2-8-2022

Tracking Cardiac Rehabilitation Utilization in Medicare Beneficiaries: 2017 UPDATE

Steven J. Keteyian
Henry Ford Health, SKeteyi1@hfhs.org

Sandra L. Jackson

Anping Chang

Clinton A. Brawner
Henry Ford Health, cbrawne1@hfhs.org

Hilary K. Wall

See next page for additional authors

Recommended Citation

Keteyian SJ, Jackson SL, Chang A, Brawner CA, Wall HK, Forman DE, Sukul D, Ritchey MD, and Sperling LS. Tracking Cardiac Rehabilitation Utilization in Medicare Beneficiaries: 2017 UPDATE. J Cardiopulm Rehabil Prev 2022.

Tracking Cardiac Rehabilitation Utilization in Medicare Beneficiaries

2017 UPDATE

Steven J. Keteyian, PhD; Sandra L. Jackson, PhD, MPH; Anping Chang, MPH, MS; Clinton A. Brawner, PhD; Hilary K. Wall, MPH; Daniel E. Forman, MD; Devraj Sukul, MD; Matthew D. Ritchey, DPT, PT, MPH; Laurence S. Sperling, MD

Purpose: This study updates cardiac rehabilitation (CR) utilization data in a cohort of Medicare beneficiaries hospitalized for CR-eligible events in 2017, including stratification by select patient demographics and state of residence.
Methods: We identified Medicare fee-for-service beneficiaries who experienced a CR-eligible event and assessed their CR participation (≥1 CR sessions in 365 d), engagement, and completion (≥36 sessions) rates through September 7, 2019. Measures were assessed overall, by beneficiary characteristics and state of residence, and by primary (myocardial infarction; coronary artery bypass surgery; heart valve repair/replacement; percutaneous coronary intervention; or heart/heart-lung transplant) and secondary (angina; heart failure) qualifying event type.
Results: In 2017, 412 080 Medicare beneficiaries had a primary CR-eligible event and 28.6% completed ≥1 session of CR within 365 d after discharge from a qualifying event. Among beneficiaries who completed ≥1 CR session, the mean total number of sessions was 25 ± 12 and 27.6% completed ≥36 sessions. Nebraska had the highest enrollment rate (56.1%), with four other states also achieving an enrollment rate >50% and 23 states falling below the overall rate for the United States.
Conclusions: The absolute enrollment, engagement, and program completion rates remain low among Medicare beneficiaries, indicating that many patients did not benefit or fully benefit from a class I guideline-recommended therapy. Additional research and continued widespread adoption of successful enrollment and engagement initiatives are needed, especially among identified populations.

Key Words: cardiac rehabilitation • Medicare • utilization

Author Affiliations: *Division of Cardiovascular Medicine, Henry Ford Health System, Detroit, Michigan (Drs Keteyian and Brawner); Centers for Disease Control and Prevention, Atlanta, Georgia (Drs Jackson, Ritchey, and Sperling, Mr Chang, and Ms Wall); Department of Public Health Sciences, Henry Ford Health System, Detroit, Michigan (Dr Brawner); Divisions of Geriatrics and Cardiology, University of Pittsburgh and the VA Pittsburgh GRECC, Pittsburgh, Pennsylvania (Dr Forman); Division of Cardiovascular Diseases, University of Michigan, Ann Arbor (Dr Sukul); and Center for Heart Disease Prevention, Emory University School of Medicine, Atlanta, Georgia (Dr Sperling).*

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.jcrpjournal.com).

The authors declare no conflicts of interest.

Correspondence: *Steven J. Keteyian, PhD, Division of Cardiovascular Medicine, Henry Ford Health System, 6525 Second Ave, Detroit, MI 48202 (sketeyi1@hfhs.org).*

DOI: 10.1097/HCR.0000000000000675

Exercise-based cardiac rehabilitation (CR) is an underutilized service with well-documented clinical and functional benefits for patients with cardiovascular disease.[1-4] To address this long-standing utilization gap, over the past decade several professional, governmental, and private organizations have adopted performance measures and developed strategies that target increasing enrollment, engagement, and completion of CR.[5-8] One such approach is Million Hearts, a national initiative co-led by the Centers for Disease Control and Prevention and the Centers for Medicare & Medicaid Services (CMS), with the goal of preventing 1 million acute cardiovascular events in 5 yr. In 2015, Million Hearts convened a CR Collaborative (Collaborative), a forum of multidisciplinary professionals, which included in its roadmap a goal to increase CR participation to 70% by 2022.[9,10]

We previously reported CR enrollment and engagement metrics in a cohort of Medicare fee-for-service (FFS) beneficiaries hospitalized in 2016 with a qualifying event,[11] representing an older adult patient group with multiple morbidities that are known to benefit from CR.[12,13] Using administrative claims, overall enrollment (ie, ≥1 CR visit in 1 yr) was 24.4%, which is generally consistent with other disease- and state-specific data.[14,15] Participation in CR varied based on age, race, sex, type of qualifying event, and geographic region.[11,14-22] That analysis, however, did not include patients who underwent an elective percutaneous coronary intervention (PCI) and were not hospitalized overnight (so-called "same-day discharge") or identify patients who underwent transcatheter aortic valve replacement (TAVR).

To assist with ongoing efforts to improve CR-related performance metrics and help monitor progress toward the goal of the Collaborative, this study updates CR utilization data in a cohort of Medicare beneficiaries hospitalized for CR-eligible events in 2017, including stratification by select patient demographics and state of residence. It also provides an updated methodology for using claims data that identifies TAVR and includes same-day PCI.

METHODS

The sample for this study included all US Medicare FFS beneficiaries aged ≥65 yr who had a CR qualifying event between January 1, 2017, and December 31, 2017. Data were derived from the CMS Virtual Research Data Center for Medicare Part A and Part B claims during 2017, 2018, and through September 7, 2019. In alignment with Medicare benefit guidance,[23,24] beneficiaries were considered eligible for outpatient CR if they experienced one or more of the following during 2017 (referred collectively as

primary qualifying events): hospitalization for acute myocardial infarction (MI); coronary artery bypass graft (CABG) surgery; heart valve repair or replacement; PCI; or heart or heart-lung transplant. Events were identified based on beneficary receipt of specified *International Classification of Diseases, Tenth Revision, Clinical Modification* (*ICD-10-CM*) diagnosis (first- or second-listed code) or procedural codes (any location) on inpatient claims or current procedural terminology (CPT) codes (any location) on outpatient or provider claims (see SDC 1, available at: http://links.lww.com/JCRP/A358). Unlike our prior article that only included patients who underwent a PCI as part of hospitalization,[11] the current analysis also includes patients who underwent a same-day discharge after an outpatient PCI procedure.

Beneficiaries without a primary qualifying event were also considered CR-eligible if they currently had documented stable angina pectoris or chronic heart failure (HF) during 2017 (referred to collectively as secondary qualifying events). Angina was defined as having a specified *ICD-10-CM* code (in any location) on ≥2 outpatient claims (see SDC 2, available at: http://links.lww.com/JCRP/A359). Heart failure was defined in two ways to match Medicare clinical eligibility criteria for CR.[24] Diagnosis-based HF was defined as having a specified *ICD-10-CM* code (any location) for systolic (or systolic/diastolic) HF only on ≥2 outpatient claims or an inpatient claim with no subsequent cardiovascular disease-related hospitalization occurring within 6 wk (see SDC 2, available at: http://links.lww.com/JCRP/A359). Procedure-based HF was defined as having a specified *ICD-10-CM* procedure code or CPT code in an inpatient or outpatient encounter for either insertion of an implantable ventricular assist device or biventricular pacemaker (see SDC 2, available at: http://links.lww.com/JCRP/A359).

STATISTICS

Data are described using standard statistical summary measures such as means ± SD for continuous variables and percentages for count data. To be included in the analyses, beneficiaries had to be alive for >21 d after their qualifying event; have continuous Medicare Part A and Part B enrollment for ≥12 mo after their qualifying event unless they died; not be a nursing home resident (defined as ≥90 consecutive d of skilled nursing facility care); not receive hospice care either before the qualifying event or for ≤21 d after discharge for the initial qualifying event; and not be entitled to Medicare benefits due to end-stage renal disease. Among beneficiaries with ≥1 primary qualifying event, the first event was considered the index event. Beneficiaries with multiple primary qualifying events occurring within 21 d were recoded as combinations (eg, MI with CABG). Additional steps were taken to identify the index date among beneficiaries meeting the angina and HF criteria (see SDC 1, available at: http://links.lww.com/JCRP/A358).

An outpatient CR session was defined as having a Healthcare Common Procedure Coding System code for physician services for outpatient CR with (93798) or without (93797) continuous electrocardiographic monitoring or intensive CR with or without continuous electrocardiographic monitoring and with (G0422) or without (G0423) exercise, in combination with a place of service code of 11 (office), 19 (off-campus outpatient hospital), or 22 (on-campus outpatient hospital).

Three CR utilization-related factors were assessed. First, enrollment/initiation rate, defined as the percentage of eligible beneficiaries who participated in CR, represents a CR-eligible beneficiary participating in ≥1 CR session within 21, 90, and 365 d after discharge from a qualifying event. The discharge date was defined as the latter of procedure date or the hospital discharge date that occurred during the 21-d period after the qualifying event. Timely initiation was defined as CR enrollment in ≤21 d after discharge for the qualifying event because it aligns with the definition of a quality measure endorsed by major societies.[5] Time to enrollment was expressed as the mean number of days from discharge date to date of CR enrollment. Second, among patients who attend ≥1 CR session in 365 d, engagement/participation describes the total number of CR sessions attended by the beneficiary within 36 wk of their first CR session and was expressed as both mean total sessions completed and percentage of patients completing ≥2, ≥12, and ≥24 sessions, all three of which align with the recently released Healthcare Effectiveness Data and Information Set (HEDIS) measures for CR.[7] Third, the achievement rate refers to the percentage of beneficiaries completing ≥36 CR sessions. Data pertinent to both engagement and completion of CR are expressed within 36 wk of their first CR session, which differs from the 90-d and 180-d periods identified by the HEDIS, because 36 wk is the period that Medicare will pay for standard CR once a patient has started.[23,24]

The above three CR utilization-related factors were also stratified by age, sex, race/ethnicity, dual Medicare and Medicaid coverage status, and primary state of residence of the beneficiary. This research was considered exempt from Institutional Review Board review under 45 Code of Federal Regulations 46.101[b] [5], which covers Department of Health and Human Services research and demonstration projects, which are designed to study, evaluate, or examine public benefit or service programs.

RESULTS

In 2017, 412080 Medicare beneficiaries (76.5 ± 7.6 yr, 59.7% men, 86.3% non-Hispanic White) had a primary CR-eligible event (Table 1), among whom 117 794 (28.6%) completed ≥1 session of CR within 365 d. Enrollment rates were 31.9% in men versus 23.7% in women and 30% in non-Hispanic Whites versus 17.3% in non-Hispanic Blacks. Overall, the mean elapsed time between hospital discharge and first CR session averaged between 39 and 67 d, across age, sex, race, and primary qualifying event. Among beneficiaries with ≥1 CR visit within 365 d, 35.3% started within 21 d (data not shown in table).

Several levels of engagement in CR, as measured over 36 wk after initiation, are also described in Table 1. The mean and the median (data not shown in table) total number of visits for all patients who completed ≥1 session were 25 ± 12 sessions and 29 (IQR: 15, 36), respectively. Among beneficiaries who completed ≥1 CR session, the overall percentage that completed 36 sessions was generally between 25-30% (mean = 27.6%), irrespective of age, race, and sex.

Table 2 provides the same information about enrollment, engagement, and completion of CR for beneficiaries with a secondary qualifying event of angina or HF. Enrollment in CR, defined as ≥1 session in 365 d, was 3.9% for angina and 2.6% for HF. Among beneficiaries having received a left ventricular assist device, enrollment, engagement, and completion of CR were 44.3%, a mean of 27 sessions, and 31.4%, respectively.

Table 3 stratifies enrollment, engagement, and completion data for CR by each state. The Figure presents the CR enrollment rate for each state, compared with the overall rate for the United States of 28.6%. Nebraska had an

Table 1

Cardiac Rehabilitation Enrollment, Engagement, and Completion Among Medicare Beneficiaries Aged ≥65 yr Who Had a Primary Qualifying Event in 2017[a]

		Enrollment/Initiation				Engagement/Participation[b]				Completion/ Achievement[b]
	Eligible N	≥1 Session in ≤21 d[c]	≥1 Session in ≤90 d[c]	≥1 Session in ≤365 d[c]	Number of Days From Discharge to First Billed CR Session[b]	Number of Sessions in 36 wk	≥2 Sessions in 36 wk	≥12 Sessions in 36 wk	≥24 Sessions in 36 wk	≥36 Sessions in 36 wk
Total	412 080	10.1	25.4	28.6	45 ± 52	25 ± 12	96.1	80.4	60.1	27.6
Age, yr										
65-74	198 228	12.3	30.7	34.3	44 ± 51	25 ± 12	96.2	80.7	60.1	27.8
75-84	150 026	9.7	24.5	27.8	46 ± 53	25 ± 12	96.1	80.7	61.0	28.0
≥85	63 826	4.2	10.9	12.6	49 ± 54	23 ± 13	94.8	76.1	55.1	24.5
Sex										
Male	246 073	11.6	28.5	31.9	44 ± 51	26 ± 12	96.3	82.0	62.0	29.0
Female	166 007	7.8	20.7	23.7	48 ± 53	24 ± 13	95.7	77.2	56.2	24.9
Race/ethnicity[d]										
Non-Hispanic White	355 480	10.7	26.1	30.0	45 ± 52	25 ± 12	96.1	80.6	60.0	27.7
Non-Hispanic Black	22 305	4.5	14.5	17.3	55 ± 60	25 ± 13	95.6	78.6	61.7	29.2
Hispanic	17 014	4.9	13.8	16.0	51 ± 57	24 ± 13	94.3	75.8	57.8	25.1
Asian	7 660	5.0	16.3	18.9	52 ± 55	24 ± 12	96.0	79.7	59.3	25.6
Dual Medicare/Medicaid coverage[e]										
No	374 619	10.8	27.1	30.5	45 ± 52	25 ± 12	96.3	81.0	60.6	27.9
Yes	37 461	2.8	7.6	9.2	55 ± 64	19 ± 14	90.0	62.4	42.5	17.8
Primary qualifying event[f]										
AMI	196 259	7.3	17.7	20.2	47 ± 55	25 ± 12	96.8	80.6	60.5	27.7
With procedure	88 019	14.1	33.6	37.1	42 ± 47	25 ± 12	97.1	81.3	61.3	28.4
No procedure	108 240	1.8	4.9	6.5	67 ± 76	24 ± 13	95.4	76.9	56.7	24.7
CABG	42 225	20.5	52.5	57.0	40 ± 41	26 ± 12	98.1	85.1	65.3	30.3
With AMI	13 165	20.1	46.9	51.2	39 ± 42	26 ± 12	97.8	84.1	64.3	30.2
No AMI	29 060	20.7	55.0	59.6	40 ± 41	27 ± 11	98.2	85.5	65.7	30.4

(*continues*)

Table 1

Cardiac Rehabilitation Enrollment, Engagement, and Completion Among Medicare Beneficiaries Aged ≥65 yr Who Had a Primary Qualifying Event in 2017[a] (*Continued*)

		Enrollment/Initiation				Engagement/Participation[b]				Completion/ Achievement[b]
	Eligible N	≥1 Session in ≤21 d[c]	≥1 Session in ≤90 d[c]	≥1 Session in ≤365 d[c]	Number of Days From Discharge to First Billed CR Session[b]	Number of Sessions in 36 wk	≥2 Sessions in 36 wk	≥12 Sessions in 36 wk	≥24 Sessions in 36 wk	≥36 Sessions in 36 wk
PCI	201 614	11.4	27.1	30.6	45 ± 54	24 ± 13	94.8	78.0	57.7	26.9
With AMI	70 703	12.8	30.8	34.1	43 ± 49	25 ± 13	96.9	80.4	60.2	27.7
No MI	130 911	10.6	25.2	28.8	47 ± 57	24 ± 13	93.5	76.5	56.2	26.3
Heart valve	44 097	11.7	33.9	38.0	46 ± 46	25 ± 12	97.3	81.5	60.4	26.2
With AMI	820	8.5	21.2	25.9	51 ± 53	25 ± 12	96.2	79.3	60.9	24.5
No AMI	43 277	11.7	34.2	38.2	46 ± 46	25 ± 12	97.3	81.6	60.4	26.2
TAVR only	21 738	8.6	26.4	29.7	48 ± 47	24 ± 12	96.3	77.1	55.4	23.8
Heart transplant	430[g]	10.2	28.6	37.2	61 ± 58	27 ± 11	97.5	84.4	70.0	27.5
Combination procedure	15 474	18.2	47.3	52.0	42 ± 44	26 ± 12	97.8	85.5	64.7	30.8
With AMI	3 327	18.7	43.3	48.2	42 ± 46	26 ± 12	97.6	84.6	64.8	30.9
No AMI	12 147	18.1	48.4	53.1	43 ± 43	27 ± 12	97.8	85.7	64.6	30.8
CABG and heart valve[h]	10 219	19.4	50.8	55.8	42 ± 44	27 ± 11	97.8	86.2	65.3	31.4

Abbreviations: AMI, acute myocardial infarction; CABG, coronary artery bypass surgery; CR, cardiac rehabilitation; PCI, percutaneous coronary intervention; TAVR, transcatheter aortic valve replacement/repair.

[a]Data presented as mean ± SD or %,

[b]Among all beneficiaries with at least one CR session.

[c]Among all eligible beneficiaries.

[d]Unknown and "other" race/ethnicity groups not shown.

[e]Dual eligible only includes those age ≥65 yr, per overall inclusion criteria.

[f]Eligible conditions/procedures that occurred in combination had to occur within 21 d of each other.

[g]Four heart transplants occurred with an AMI.

[h]Both a CABG and a heart valve procedure were performed within the first 21 d of the initial qualifying event with or without an AMI occurring.

Table 2

Cardiac Rehabilitation Enrollment, Engagement, and Completion Among Medicare Beneficiaries Aged ≥65 yr Who Had a Secondary Qualifying Event in 2017[a]

		Enrollment/Initiation				Engagement/Participation[c]				Completion/Achievement[c]
	Eligible, n	≥1 Session in ≤21 d[b]	≥1 Session in ≤90 d[b]	≥1 Session in ≤365 d[b]	Number of Days From Discharge to First Billed CR Session[c]	Number of Sessions in 36 wk	≥2 Sessions in 36 wk	≥12 Sessions in 36 wk	≥24 Sessions in 36 wk	≥36 Sessions in 36 wk
Stable angina	158 453	2.6	3.2	3.9	…	24 ± 12	96.6	78.9	54.1	22.5
Heart failure	397 314	1.3	1.7	2.6	…	22 ± 13	94.4	72.8	51	20.1
Diagnosis based	380 868	1.2	1.6	2.5	…	22 ± 13	94.3	72.5	50.3	19.7
Procedure based	16 446	2.5	3.6	5.1	67 ± 98	24 ± 13	95.1	75.7	58.2	24.0
VAD	158	26.6	35.4	44.3	42 ± 67	27 ± 12	95.7	82.9	68.6	31.4
BiV pacemaker	16 288	2.3	3.3	4.7	70 ± 100	24 ± 13	95.0	75.0	57.2	23.3

Abbreviations: BiV, biventricular; CR, cardiac rehabilitation; VAD, ventricular assist device.
[a]Data presented as mean ± SD or %.
[b]Among all eligible beneficiaries.
[c]Among all beneficiaries with ≥1 CR session.

enrollment at 56.1%, with four other states (Iowa, Minnesota, South Dakota, and Wisconsin) achieving an enrollment rate above 50% and 23 other states falling below the overall rate for the United States.

The 2020 CR-specific HEDIS measures applied to beneficiaries who had a primary qualifying event are shown in Table 4. Initiation, defined as ≥2 sessions in 30 d, was 11.8%; engagement in ≥12 sessions in 90 d was 58.0%; engagement in ≥24 sessions in 180 d was 53.5%; and achievement of ≥36 sessions in 180 d was 21.5%.

DISCUSSION

In a large national cohort of demographically and clinically diverse Medicare FFS beneficiaries eligible for CR following a primary qualifying event, we found that overall CR utilization within 1 yr remains alarmingly low in the United States at 28.6% (goal = 70%). Enrollment in CR was highest among those with CABG and no MI (59.6%) and lowest among patients with an MI and no revascularization procedure (6.5%). Additionally, among patients who enroll in CR, both the average number of sessions completed in 36 wk (actual = 25 sessions; goal = 36 sessions) and the percentage of patients completing ≥36 sessions of CR (27.6%) were less than optimal.[5,9] Low enrollment rates were observed for both chronic stable angina and HF at 3.9% and 2.6%, respectively, and there is considerable state-level variation for several of the key metrics that pertain to CR enrollment, engagement, and completion. Finally, to our knowledge, this study is the first to report national-level data for CR utilization among older adults undergoing TAVR, with enrollment at 29.7% (Table 1).

Although the methodology we used in this study differed slightly from our prior article involving Medicare beneficiaries hospitalized in 2016,[11] in that we now include beneficiaries who underwent a same-day discharge after an outpatient PCI procedure, the analyses performed are generally comparable. The 28.6% enrollment rate into CR for beneficiaries hospitalized in 2017 with a primary qualifying event is higher than the 24.4% rate we previously reported for 2016[11] and may be due, in part, to the many strategies that are being implemented at the state, federal, and organizational levels to improve CR enrollment in the United States.[6,8,25,26]

Although the enrollment rate in 2017 is higher (than in 2016), it is important to point out that this rate of 28.6% remains suboptimal. Specifically, hundreds of thousands of CR-eligible Medicare beneficiaries in 2017 did not initiate CR, a class I guideline-recommended secondary prevention therapy,[27-32] and tens of thousands more may have received a suboptimal dose (ie, mean number of sessions completed was 25 and only 27.6% completed 36 sessions).[33-36] Additional research is needed to (*a*) improve attendance in CR[37] and (*b*) describe the dose-response relationship across various age groups and subpopulations. Also, state-level enrollment rates for CR varied substantially (range: Nebraska = 56.1%, Hawaii = 9.4%) (Figure), likely influenced by the availability and capacity of CR programs in each state (so-called CR deserts).[10] Also, further research is needed to elucidate the factors and practices that enhance CR utilization at the state level, and as these are identified in higher performing states, they can then be disseminated for implementation in other states.

For example, in the state of Michigan, the Blue Cross Blue Shield of Michigan Cardiovascular Consortium (BMC2),[38] regularly brings together CR professionals, cardiologists, and hospital clinical quality personnel and administrators, to discuss common challenges and share best practices to

Table 3

Cardiac Rehabilitation Enrollment, Engagement, and Completion Among Medicare Beneficiaries Sorted by State for People Aged ≥65 yr Who Had a Primary Qualifying Event in 2017[a]

		Enrollment/Initiation				Engagement/Participation[c]				Completion/ Achievement[c]
	Eligible, n	≥1 Session in ≤21 d[b]	≥1 Session in ≤90 d[b]	≥1 Session in ≤365 d[b]	Number of Days From Discharge to First Billed CR Session[c]	Number of Sessions in 36 wk	≥2 Sessions in 36 wk	≥12 Sessions in 36 wk	≥24 Sessions in 36 wk	≥36 Sessions in 36 wk
Alabama	7932	4.6	13.8	16.2	53 ± 60	25 ± 13	97.4	78.7	59.3	31.2
Alaska	906	6.6	18.7	23.2	59 ± 63	25 ± 13	93.8	79.5	60.0	33.8
Arizona	8201	6.6	24.8	28.1	50 ± 51	24 ± 12	96.8	79.8	58.7	19.0
Arkansas	7759	7.6	16.7	19.3	48 ± 64	25 ± 13	95.9	80.0	59.2	32.5
California	29205	4.1	16.1	19.3	58 ± 57	25 ± 13	95.8	79.8	63.8	26.7
Colorado	3802	22.4	43.6	46.8	36 ± 45	25 ± 12	97.4	80.2	58.6	27.5
Connecticut	3979	8.1	28.4	32.3	48 ± 45	28 ± 12	96.7	83.9	70.6	41.1
Delaware	1723	12.4	33.4	39.4	51 ± 52	25 ± 12	97.5	82.2	58.1	23.5
Florida	31288	6.8	19.4	22.6	51 ± 60	24 ± 12	92.8	75.6	55.8	25.6
Georgia	10939	6.6	22.5	26.0	52 ± 53	25 ± 13	95.5	77.5	62.0	33.3
Hawaii	955	2.0	7.6	9.4	62 ± 73	17 ± 10	95.6	66.7	20.0	3.3
Idaho	1951	15.3	28.8	31.6	39 ± 51	26 ± 13	97.1	79.9	62.7	41.3
Illinois	18084	14.3	35.8	39.8	43 ± 48	26 ± 12	94.6	82.5	67.6	30.4
Indiana	10283	18.2	36.2	39.0	35 ± 45	23 ± 12	94.0	80.4	53.4	23.7
Iowa	5883	35.3	52.9	55.3	26 ± 38	21 ± 12	96.3	78.9	41.8	15.4
Kansas	6003	19.4	34.4	37.1	34 ± 45	26 ± 12	98.1	83.3	62.6	35.1
Kentucky	7482	7.2	22.0	24.4	45 ± 47	25 ± 13	97.6	79.7	60.7	30.2
Louisiana	6661	7.5	16.2	18.5	47 ± 60	26 ± 13	96.3	80.9	64.6	35.8
Maine	2355	11.9	26.5	30.2	44 ± 52	23 ± 12	96.9	79.7	54.9	17.2
Maryland	7896	5.1	23.7	27.6	54 ± 51	27 ± 12	96.9	83.7	67.4	35.9
Massachusetts	9684	7.2	21.0	26.0	58 ± 60	23 ± 12	95.4	80.6	53.6	19.5
Michigan	15534	10.0	26.8	30.2	47 ± 52	23 ± 12	97.4	78.4	53.4	22.3
Minnesota	3541	36.4	49.6	51.7	25 ± 40	22 ± 12	95.1	74.9	46.3	15.5
Mississippi	5725	6.5	18.8	20.7	43 ± 52	23 ± 12	97.9	79.5	52.2	21.3
Missouri	9345	15.9	35.7	39.0	40 ± 48.6	27 ± 13	96.3	81.4	65.8	36.6
Montana	1941	19.9	41.4	45.4	39 ± 49	24 ± 13	96.4	77.6	55.8	22.9

(*continues*)

Table 3

Cardiac Rehabilitation Enrollment, Engagement, and Completion Among Medicare Beneficiaries Sorted by State for People Aged ≥65 yr Who Had a Primary Qualifying Event in 2017[a] (*Continued*)

		Enrollment/Initiation				Engagement/Participation[c]				Completion/ Achievement[c]
	Eligible, n	≥1 Session in ≤21 d[b]	≥1 Session in ≤90 d[b]	≥1 Session in ≤365 d[b]	Number of Days From Discharge to First Billed CR Session[c]	Number of Sessions in 36 wk	≥2 Sessions in 36 wk	≥12 Sessions in 36 wk	≥24 Sessions in 36 wk	≥36 Sessions in 36 wk
Nebraska	3251	36.9	53.9	56.1	25 ± 34	24 ± 11	98.6	84.4	53.0	20.8
Nevada	2909	5.0	15.5	17.7	50 ± 56	24 ± 13	94.4	78.7	59.3	34.3
New Hampshire	2522	13.7	33.5	37.2	42 ± 46	21 ± 11	95.6	78.3	40.4	11.4
New Jersey	14929	4.3	19.9	24.1	60 ± 57	27 ± 11	97.4	84.9	69.4	26.4
New Mexico	2453	6.4	16.6	18.6	46 ± 57	26 ± 13	95.0	80.4	66.2	28.8
New York	21859	2.1	11.6	15.4	69 ± 60	26 ± 12	97.4	82.0	65.4	31.1
North Carolina	12952	6.8	25.9	29.7	53 ± 51	27 ± 12	97.7	85.1	66.8	35.3
North Dakota	1352	29.4	44.9	47.6	28 ± 39	21 ± 13	92.4	73.6	45.4	22.7
Ohio	16025	9.6	28.2	31.5	46 ± 49	26 ± 12	97.7	83.4	65.8	27.7
Oklahoma	8187	10.7	23.0	25.7	42 ± 54	26 ± 13	96.3	81.1	65.9	32.6
Oregon	4081	11.8	32.8	37.2	47 ± 52	21 ± 13	93.5	70.9	47.5	15.7
Pennsylvania	17217	8.9	24.7	27.9	46 ± 51	25 ± 11	98.2	83.5	59.1	22.2
Rhode Island	1376	5.7	20.4	23.8	54 ± 53	26 ± 12	95.4	82.6	64.6	25.0
South Carolina	7850	9.8	33.4	37.1	46 ± 46	27 ± 12	97.7	85.3	68.0	34.7
South Dakota	1601	40.7	52.9	55.1	24 ± 42	23 ± 13	95.5	77.4	52.0	21.5
Tennessee	10125	8.1	24.7	27.2	45 ± 49	27 ± 12	97.5	82.9	67.3	41.1
Texas	27045	10.4	23.6	26.1	42 ± 52	25 ± 13	93.6	78.2	61.9	30.0
Utah	2202	31.2	38.9	40.4	21 ± 39	18 ± 14	90.0	61.0	37.9	16.6
Vermont	1493	10.6	32.9	36.4	45 ± 46	25 ± 12	97.8	83.6	61.3	26.7
Virginia	11680	8.0	27.3	31.0	50 ± 54	26 ± 12	97.3	83.3	60.8	28.2
Washington	8378	6.7	25.3	29.0	52 ± 53	25 ± 13	95.4	79.7	61.6	26.9
West Virginia	4407	5.2	15.5	17.9	51 ± 55	26 ± 12	98.0	80.5	65.3	31.3
Wisconsin	6948	34.8	41.5	53.6	26 ± 37	24 ± 13	96.7	78.5	56.0	25.6
Wyoming	1071	22.1	38.1	40.7	32 ± 40	22 ± 13	95.9	76.2	46.1	24.3

Abbreviation: CR, cardiac rehabilitation.

[a]Data presented as mean ± SD or %.

[b]Among all eligible beneficiaries.

[c]Among all beneficiaries with ≥1 CR session.

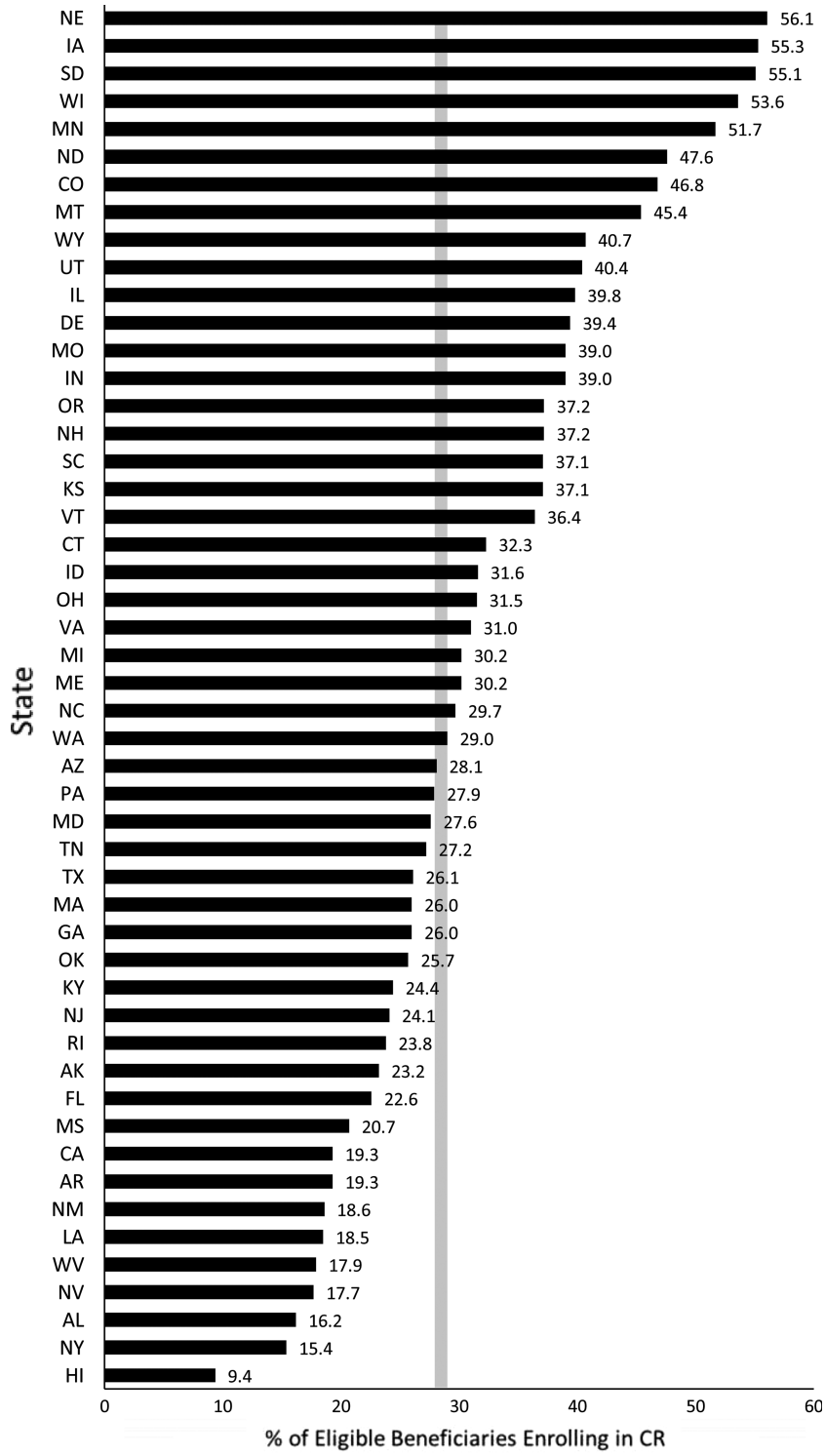

Figure. The percentage of CR-eligible Medicare beneficiaries hospitalized in 2017 in each state who completed ≥1 CR session within 365 d after experiencing a primary qualifying event. The vertical line indicates the overall enrollment rate of 28.6% for all CR-eligible Medicare beneficiaries in the United States in 2017. CR, cardiac rehabilitation.

improve CR utilization throughout the state.[39] The BMC2 works closely with the Michigan Value Collaborative,[40,41] a quality improvement program that uses administrative claims to support high-value health care, to provide individual hospitals and providers with site-specific CR utilization reports for their patients with CR qualifying events. The BMC2 consortium not only allows hospitals and providers to identify opportunities for improvement, but also provides a forum to discuss and rapidly disseminate CR-specific information pertaining to best practices and pertinent policies.[42] Started in 2019, the effect of the BMC2 consortium on improving CR utilization is yet to be quantified; however, it represents a coalition model that other states could duplicate using state-level cardiology and CR societies.

Table 4

Among All Eligible Beneficiaries Who Had a Primary Qualifying Event in 2017, a Summary of Cardiac Rehabilitation Utilization Rates According to the Measures Specified in the 2020 Healthcare Effectiveness Data and Information Set[a]

		Initiation	Engagement		Achievement
	Eligible, n	≥2 Sessions in 30 d	≥12 Sessions in 90 d	≥ 24 Sessions in 180 d	≥36 Sessions in 180 d
Total	412 080	11.8	58.0	53.5	21.5
Sex					
Male	246 073	13.7	60.8	55.7	23.0
Female	166 007	9.1	52.4	49.1	18.4
Race/ethnicity[b]					
Non-Hispanic White	355 480	12.6	58.6	53.6	21.6
Non-Hispanic Black	22 305	5.6	48.8	52.3	21.6
Hispanic	17 014	5.6	50.6	50.1	17.7
Asian	7 660	6.0	51.3	51.6	18.7

[a]Data presented as %.

[b]"Other" race/ethnicity groups not shown.

To assist with meaningful improvements in the CR enrollment and completion rates, changes in both delivery model and reimbursement structure may be needed. One such initiative that is currently experiencing strong momentum worldwide, due partly to the pandemic and its effect on outpatient services at large,[43] is the use of hybrid CR.[26,44-46] This model combines a patient-tailored number of facility-based CR sessions with remote, audiovisual synchronized (real-time) and virtually supervised exercise sessions; asynchronous patient contact via telephone or another technology platform may also be included.[4,26,47-50] This approach strives to enroll and engage those patients who are limited in their ability to access facility-based CR due to dependent care duties, concerns associated with exercising in-person or with others, transportation issues, conflicts with program-specified hours of operation, and return to work obligations.[10,51-53]

Another strategy or project targeting improved utilization of CR is TAKEheart, funded by the Agency for Healthcare Research and Quality.[54] This nationwide program involves clinical teams/learning communities that strive to achieve its goals through provider site training, awareness, and engagement. TAKEheart targets improving referrals and enrollment in CR, and focuses on CR processes such as decreasing the time between hospital discharge and first visit in CR. Regarding the latter, our current data show an average of 45 d between discharge after a primary qualifying event and first CR visit, which is more than twice the recommended quality measure of ≤21 d.[5] Striving to achieve CR initiation within 21 d is important because there is an approximately 1% decrease in CR enrollment for each day that passes after hospital discharge.[55,56] Process improvement strategies used to decrease discharge-to-start time might include incorporating an opt-out automatic referral to CR as part of a hospital discharge order set[25] and having a CR liaison meet with eligible patients prior to hospital discharge to discuss CR and schedule their first outpatient CR appointment.[6]

Based on our data, CR is particularly underutilized in several populations. Specifically, low levels of enrollment were identified for non-Hispanic Blacks (17.3%), Hispanics (16.0%), persons ≥85 yr (12.6%), women (23.7%), and those with angina (3.9%) or HF (2.6%). Feasible population-specific strategies and additional timely research are needed to improve CR utilization and completion among these groups.[37,57-59] Older adults may have distinctive challenges due to frailty, multimorbidity, cognitive decline, and other complexities associated with old age.[12] Finally, we concur with the recent call-to-action that "clinicians, health care leaders, and payers should prioritize incorporating CR as part of the standard of care for patients with HF."[27]

In 2016, we estimated the total costs for CR at $227.6 million, which was based on an average outpatient payment of $103/session and included the out-of-pocket costs paid by beneficiaries and supplemental insurance payments.[11] For 2017, using an outpatient payment of $109/session, we estimate total costs for CR to be $320.1 million, with the majority of the increase in 2017 due to our inclusion of patients who underwent a same-day discharge after an outpatient PCI procedure. The CR-related out-of-pocket costs (ie, co-payment) paid by beneficiaries are known to influence program adherence.[60]

The major strength of this study is that it assessed contemporary CR utilization data among Medicare FFS beneficiaries age ≥65 yr. As a result, we provide evidence that can be used to help guide health policy, clinical practice pathways, and research directions for a defined and large cohort of patients in whom coronary heart disease and HF are highly prevalent—a cohort associated with increased risk for mortality and multiple morbidities (eg, frequent hospitalizations, reduced exercise capacity and quality of life) and well positioned to benefit from CR.[12,13] However, these findings may not be generalizable to younger patients who likely have different CR use rates and/or are covered by other health insurance plans.

Regarding limitations, the administrative claims-based definitions used have not been validated through chart review for coding errors or definitions for qualifying events, the latter most likely having its effect on the definitions used for identifying eligible beneficiaries with HF status. Also, despite our exclusion criteria, we were likely unable to exclude all beneficiaries for whom CR is not appropriate, and as a result, our enrollment rates may be underestimated.

CONCLUSIONS

Among Medicare FFS beneficiaries eligible for CR in 2017, enrollment, engagement, and completion remained low at

28.6%, 25 average sessions completed, and 27.6%, respectively. This data indicates that many patients eligible for CR in 2017 did not benefit or fully benefit from a class I guideline-recommended secondary prevention therapy. Continued and more widespread dissemination and adoption of existing successful initiatives, novel strategies, and additional research that targets improved enrollment and engagement is needed, especially among identified populations.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the contributions of Thomas Schaffer, MHS, and Jess McNeely, PhD, from the Centers for Medicare & Medicaid Services for their assistance with the development of the original Million Hearts cardiac rehabilitation surveillance framework and analysis coding used in this project.

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