2 CR sessions being billed jointly (i.e., bundled claims). Bundled claims may have corresponding line-item files, and those line-item files should be examined to see whether they contain additional CR sessions with different dates of service. Simply counting the number of individual CR claims could result in an undercount of the number of sessions completed.
- If the dataset does not contain units of service provided (or the units are unrelated to the CR encounter), individual CR sessions on different dates should be used to count number of CR sessions. If >1 CR session occurred on the same day, count as a single session.

5. CR surveillance measures

- Definitions for CR measures have been updated from CR surveillance use methodology v2.1 to include options for aligning analyses with CR clinical quality measure specifications from the American College of Cardiology (ACC), American Heart Association (AHA), and National Committee for Quality Assurance (NCQA) and/or for standardizing the reporting of outcomes (Table 1).

6. Main CR use surveillance methodology

- Use the ICD-9/-10-CM diagnosis and procedure codes and CPT/HCPCS codes to identify the primary QEs (Table 2).
- Follow the main CR use surveillance methodology to report on the CR measures for primary QEs (Appendix Figure 1).
- An example table shell for main CR surveillance is provided (Table 3).

6.1. Steps for main CR use surveillance; Appendix Figure 1

- Step 1: During year 1 of the measurement period, determine the number of persons who had a CR QE.
- Step 2: Identify the CR QE index date (beginning of CR surveillance).
    - Step 2a: If the person had a single event, then the CR QE index date is the inpatient hospital discharge date associated with the QE or the outpatient procedure date.
    - Step 2b: If the person had a combination event, then the CR QE index date is the inpatient hospital discharge date associated with the subsequent QE or the subsequent outpatient procedure date.
    - Step 2c: If a direct inpatient transfer occurred (i.e., a patient transferred from one inpatient facility to another with discharge and admission dates occurring on the same day or 1 day apart), then the CR QE index date is the discharge date from the second inpatient facility.
- Step 3: From the CR QE index date, look forward 365 days and identify the first CR service claim and subsequent CR sessions attended.

7. Secondary CR use surveillance methodology

- People eligible for CR based on the conditions included in the main surveillance should be excluded from the secondary CR surveillance.
- Secondary QEs can be analyzed as:
    - Mutually exclusive categories: if a person has current, stable angina pectoris and stable, chronic HF, assign them to the event with the earliest CR QE index date and track for use of CR services; or
    - Non-mutually exclusive categories: if a person has current, stable angina pectoris and stable, chronic HF, assign them to both QEs and track for use of CR services.
- An example table shell for secondary CR surveillance is provided (Table 3).

7.1. Current, stable angina pectoris

- Use the ICD-9/-10-CM diagnosis codes to identify stable angina pectoris (Table 2).
- Follow the main CR use surveillance methodology to report on the CR measures for current, stable angina pectoris (Appendix Figure 1).

7.2.1. Stable, chronic HF

- Use the ICD-9/-10-CM diagnosis and procedure codes and CPT codes to identify stable, chronic HF (Table 2).
- In year 1 of the measurement period:
    - If the person first had ≥2 outpatient HF claims in the outpatient setting, follow the stable, chronic HF CR use surveillance outpatient visit methodology (Appendix Figure 2).
    - If the person had (1) ≥1 HF claim first in the inpatient setting, (2) a HF-related hospitalization after the first but before the second outpatient HF claim (Appendix Figure 2), or (3) a HF-related procedure, follow the stable, chronic HF CR use surveillance inpatient and procedure-based methodology (Appendix Figure 3).

7.2.2. Steps for CR use surveillance for stable, chronic HF (outpatient visit methodology; Appendix Figure 2)

- Step 1: During year 1 of the measurement period, identify the two outpatient diagnosis-based HF claims (Table 2) occurring on separate dates without a CVD hospitalization occurring between the two claims (see Appendix Table 1 for how to identify CVD-related claims[8]). If a CVD hospitalization occurred between the two outpatient claims, follow the methodology described in Appendix Figure 3.
- Step 2: Look back 6 weeks from the date of the first outpatient HF claim for a CVD hospitalization.
- Step 3a: If a CVD hospitalization occurred in Step 2 (CVD hospitalization 1), identify the HF QE index date (beginning of CR surveillance) through an iterative process of looking forward 6 weeks from CVD hospitalization 1 for another CVD hospitalization.
    - Step 3a1: If a CVD hospitalization occurred (CVD hospitalization 1) and no other CVD hospitalization occurred 6 weeks after discharge from CVD hospitalization 1, then the HF QE index date is the date of the first CR service claim or the date 6 weeks after discharge from CVD hospitalization 1, whichever occurred first.
    - Step 3a2: If a CVD hospitalization occurred and another CVD hospitalization occurred 6 weeks after discharge from CVD hospitalization 1 (CVD hospitalization 2), then the HF QE index date is the date of the first CR service claim after CVD hospitalization 2 or the date 6 weeks after discharge from CVD hospitalization 2, whichever occurred first.
    - Step 3a3: Repeat the process of looking forward 6 weeks after discharge from the most recent CVD hospitalization for another CVD hospitalization, until there exists a 6-week window without a CVD hospitalization or CR begins, whichever occurred first.
    - Step 3a4: If year 1 ends without establishing the HF QE index date in order to begin CR surveillance, then the final 6-week assessment for a CVD hospitalization should continue into year 2, but no additional 6-week window assessments should be performed in year 2. If

CR surveillance cannot be performed because the person had another CVD hospitalization during the final 6-week assessment that continued into year 2, remove the person from the CR-eligible cohort.

- Step 3b: If a CVD hospitalization did not occur in Step 2, then the HF QE index date (beginning of CR surveillance) is the date of the first outpatient HF claim.
- Step 4: From the HF QE index date, look forward 365 days to count number of CR sessions attended.

7.2.3. Steps for CR use surveillance for stable, chronic HF (inpatient and procedure-based methodology; Appendix Figure 3)

- Step 1: During year 1 of the measurement period, identify the first HF-related inpatient hospitalization or procedure.
- Step 2: Look forward 6 weeks from the date of the first HF-related inpatient hospitalization or procedure for a CVD hospitalization (see Appendix Table 1 for how to identify CVD-related claims[8]).
- Step 3a: If a CVD hospitalization occurred in Step 2 (CVD hospitalization 1), identify the HF QE index date (beginning of CR surveillance) through an iterative process of looking forward 6 weeks after discharge from the most recent CVD hospitalization for another CVD hospitalization.
    - Step 3a1: If a CVD hospitalization occurred (CVD hospitalization 1) and no other CVD hospitalization occurred within 6 weeks of discharge from CVD hospitalization 1, then the HF QE index date is the date of the first CR service claim or the date associated with 6 weeks after discharge from the CVD hospitalization, whichever occurred first.
    - Step 3a2: If a CVD hospitalization occurred and another CVD hospitalization occurred within 6 weeks of discharge from CVD hospitalization 1 (CVD hospitalization 2), then the HF QE index date is the date of the first CR service claim after CVD hospitalization 2 or the date associated with 6 weeks after discharge from CVD hospitalization 2, whichever occurred first.
    - Step 3a3: Repeat the process of looking forward 6 weeks after discharge from the most recent CVD hospitalization for another CVD hospitalization, until there exists a 6-week window without a CVD hospitalization or a CR service claim was identified, whichever occurred first.
    - Step 3a4: If year 1 ends without establishing the HF QE index date to begin CR surveillance, then the final 6-week assessment for a CVD hospitalization should continue into year 2, but no additional 6-week window assessments should be performed in year 2. If CR surveillance cannot be performed because the person had another CVD hospitalization during the final 6-week assessment that continued into year 2, remove the individual from the CR-eligible cohort.
- Step 3b: If a CVD hospitalization did not occur in Step 2, the HF QE index date (beginning of CR surveillance) is the date of the first CR service claim after the HF-related inpatient hospitalization or the date 6 weeks from the HF-related inpatient hospitalization discharge date, whichever occurred first.
- Step 4: From the HF QE index date, look forward 365 days to count number of CR sessions attended.

7.2.4. Limitations of methodology for stable, chronic HF

- Unable to capture New York Heart Association (NYHA) class and formally determine preserved versus reduced left ventricular ejection fraction (LVEF) using administrative data. If the researcher has access to clinical data and NYHA classification information, these criteria can be applied to the definition for stable, chronic HF.
- Unable to know what hospitalizations or procedures were planned (versus unplanned) at the time the person became eligible for CR. If the researcher has access to this type of information, these criteria can be applied to definition for stable, chronic HF.

8. Considerations for subgroup analyses

- Consider assessing CR measures by patient/demographic characteristics (age group, sex, race/ethnicity, initial QE type); combinations of demographic characteristics (e.g., race/ethnicity by age and/or sex); geographic classifications (e.g., hospital referral region, county, census block); and/or groups at increased risk for poor CR participation (e.g., patients with chronic kidney disease, certain demographic groups).

Table 1. Cardiac rehabilitation use surveillance measures

Measure		Definition	Report
Eligibility	CDC	# persons who had ≥ 1 CR QE within the measurement period / All persons identified in the measurement period	Percentage
Enrollment	CDC	# persons who attended ≥ 1 CR session within 365 days of the QE index date / # persons who had ≥ 1 CR QE within the measurement period	Percentage
	Option	Persons who enrolled in CR within the first 21 days after the QE aligns with the 2018 ACC/AHA clinical performance and quality measures for CR quality measure one (QM-1, CR Time to Enrollment).[9]	--
Time to enrollment	CDC	Time (in days) from the QE index date to the *first* CR session date.	Average
Initiation	CDC	# persons who attended ≥ 2 CR sessions within 365 days of the QE index date / # persons who had ≥ 1 CR QE within the measurement period	Percentage
	Option	Persons who attended ≥2 sessions of CR within 30 days after a QE aligns with the 2021 NCQA new HEDIS CR measure.[10]	--
Adherence	CDC	Number of CR sessions attended within 36 weeks of enrolling in CR.	Average
Participation 1/ engagement 1	CDC	Participation 1: # persons who attended ≥ 12 CR sessions within 365 days of the CR QE index date / # persons who enrolled in CR	Percentage
	Option	Engagement 1: Persons who attended ≥12 sessions of CR within 90 days after a QE aligns with the 2021 NCQA new HEDIS CR measure.[10]	--

Table 1 (continued). Cardiac rehabilitation use surveillance measures			
Measure		**Definition**	**Report**
Participation 2/ engagement 2	CDC	Participation 2: $\frac{\text{\# persons who attended} \geq 24 \text{ CR sessions within 365 days of the CR QE index date}}{\text{\# persons who enrolled in CR}}$	Percentage
	Option	Engagement 2: Persons who attended ≥24 sessions of CR within 180 days after a QE aligns with the 2021 NCQA new HEDIS CR measure.[10]	--
Participation 3/ completion/ achievement	CDC	Participation 3/Completion: $\frac{\text{\# persons who attended} \geq 36 \text{ CR sessions within 365 days of the CR QE index date}}{\text{\# persons who enrolled in CR}}$	Percentage
	Option	Achievement: Persons who attended ≥36 sessions of CR within 180 days after a QE aligns with the 2021 NCQA new HEDIS CR measure.[10]	--
ACC, American College of Cardiology; AHA, American Heart Association; CR, cardiac rehabilitation; HEDIS, Healthcare Effectiveness Data and Information Set; NCQA, National Committee for Quality Assurance; QE, qualifying event; QM, quality measure.			

Table 2. Diagnosis and procedural codes used to identify cardiac rehabilitation QEs[a]

Main Surveillance	Diagnosis/Procedure Codes
AMI[b]	
ICD-9-CM DX	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
ICD-10-CM DX	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
CABG surgery (inpatient procedure)	
ICD-9-CM PR	36.10, 36.11, 36.12, 36.13, 36.14, 36.15, 36.16, 36.17, 36.19, 36.2
ICD-10-PCS	0210[c], 0211[c], 0212[c], 0213[c], 02700[d], 02710[d], 02720[d], 02730[d], 02C00[d], 02C10[d], 02C20[d], 02C30[d]
CPT/HCPCS	33510, 33511, 33512, 33513, 33514, 33516, 33533, 33534, 33535, 33536, S2205, S2206, S2207, S2208, S2209
Heart valve repair/replacement procedures (inpatient procedure)	
ICD-9-CM PR	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
ICD-10-PCS[c]	027F, 027G, 027H, 027J, 02CF, 02CG, 02CH, 02CJ, 02NF, 02NG, 02NH, 02NJ, 02QF, 02QG, 02QH, 02QJ, 02RF, 02RG, 02RH, 02RJ, 02TH, 02UF, 02UG, 02UH, 02UJ, 02VG
CPT	33361-33366; 33390-33391; 33400-33401; 33403-33406; 33410-33418; 33420; 33422; 33425-33427; 33430; 33460; 33463-33465; 33468; 33470-33472; 33474-33478; 33863; 0345T; 0483T; 0544T; 0545T; 0569T

Table 2 (continued). Diagnosis and procedural codes used to identify cardiac rehabilitation QEs[a]

Main Surveillance (continued)	Diagnosis/Procedure codes
PCI (inpatient/outpatient procedure)[e]	
ICD-9-CM PR	00.66, 36.03, 36.04, 36.06, 36.07, 36.09
ICD-10-PCS	02703[d], 02704[d], 02713[d], 02714[d], 02723[d], 02724[d], 02733[d], 02734[d], 02C03[d], 02C04[d], 02C13[d], 02C14[d], 02C23[d], 02C24[d], 02C33[d], 02C34[d], 3E07017, 3E070PZ, 3E07317, 3E073PZ
CPT	92920, 92924, 92928, 92933, 92937, 92941, 92943, 92975
Heart or heart-lung transplant or VAD (inpatient procedure)	
ICD-9-CM PR	33.6, 37.51, 37.52, 37.53, 37.54
ICD-10-PCS	02YA0Z0, 02YA0Z1, 02YA0Z2, 02RK0JZ, 02RL0JZ, 02WA0JZ
CPT	33927, 33928, 33945, 0051T, 0052T, 0053T
Secondary Surveillance	**Diagnosis/Procedure codes**
Current stable[f] angina pectoris[g]	
ICD-9-CM DX	413.0, 413.1, 413.9
ICD-10-CM DX	I20.1, I20.8, I20.9
Stable[f] chronic heart failure[h] (diagnosis based[i])	
ICD-9-CM DX	428.22, 428.42
ICD-10-CM DX	I50.22, I50.42, I50.82

Table 2 (continued). Diagnosis and procedural codes used to identify cardiac rehabilitation QEs[a]

Secondary Surveillance (continued)	Diagnosis/Procedure codes
Stable[f] chronic heart failure[h] (procedure based[i])	
Implantable (intracorporeal) VAD insertion/replacement	
ICD-9-CM PR	37.66
ICD-10-PCS	02HA0QZ
CPT	33979
Bi-ventricular pacemaker insertion	
ICD-9-CM PR	00.50, 00.51, 00.53, 00.54
ICD-10-PCS	0JH609Z, 0JH639Z, 0JH809Z, 0JH839Z, 0JH607Z, 0JH637Z, 0JH807Z, 0JH837Z
CPT	33224, 33225

AMI, acute myocardial infarction; CABG, coronary artery bypass graft; CPT, Current Procedural Terminology; DX, diagnosis; HCPCS, Healthcare Common Procedure Coding System; ICD-9/-10-CM, International Classification of Diseases, 9th/10th edition, Clinical Modification; PCI, percutaneous coronary intervention; PCS, procedure coding system; PR, procedural; VAD, ventricular assist device; QE, qualifying event.

[a] ICD-9-CM codes were in effect until September 30, 2015, and ICD-10-CM codes were in effect as of October 1, 2015. Effective dates for ICD-9-CM, ICD-10-CM, and CPT codes may vary by year.
[b] Code first or second listed ICD-9/-10-CM diagnosis code.
[c] Includes all codes with these as the first 4 identifiers.
[d] Includes all codes with these as the first 5 identifiers.
[e] PCI includes percutaneous transluminal coronary angioplasty (PTCA) or coronary stenting and same-day discharge after an outpatient PCI.
[f] A stable condition is defined as no recent (≤6 weeks) or planned (≤6 months) major cardiovascular hospitalizations or procedures according to the Centers for Medicare & Medicaid Services.[2]
[g] ICD-9/-10-CM in any location on ≥2 outpatient claims in year 1 of the measurement period.[3]
[h] Chronic heart failure is defined as having a left ventricular ejection fraction (LVEF) ≤35% and New York Heart Association (NYHA) class II to IV, effective for claims on or after February 18, 2014, for Medicare fee-for-service beneficiaries.[2] The effective date will need to be determined for people on other health plans.
[i] ICD-9/-10-CM in any location.

Table 3. Cardiac rehabilitation surveillance table shell

	Total	**Eligible**		**Enrollment[a]**		**≥12 CR Sessions[b]**		**≥24 CR Sessions[b]**		**≥36 CR Sessions[b]**	
	N	N	%	N	%	N	%	N	%	N	%
Overall											
Age groups (years)											
18–44											
45–54											
55–64											
65–74											
75–84											
85+											
Sex											
Male											
Female											
Race and ethnicity											
Non-Hispanic White											
Non-Hispanic Black											
Hispanic											
Asian											
Other race/ethnicity											
Unknown											
Primary QE type											
AMI											
With no procedure											
With any procedure											
CABG											
With AMI											
No AMI											
Percutaneous coronary intervention											
With AMI											
No AMI											
Heart valve procedure											
With AMI											
No AMI											
Heart or heart-lung transplant											

Combination procedure											
With AMI											
No AMI											
CABG + heart valve[c]											
Secondary QE type[d]											
Stable angina											
Heart failure, overall											
Diagnosis based											
Procedure based											
Ventricular assist device insertion											
Bi-ventricular pacemaker insertion											

AMI, acute myocardial infarction; CABG, coronary artery bypass graft; CR, cardiac rehabilitation; QE, qualifying event.

[a] ≥1 CR session within 365 days of the CR QE index date.
[b] ≥12, ≥24, or ≥36 CR sessions within 365 days of the CR QE index date, among those enrolled in CR.
[c] Both procedures performed within 21 days of the initial QE with or without an AMI occurring.
[d] Excludes individuals who were eligible for CR based on conditions and events captured in the main CR surveillance.

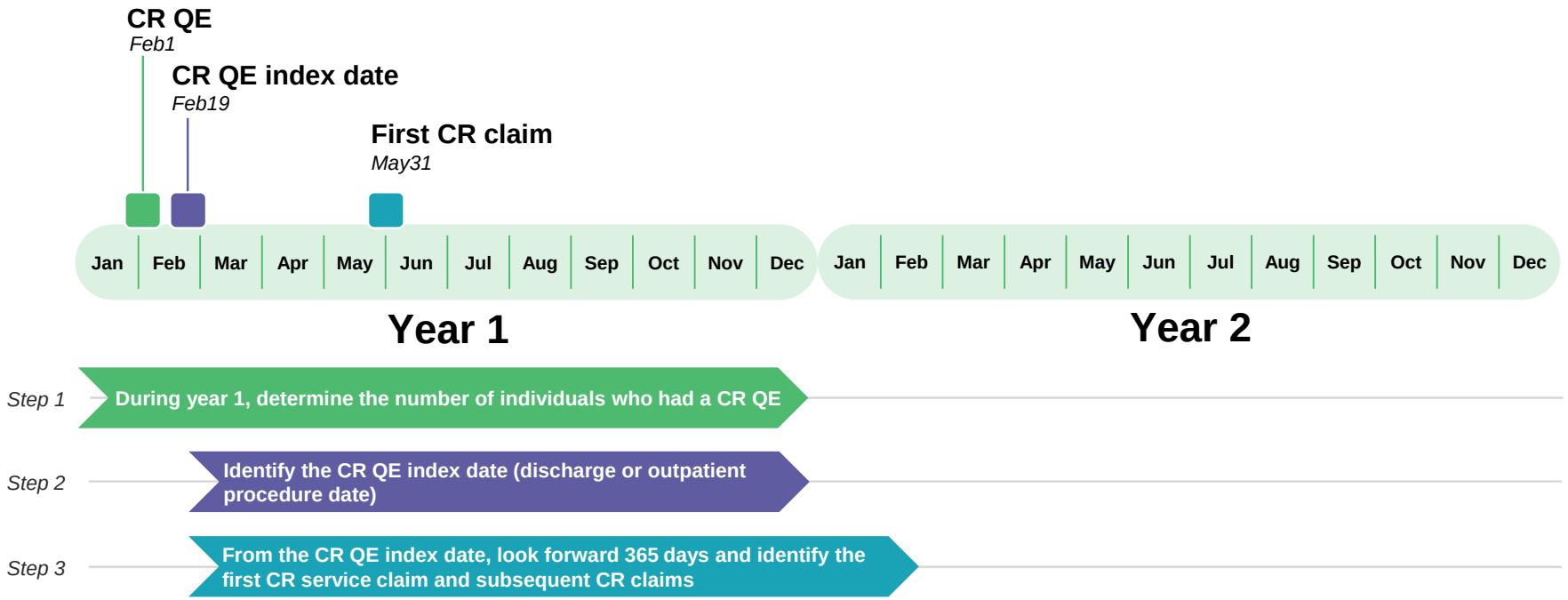
Appendix Table 1. Example value sets

ESRD[a]	
ICD-9-CM DX	585.5, 585.6, V42.0, V45.1, V56
ICD-10-CM DX	N18.5, N18.6, Z49, Z91.15, Z94.0, Z99.2
CVD-related claims[b]	
ICD-9-CM DX	390-434, 436-448
ICD-10-CM DX	I00-I78

CVD, cardiovascular disease; DX, diagnosis; ESRD, end stage renal disease; ICD-9/-10-CM, International Classification of Diseases, 9th/10th edition, Clinical Modification.

[a] Excludes people with Stage 5 chronic kidney disease or end stage renal disease.
[b] Use the first- or second-listed ICD-9/-10-CM diagnosis codes.

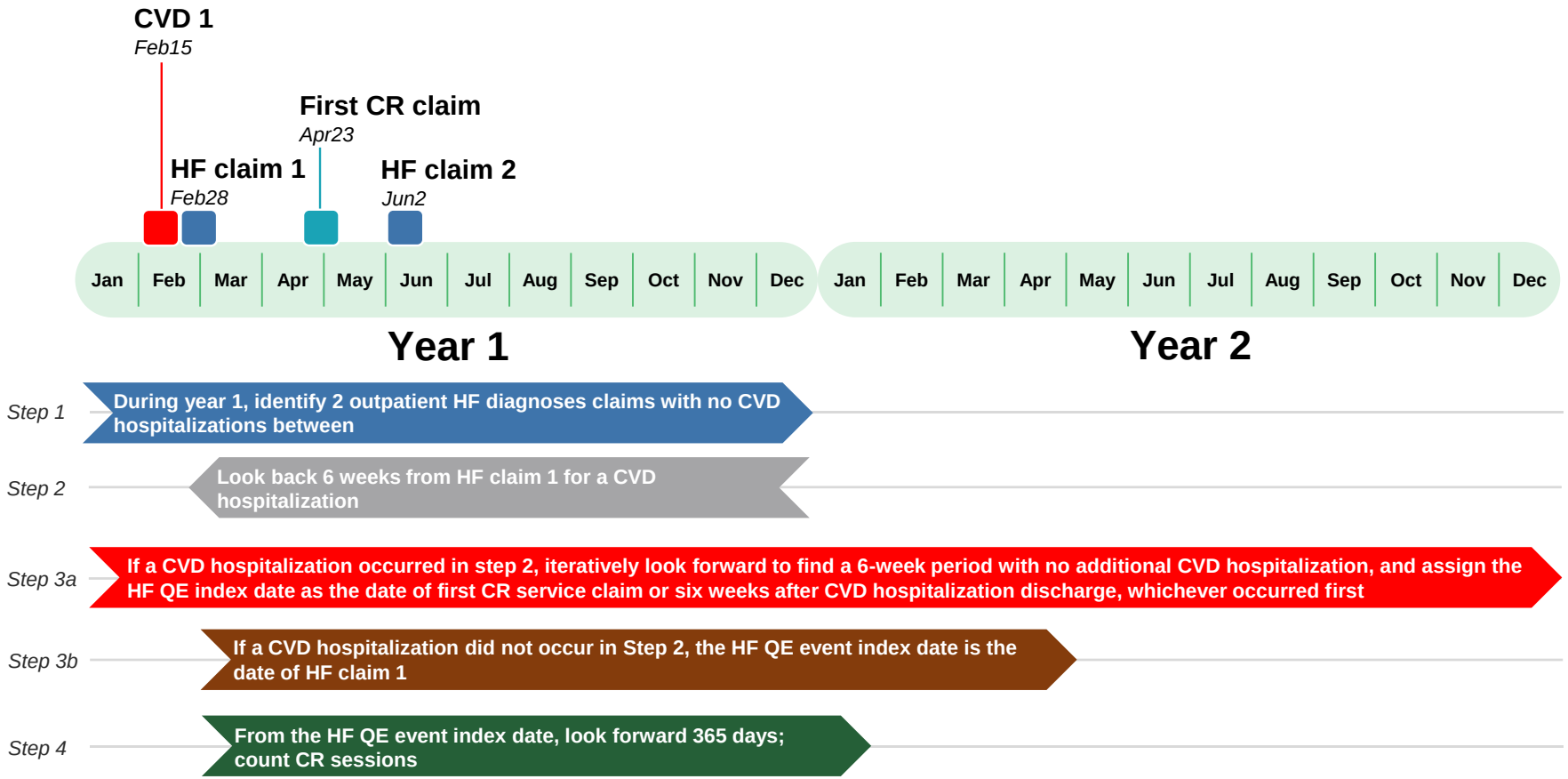
Appendix Figure 1. Main CR use surveillance



CR, cardiac rehabilitation; QE, qualifying event.

Appendix Figure 1 shows timelines and steps for main CR use surveillance.

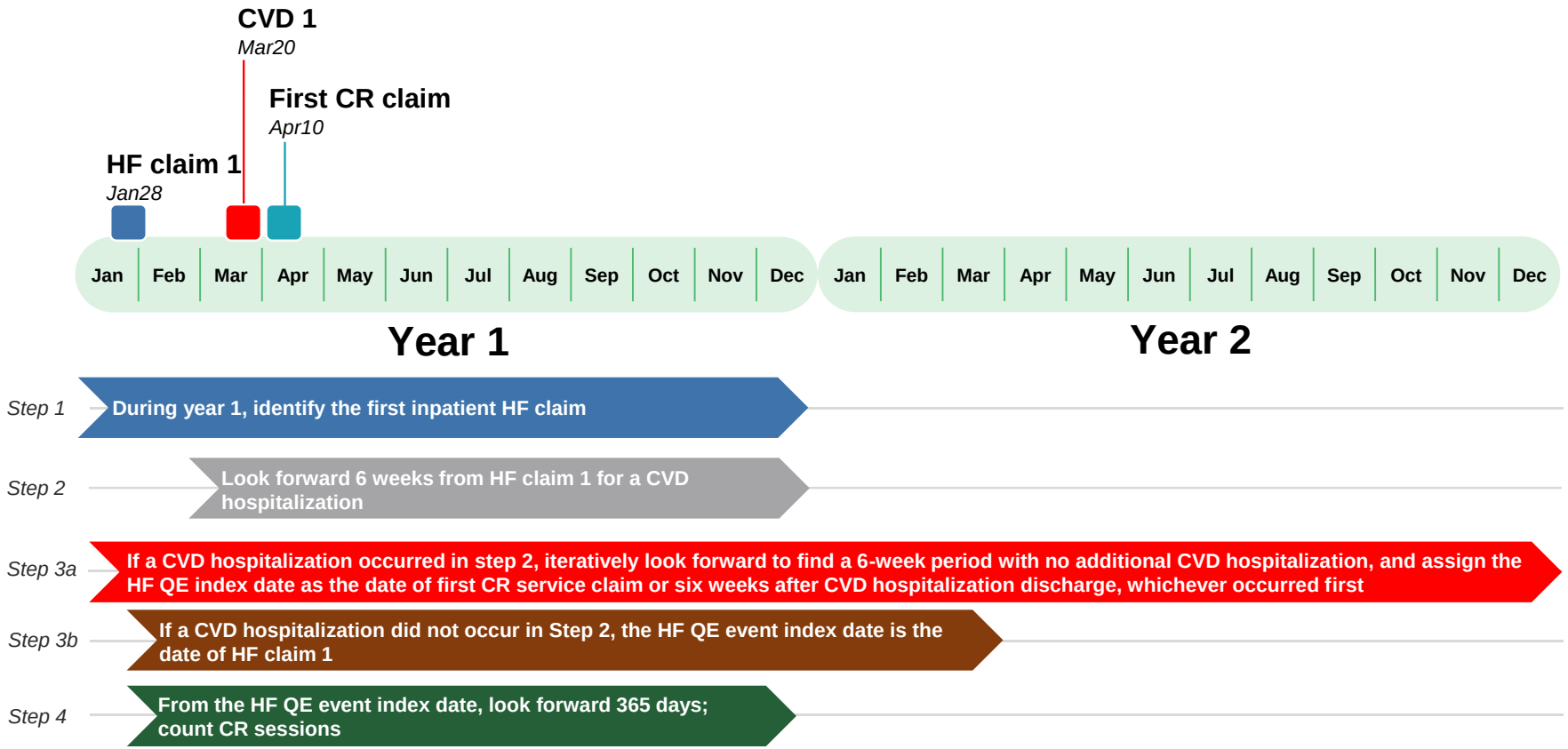
Appendix Figure 2. Stable, chronic HF CR use surveillance: outpatient visit methodology



CR, cardiac rehabilitation; CVD, cardiovascular disease; HF, heart failure; QE, qualifying event.

Appendix Figure 2 shows timelines and steps for stable chronic heart failure CR use surveillance for outpatient visits.

Appendix Figure 3. Stable, chronic HF CR use surveillance: inpatient and procedure-based methodology



CR, cardiac rehabilitation; CVD, cardiovascular disease; HF, heart failure; QE, qualifying event.

Appendix Figure 3 shows timelines and steps for stable chronic heart failure CR use surveillance for inpatient and procedure-based methodology.

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